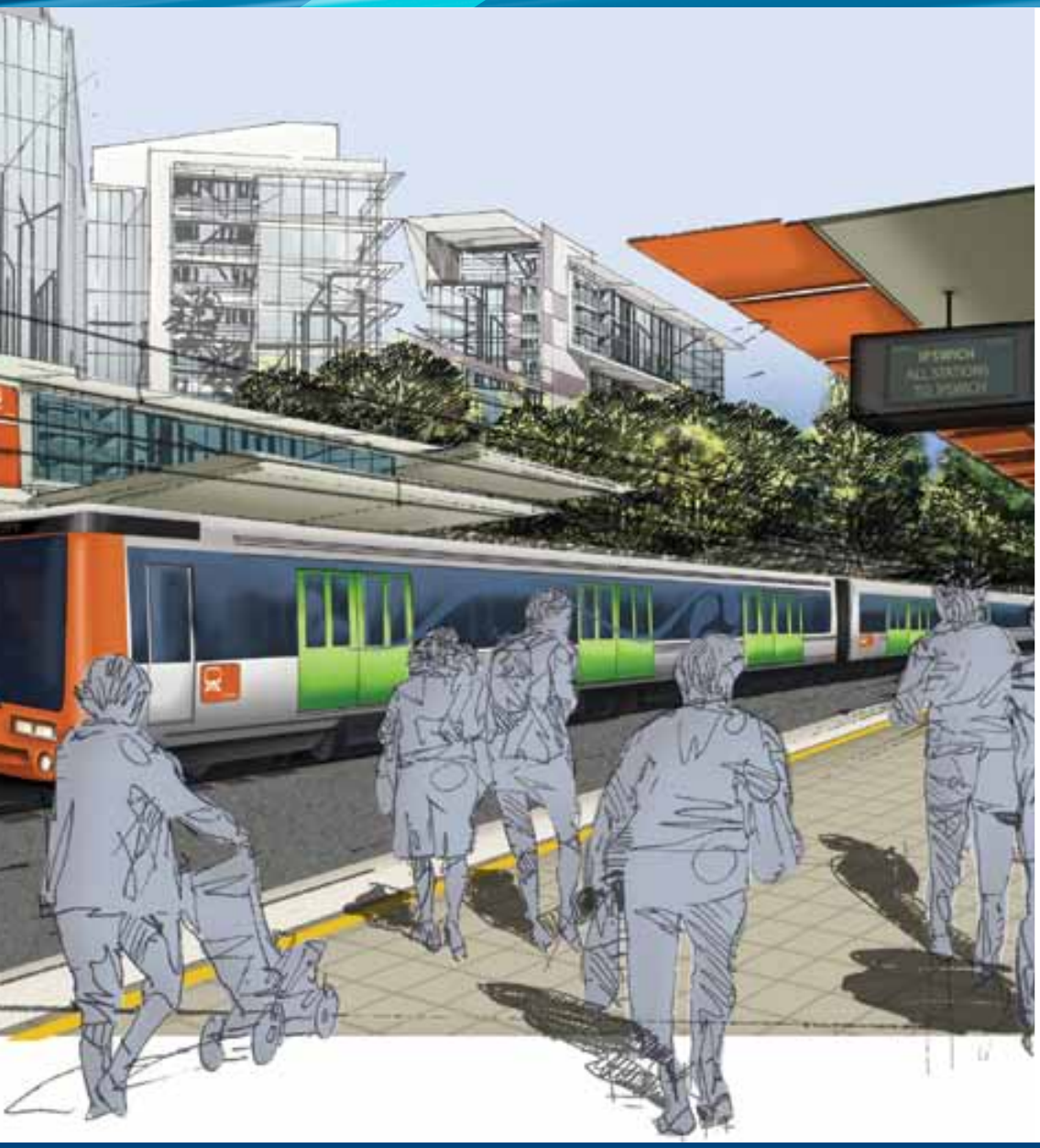
connect west consortium



Western Brisbane

Transport Network Investigation
Basis of Strategy Report

May 2009

Queensland Government

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Department of Transport and Main Roads, *Basis of Strategy Report*, 2009
This is a Queensland Government study

Foreword

The 2005–2026 South East Queensland Regional Plan (The Regional Plan) is a statutory plan to manage growth and development in South East Queensland to 2026. South East Queensland's population is forecast to increase to around 4 million by 2026, an increase of more than 1 million.

The Regional Plan recommended the Western Brisbane Transport Network Investigation as an important project for western Brisbane and the region as a whole. Its aim was to plan for the impacts this growth may have on the western Brisbane transport network.

This report has been prepared by the Connect West team and summarises the findings and the assessment of that investigation into the western Brisbane transport network. It is the basis of the Preferred Network Strategy that was considered by The Department of Transport and Main Roads and the Queensland Government.

The contents of the Basis of Strategy Report do not necessarily align with the views of The Department of Transport and Main Roads nor do they represent government policy.

The Investigation looked to the future to develop the Preferred Strategy advice. It purposely addressed uncertainties, such as population and employment growth, increasing costs of transport from peak oil concerns and the likely effects these would have on modal travel demands on the future network. The developed Preferred Strategy from the investigation balances investment between the modes to manage these uncertainties and reduce risks to government of over or under investment in any one mode. It provides transport choices to users and protects the environment.

Some 4,000 comments and submissions were received from the community during the course of the investigation and over 2,500 pages of technical findings have been written in support of the Preferred Strategy.

The Investigation spanned over 2 years. It involved social, environmental and economic considerations in respect to alternative strategy directions which were considered for the development of the transport network. The community's input was important in this respect. It gave a wide range of issues to the investigation and was instrumental in developing the Preferred Strategy. The Investigation team would like to thank all those who contributed to the Investigation, including the members of the Community Liaison Groups, The Department of Transport and Main Roads and the many members of the various steering groups within government who guided the investigation.

The original report was submitted to government in late 2008 as a draft. Following review this report was finalised in May 2009.

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1 Summary of findings

1.1 Introduction

The South East Queensland Regional Plan 2005-2026 and South East Queensland Infrastructure Plan and Program 2008-2026 (SEQIPP) list the Western Brisbane Transport Network Investigation (the investigation) as an important project for western Brisbane and the region as a whole.

The investigation plans to accommodate future growth in SEQ and other changes which will impact on the western Brisbane transport network.

The major purpose for undertaking the investigation can be summarised as:

- To provide government with a transport strategy for Western Brisbane and recommendations for the timely provision of infrastructure for the sustainable management of growth in SEQ with particular regard to the importance of growth in the Western Corridor, Australia TradeCoast and Moreton Bay Regional Council over the next 20 years;
- To examine the need for a Western Bypass of Brisbane and to assess the strategic merits of Northen Link;
- To consider the role existing preserved transport corridors may have in the future network; and
- To investigate and recommend ways to maintain and improve accessibility, as well as address transport network issues in western Brisbane.

The investigation has the objective of preparing an integrated transport strategy to guide the development of the transport network for western Brisbane for decades to come.

1.2 Scope of work and community input

Feedback from the community in two separate surveys greatly influenced the change to the scope of the investigation from its original road based brief.

The scope of work was extended to address the importance of public transport and in particular the importance of rail and how rail services are delivered on the western network.

The community's input to the investigation was instrumental in determining the preferred strategy. The preferred strategy components in respect to rail, bus, active transport, road and freight, while based on analysis, consistently match the community's views.

1.3 Challenges we face

South East Queensland will face significant challenges over the next 20 years. Unprecedented population growth is a catalyst for economic prosperity but is also stretching the transport network to the point where traffic congestion is now a part of daily life.

Uncertainties of rising transport costs and climate change contribute to the challenge of developing a transport network to respond to this growth while protecting the environment and the lifestyle that western Brisbane residents value.

Specific challenges include:

- Managing population growth;
- Reducing overcrowding on passenger transport services;
- Managing peak hour congestion;
- Reducing freight movement costs;
- Managing rising transport and fuel costs; and
- Dealing with construction and maintenance costs.

Climate change, peak oil and rising transport costs

Transport costs in future are likely to rise significantly as a result of uncertain futures influenced by climate change and rising costs of fuel.

The rising cost of crude oil can significantly increase transport costs, accelerating a move from cars to public transport.

The investigation has focussed on rail and bus priority to provide a sustainable network system with the capacity and flexibility to manage the uncertain future challenges faced by the community in South East Queensland.

Approach of the investigation

The investigation sought to balance the competing objectives of accessibility, economic development and sustainability. Investing only in roads will not achieve sustainability, deal with higher transport costs or address the issues of climate change and emissions reduction. Investing only in public transport will not provide for region-wide accessibility, enable economic development, improve goods delivery reliability or reduce freight costs.

The aim of the investigation was to produce a 20-year vision to guide all levels of government. It used a fully integrated, multi-modal approach to transforming the transport network of western Brisbane based on the key principles of:

- Making better use of existing infrastructure;
- Building on current infrastructure programs; and
- Prioritising transport corridor space.

1.4 Key principles

1.4.1 Making better use of existing infrastructure

Brisbane has an extensive network of existing transport corridors. The investigation's approach was based on making better use of these existing transport corridors before considering new corridors.

By being strategic and forward thinking with existing assets, and by using additional corridor space to enable priority to be given to public transport where possible, future transport needs could be largely accommodated within existing corridors with minimal impact on the surrounding environment.

Passenger rail assets

The existing rail network is a significant asset. It supports existing land use and provides a good distribution of services across the network. However it is operating well below its potential.

Bus assets

The transformation of our bus system has already started. Brisbane's existing busways are world leading, for example, the South East Busway is currently moving up to 18,000 people an hour.

Our busways provide a similar service to rail for suburbs without direct access to rail lines. However, in most other cases, buses are often caught up in congestion on roads.

Walking and cycling infrastructure

Brisbane has some outstanding walking and cycling infrastructure around the city, including innovative facilities such as the King George Square cycle centre. However, for the most part, walking and cycling infrastructure in western Brisbane is fragmented, restricting the potential for increasing mode share.

Road assets

The strategic road network in western Brisbane is incomplete. There is no motorway connection between the Centenary Motorway and the Bruce Highway. This forces arterial and local roads to accommodate both short and longer distance traffic.

1.4.2 Building on existing projects

The South East Queensland Infrastructure Plan and Program (SEQIPP) is the largest infrastructure program in the country. It provides the first stages of the transformation of the western Brisbane transport network. The investigation builds on currently committed SEQIPP projects to complete the transformation.

1.4.3 Prioritising transport corridor space

Each transport corridor is a valuable asset that should be used for maximum community benefit. A fundamental principle of the investigation is to capitalise on opportunities to make better use of corridor space to increase the number of people who can use it, particularly during peak periods.

A general purpose arterial road lane has a capacity of up to 2,000 people per hour. The same lane operating as a bus lane has a capacity of up to 5,000 people per hour. A busway lane can move up to 18,000 people per hour. A modern railway line can move up to 30,000 people per hour.

Enabling better use of walking, cycling and public transport helps manage congestion and also provides opportunities for urban regeneration.

1.5 Strategy choices

The investigation developed five different network strategies, shown in Figure 1.1, which would result in different network performance outcomes in managing the growth in demand on the network.

Performance criteria values for each strategy choice were compared with a set of environmental, social and economic objectives to determine the preferred strategy which best met these objectives and the community's concerns.

1.6 Preferred network strategy

The 'Balanced Transport' strategic network choice is the preferred network strategy.

The preferred strategy revitalises transport corridors and fills in the gaps in the existing transport network, improving Brisbane's economy and lifestyle. It offers a robust network that provides real travel choices in the face of population growth, traffic congestion, fuel price increases and climate change.

The preferred strategy would transform western Brisbane's transport network.

For the first time, a coordinated approach to the transport needs of western Brisbane integrates all types of transport and land use into one strategy, balancing the city's social, environmental and economic objectives.

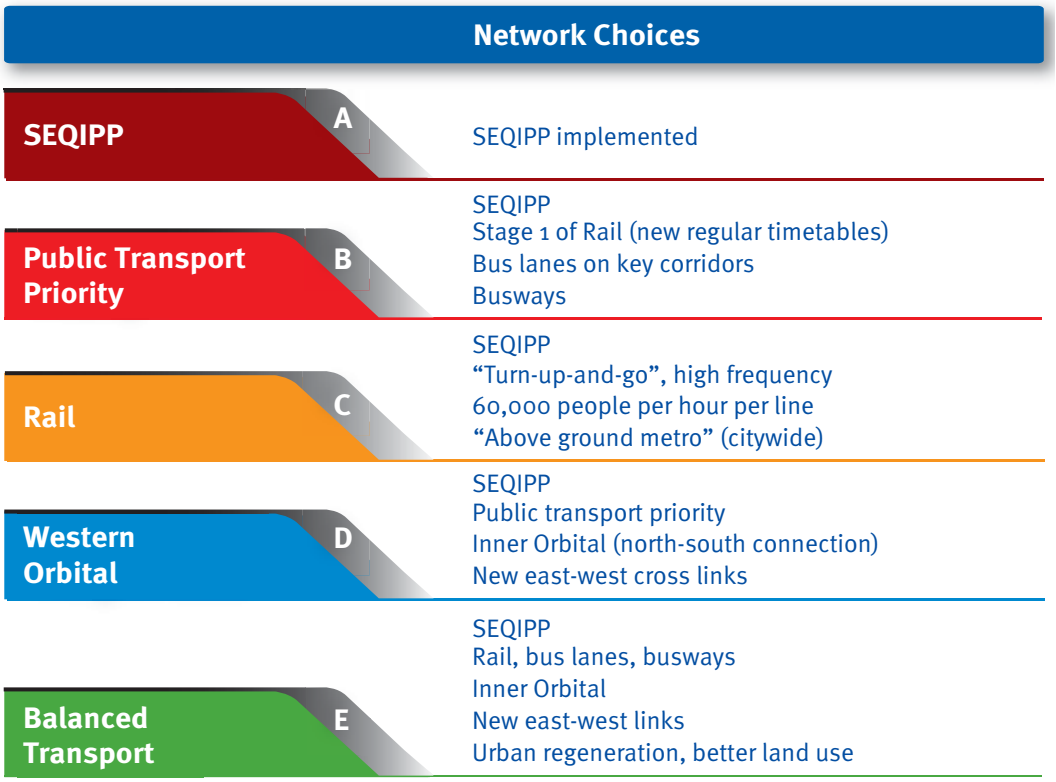

Figure 1.1 Strategic network choices

Rail

The staged transformation of the existing rail network to a high capacity surface rail system with new, multi-purpose stations and new carriages designed to minimise stopping times at stations is the centrepiece of the preferred strategy.

It delivers greater service reliability, higher frequency and safety benefits, including best practice signalling and the upgrade of level crossings.

Providing more frequent and reliable services on the existing rail corridors could dramatically increase the number of people who can use those corridors and reduce road congestion without the need for new corridors.

Rail provides the potential to triple the passenger capacity of the rail network.

Bus priority

Transport corridors are community assets. Prioritising freed-up road space for buses maximises the ability to move more people along the corridor.

Bus priority provides direct services to the Brisbane Central Business District and activity centres in corridors not served by rail, and supports high capacity rail corridors through improved bus feeder services.

Continuing the bus transformation would involve removing buses from congestion by providing bus priority in the form of busways, bus lanes or transit lanes.

Active transport choices – walk and cycle

The preferred strategy provides a continuous network of high standard, easy to follow walking and cycling routes through a combination of bikeways, bike lanes, wide footpaths and river crossings.

An urban community with a well designed active transport system benefits the network at two levels; it supports access to public transport for commuter trips and it promotes sustainable local trips, reducing congestion.

Western Orbital

Road corridors connect communities through many types of transport. The new road structure for western Brisbane improves 24-hour accessibility, reduces travel times and makes local trips easier.

A motorway-standard facility between the Ipswich Motorway and the Bruce Highway reduces congestion on other north-south links, and provides flexibility and alternative routes for long distance trips and freight carriage.

The transformation of the road network would involve completing the network, creating opportunities to return local roads to the local community and where appropriate, to prioritise corridor space for public transport and active transport on the existing network.

1.7 Into the future

The preferred strategy supports sustainable planning principles that will guide development in western Brisbane beyond the timeframes of the South East Queensland Regional Plan such as:

- Affordable urban housing and smart design standards;
- Market-driven employment in the Brisbane Central Business District and surrounding areas with supporting transport; and
- Greater use of rail and development of new activity centres and Transit Oriented Development (TOD) centres around major rail stations.

1.8 Implementation program

Table 1.1 provides an indicative western Brisbane transport network strategy implementation program. Note that this is not an approved program of works, but an example of how the preferred strategy might be delivered over time. It is contingent upon funding availability and prioritisation against other government priorities.

Table 1.1 Indicative western Brisbane transport network strategy program

		Strategy Component	Lead Agency	Strategic Estimate ($m)	Estimate Category (see note 2)	Delivery Timeframe		
						Phase 1	Phase 2	Phase 3
Western Brisbane Rail								
	R1	Full sectorisation and 'Turn-up-and-go' timetabling	QT	1450	0			
	R2	Upgraded stabling						
	R3	Signalling upgrades						
	R4	Rolling stock procurement	QT	4030	0			
	R5.1	Redevelop CBD rail stations to cater for additional passenger throughput	QT	600	0			
	PR1	Rail Operational Review	QT	15	0			
Ferny Grove rail								
	R6.1	Implement SEQIPP (Michelton to Keperra to Ferny Grove track duplication)	QT	SEQIPP project	1&4			
	R5.2	Upgrade Mitchelton, Ferny Grove stations bus-rail interchange	QT	30	0			
	R7.1	Level crossing upgrade program - 4 major crossings (Shand St, Dawson St, Osborne Rd, Prospect St)	QT	700	0			
	R7.2	Level crossing upgrade program - 4 minor crossings (Arbor St, Samford Rd, Wilston Rd, Glen Holm St) (c)						
	R5.3	Ferny Grove station TOD opportunity	QT	30	0			
	R5.4	Extended Ferny Grove Park 'n' Ride	QT	20	0&1			
	R5.5	Upgrade Enoggera/Alderley station bus-rail hub	QT	30	0			
Ipswich rail								
	R6.2	Implement SEQIPP (Darra to Springfield passenger rail line, third track upgrade Corinda to Darra, Darra to Redbank)	QT	SEQIPP project	1&3			
	R5.6	Milton, Indooroopilly and Darra station TOD opportunity	QT	80	0			
	R5.7	Upgrade Oxley, Wacol, Redbank and Dinmore Park 'n' Ride	QT	40	0			
	R7.3	Level crossing upgrade program - 2 major crossings (Sherwood Rd, Wacol Station Rd)	QT	180	0			
	R5.8	Upgrade Goodna station bus-rail hub	QT	20	0			
Caboolture rail								
	R6.3	Implement SEQIPP (Third track Lawnton to Petrie)	QT	SEQIPP project	1			
	R5.9	Upgrade Zillmere, Northgate and Bald Hills Park 'n' Ride	QT	25	0			
	R7.4	Level crossing upgrade program - 6 major crossings (Robinson Rd, Telegraph Rd, South Pine Rd, Beams Rd, Northgate Rd, Ellison Rd)	QT	530	0			
	R5.10	Upgrade Strathpine and Carseldine stations bus-rail hub	QT	30	0			
			Western Brisbane Rail sub total	7810				
Western Brisbane bus network								
	B1.1	Implement SEQIPP (Northern Busway to Kedron)	QT	SEQIPP project	3			
	B1.2	Implement SEQIPP - Centenary Motorway bus priority/ transit lanes (Ipswich Motorway to Toowong)	QT	SEQIPP project	1			
	B2.1	Northern Busway - staged bus lanes (Kedron to Chermside to Aspley)	QT	SEQIPP project	1			
	B3	Western Bus Corridor staged bus lanes - (Inner Northern Busway to Kenmore)	QT	750	0			
	B4	Stafford Road High Occupancy Vehicle lanes	DMR	300	0			
	B5	Kelvin Grove Road/ Enoggera Road bus lanes	BCC	50	0			
	B6	Waterworks Road/ Musgrave Road bus lanes	BCC	130	0			
	B7	North West Transport Corridor bus lanes	DMR	300	0			
	B8.1	Upgrade Chermside bus interchange	QT	20	0			
	B8.2	Mt. Ommaney and Kenmore Park 'n' Ride	QT	10	0			
	B8.3	Northern Busway - staged upgrade towards busway (Kedron to Chermside to Aspley)	QT	SEQIPP project	0			
	B9	Aspley and Albany Creek Park 'n' Ride	QT	10	0			
	PB1	Public Transport Improvement Program	QT	300	0			
	PB2	Western Bus Corridor (Inner Northern Busway to Kenmore) Transport Investigation	QT	6	0			
	PB3	Northern Busway Transport Investigation	QT	SEQIPP project	0			
	PB4	High Occupancy Vehicle Network Plan Investigation	QT	SEQIPP project	0			
			Western Brisbane bus network sub total	1876				

Table 1.1 Indicative western Brisbane transport network strategy program cont'd

		Strategy Component	Lead Agency	Strategic Estimate ($m)	Estimate Category (see note 2)	Delivery Timeframe: Phase 1	Phase 2	Phase 3
Major road network								
	RD1.1	Implement SEQIPP (Airport Link)	DMR	SEQIPP project	3	■		
	RD2	TransApex Northern Link	BCC	SEQIPP project	0	■		
	RD3	Kenmore Bypass	DMR	SEQIPP project	0	■		
	RD4	Moggill Road upgrade (a)	DMR	130	0		■	■
	RD5	North West Transport Corridor	DMR	1100	0		■	
	RD6	Inner Orbital tunnel	DMR	5600	0			■
	RD1.2	Implement SEQIPP Centenary Motorway HOV lanes - (Ipswich Motorway to Toowong)	DMR	SEQIPP project	0	■		
	RD7	Centenary Motorway Upgrade - (Ipswich Motorway to Toowong) (b)	DMR	SEQIPP project	0	■	■	
	RD8	Northern Crosslink Corridor (Stafford Road tunnel)	DMR	2500	0		■	
	PRD1	Western Orbital Corridor Investigation	DMR	25	0	■		
	PRD2	East-West Arterial Upgrade Study	DMR	SEQIPP project	0	■		
	PRD3	South West Sub-Regional Transport Network Investigation	DMR	10	0	■		
		(a) Subject to Kenmore Bypass investigation (b) Subject to South West Sub-Regional Transport Network Investigation						
				Western Brisbane road network sub total	9365			
Active Transport network (c)								
	A1	Implement SEQIPP (Brisbane and Western Corridor sub-regional cycle and walking network)	QT	SEQIPP project		■		
	A2	'Connect Two' Program	QT	1000	0		■	■
	A3	'Links to School' and Safety Programs					■	■
	A4	Active Neighbourhood Zones					■	■
	A5.1	Northern Veloway - Section 1 (Kedron to CBD)	QT	760	0	■		
	A6	Northern Crosslink Veloway (Stafford Road)	DMR					
	A7.1	Western Veloway - Section 1 (Indooroopilly to Toowong)	BCC				■	
	A7.2	Western Veloway - Section 2 (Kenmore to Indooroopilly)	DMR				■	
	A8	Gap Access Veloway (Ashgrove to CBD)	BCC				■	
	A9.1	North-Western Veloway - Section 1 (Everton Park to Kelvin Grove)	BCC				■	
	A9.2	North-Western Veloway - Section 2 (Carseldine to Everton Park)	DMR				■	
	A5.2	Northern Veloway - Section 2 (Aspley to Kedron)	QT					■
	A10	Western Ring Veloway (Toowong to Everton Park)	DMR					■
	A11	Albert Street Garden Axis Veloway	BCC					■
	A12	Uni Link Veloway (Indooroopilly to Dutton Park)	BCC					■
	A13	Uni River Link (St Lucia to West End)	QT	150	0		■	
	PA1	Active Transport Investigation - Veloways and River Links	QT	4	0	■		
		(c) The walking and cycling projects will be implemented with the proposed public transport and road corridor upgrades. Additional funding for Veloway projects is included in the Major Road Network scheme.						
				Western Brisbane walking and cycling sub total	1914			
				Total	20965			

Notes:

1. The table identifies the indicative delivery timeframe for the WBTNI strategy projects.
2. These are pre-project estimates in $2007. Estimating has been carried out using a strategic estimate method for a cost comparison only. It is not to be used as a project budget. Compares to SEQIPP Type 0 estimate except where noted otherwise.
3. The strategic estimates make no allowance for risk & opportunities.
4. The program does not include ALL projects within Western Brisbane proposed by SEQIPP, BCC, PRSC, DMR and ICC. It is assumed that these projects will be implemented in accordance with their individual works program.
5. The program is indicative only. It is expected that the timing and delivery will be refined for each project with a detailed corridor assessment.
6. The strategic estimates are an incremental investment to SEQIPP 2008 and exclude funding already allocated in SEQIPP.
7. All corridor planning projects for roads and bus priority include investigation for associated provision for walking and cycling as per the Active Transport Strategy.

2.0 Purpose of this investigation

2.1 Background

The South East Queensland (SEQ) region is Australia's fastest growing urban area, having attracted an average of 55,000 new residents each year over the past two decades. This growth is forecast to continue with the SEQ population estimated to reach around four million people by 2026 – an increase of more than one million. The region is also experiencing rapid employment growth and is emerging as a significant economic hub of national and international importance.

An additional one million people in the region by 2026 will generate about five million additional trips on the transport network each day. There will be a major increase in the freight task, particularly associated with continued growth in the Australia TradeCoast area and the Western Corridor (i.e. the Ipswich region).

The future of western Brisbane is important not only to those living there but to all Brisbane residents. Major Brisbane transport network improvements currently planned or under construction include the Gateway Motorway, Ipswich Motorway, Centenary Motorway, Clem Jones tunnel, Airport Link, Northern Busway, Eastern Busway and Brisbane City Council's proposed Northern Link. In order to be effective into the future and to support population growth, the Brisbane transport network will need further improvements to the western network to maintain competitiveness.

South East Queensland Regional Plan and South East Queensland Infrastructure Plan and Program

The 2005–2026 South East Queensland Regional Plan (the Regional Plan) is a statutory plan to manage growth and development in SEQ to 2026. The overriding intent of this plan is to ensure the region grows and changes in a sustainable way. It identifies the strategic directions, regional land use patterns and regional policies that are to be followed in SEQ over the next 20 years.

In the course of the investigation the State Government released the Draft Regional Plan 2009-2031. Whilst the new draft plan extends population growth projections another 5 years into the future, it maintains the original plan's emphasis on planning for the Western Brisbane Transport Network.

First released in 2005, the SEQIPP is the Queensland Government's commitment to providing the infrastructure to cater for this growth. It is reviewed and updated on an annual basis.

Both the Regional Plan and SEQIPP list the Western Brisbane Transport Network Investigation (the investigation) as an important project for western Brisbane and the region as a whole. The investigation will plan to accommodate future growth in SEQ and other changes which may impact on the western Brisbane transport network.

The major purpose for undertaking the investigation can be summarised as:

- To provide Government with a transport strategy for Western Brisbane and recommendations for the timely provision of infrastructure for the sustainable management of growth in SEQ with particular regard to the importance of growth in the Western Corridor, Australia TradeCoast and Moreton Bay Regional Council over the next 20 years;
- To examine the need for a western bypass of Brisbane and to assess the strategic merits of Northern Link;
- To consider the role existing preserved transport corridors may have in the future network; and
- To investigate and recommend ways to maintain and improve accessibility, as well as address transport network issues in western Brisbane.

The investigation has the objective of preparing an integrated transport strategy to guide the development of the transport network for western Brisbane for decades to come.

Terms of Reference

The investigation will provide a recommendation to the Queensland Government on an integrated transport strategy for western Brisbane, with an emphasis on public transport infrastructure improvements.

This investigation is guided by the following terms of reference which were developed in consultation with the community.

1. The investigation will assess the community's travel needs, including freight, for the next 20 years and how that need should be responded to in western Brisbane. The investigation will take an integrated approach in assessing the infrastructure needs of all transport modes – public transport, walking, cycling and private vehicles.
2. The investigation will examine a range of transport infrastructure options, with a particular focus on the infrastructure needs of the public transport network. All options will be assessed against transport, social, economic and environmental factors. In doing so, the investigation is aware of other transport initiatives and investigations.
3. The investigation will consider the role existing preserved transport corridors may have in the future network.
4. The investigation will include community consultation and consider feedback throughout the study.
5. The investigation will examine the need for a western bypass of Brisbane and if needed, its projected timing. The investigation will specifically consider a far western bypass option (Brisbane Valley) and a bypass option to the west of Mt. Coot-tha in deciding the need for a bypass. In doing this, the investigation should take into account that no route for a western bypass has been chosen and there is currently no recommendation to build one.
6. If a need for a western bypass of Brisbane were established, then a further study to determine its location and timing would be required. The requirement for this further study will only occur after the Queensland Government has considered the findings of this investigation.
7. The further study would involve analysis of environmental, social and engineering issues along with extensive community consultation to determine if an acceptable alignment can be found.
8. The investigation will examine the consequences of all options, pursued or not pursued, on the existing road and public transport network in South East Queensland.
9. The investigation will consider the strategic merits of Brisbane City Council's TransApex Northern Link proposal.
10. The investigation will provide a report to the Queensland Government with recommendations on a preferred regional transport network development strategy for the western Brisbane study area for the next 20 and more years. The report will include consideration of the priority and affordability of the recommendations.
11. The report is due to be provided to the Queensland Government in mid 2008.

Study area

For the purpose of this investigation, western Brisbane is defined as the area extending north of the Ipswich Motorway/Warrego Highway, south of the Pine River and west of the Brisbane CBD to the D'Aguilar Range. The study area is larger than the western Brisbane area because travel demand in western Brisbane is also affected by potential connections and growth outside of western Brisbane. The study area therefore includes high growth areas in Ipswich (including the Western Corridor) and Moreton Bay Regional Council, and links areas of high residential, employment and industrial development with existing and future residential areas.

The Brisbane Valley area is important in the SEQ context. It is the location of one of the western bypass zones under consideration and was included in the study area for that reason.

The Ipswich area (i.e. the Western Corridor) and the areas north of the Pine River are important because of their forecast significant population and employment growth and their effects on the western Brisbane transport network. This investigation will not address these areas' transport infrastructure requirements but will take particular account of their likely influence on travel demand in western Brisbane. There are other transport investigations both current and proposed which will consider the infrastructure needs within the Western Corridor and Moreton Bay Regional Council.

Figure 2.1 Indicative study area of the Western Brisbane Transport Network Investigation

2.2 Study process

The investigation utilised a strategic transport planning process, as illustrated in Figure 2.2, to develop the most appropriate strategy on the network. This process was based on identifying existing issues and challenges, and recognising that any acceptable strategy and network for 2026 needed to be consistent with a long-term vision for the transport network. The study process was framed by government objectives derived from the Queensland Government's Regional Plan. Each objective was defined by a set of performance criteria which were used to assess a range of network improvement options.

The network improvement options were developed from the analysis of network performance of existing and future conditions as well as stakeholder input. Different combinations of options were developed to represent different ways of investing in network improvements. For example, one choice was to focus on public transport and another to focus more on roads.

The strategy choices were different combinations of network improvement options, comparing outcomes against a 2026 Base Case based on a set of operational, economic and behavioural assumptions. The strategy choices were assessed in a similar manner to the individual network improvement options and a preferred strategy was chosen.

Sensitivity tests were undertaken on key assumptions which allowed the preferred strategy's robustness to be tested against possible different futures, such as increased fuel costs as a result of peak oil or climate change, increased network capacity as a result of improved transport or traffic management technology, and changes in land use that are different to the land use envisioned in the Regional Plan.

Community feedback informed every stage of the process.

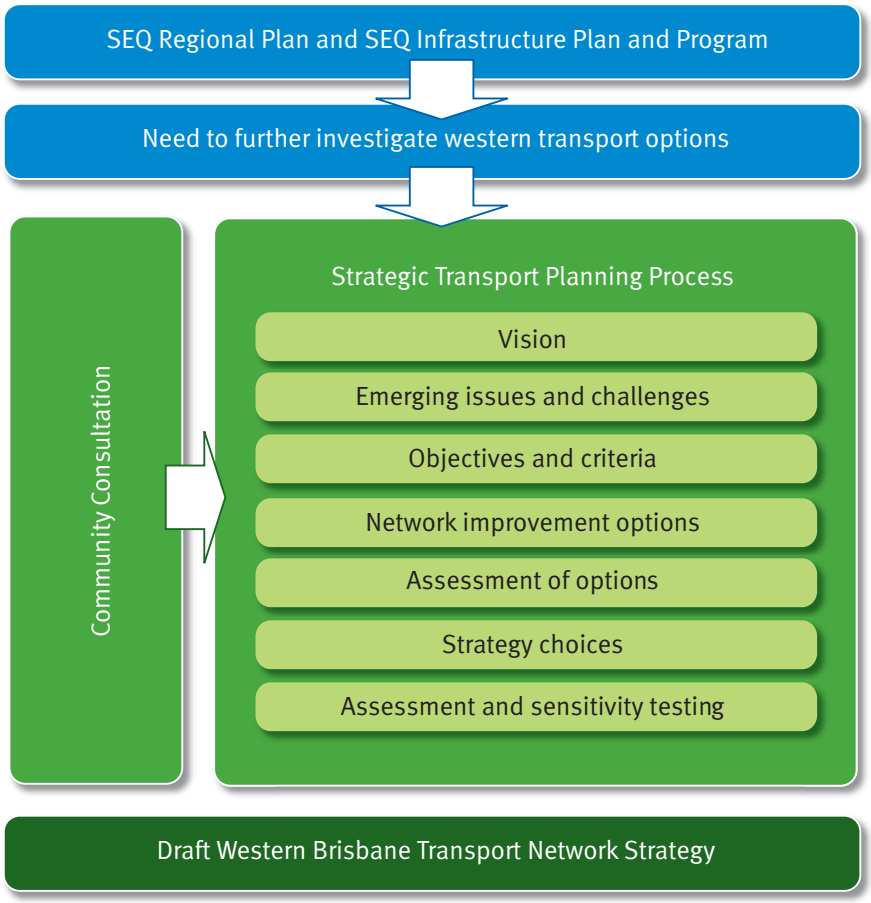

Figure 2.2 Study process of the Western Brisbane Transport Network Investigation

2.3 Reporting

This Basis of Strategy Report provides the basis for the Western Brisbane Transport Network Strategy, which is reported separately. It is the outcome of a 24-month investigation over which period the investigation's terms of reference were revised based on community feedback to place a stronger focus on public transport. The release in April 2008 of the Queensland Government's decision not to proceed with a western bypass was based on early findings of the investigation. The strategy and the Basis of Strategy Report (this document) are prepared over the period of the investigation.

3.0 Current transport conditions in western Brisbane

3.1 Introduction

The major generators of travel demand on the network are population, population increase, economic development and increasing wealth. The many trip purposes relate mainly to employment, education, shopping and leisure activities. Existing key employment areas in SEQ are concentrated in the Brisbane CBD and surrounds, and to a lesser extent in areas around the Brisbane Airport and Port of Brisbane, and in activity centres such as Indooroopilly, Upper Mt. Gravatt, Carindale, Chermside, Ipswich and Caboolture. Specifically,

- Nearly 20 per cent of jobs are contained in the CBD and surrounds (Spring Hill, Fortitude Valley, Milton and South Brisbane);
- Less than 1 per cent of jobs are currently contained at the Brisbane Airport (part of Australia TradeCoast); and
- Over 50 per cent of jobs are widely distributed across the region.

The western Brisbane area contains a number of significant regional trip generators in the education, retail, health and entertainment sectors including:

- Education destinations – University of Queensland (UQ) at St. Lucia and Queensland University of Technology (QUT) campus at Kelvin Grove;
- Key retail destinations outside the Brisbane CBD include Mt. Ommaney, Indooroopilly, Toowong Village, Milton, Brookside and Chermside shopping centres;
- Major health services and allied health precincts include Royal Brisbane, Prince Charles, Princess Alexandra and Wesley Hospitals; and
- Major sporting and entertainment venues include Suncorp Stadium and RNA Exhibition Grounds.

The UQ campus at St. Lucia is one of the largest trip generators in Brisbane generating an estimated 65,000 daily car and public transport trips from across Brisbane and surrounding LGA's (Brisbane City Council, 2003). Twenty per cent of these trips are public transport trips. This compares to about 290,000 public transport trips generated each day by the Brisbane CBD.

3.2 Key elements of the existing transport network

3.2.1 Public transport

The public transport network is inextricably linked to the type and form of land use it supports, and the provision and role of public transport services it performs. The principal public transport network is shown in Figure 3.1. The rail and busway network in the western Brisbane area and elsewhere across the metropolitan area of Brisbane is built radially to support the Brisbane CBD and other smaller regional centres. Trip destinations outside the Brisbane CBD are dispersed, presenting challenges in public transport service design.

WESTERN BRISBANE TRANSPORT NETWORK INVESTIGATION

LEGEND

2005 Existing Urban Area

Waterbodies

2005 Existing Transport Network

Motorway & Highway

Arterial Road

Railway

Busway

Figure 3.1

The elements of the existing strategic transport network in western Brisbane and beyond

Queensland Government

connect west consortium

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Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

The buses serving the western Brisbane area, which are part of a wider bus system, include:

- The only busway, the Inner Northern Busway, provides grade separated access from Herston to the Brisbane CBD and connects to the South East Busway;
- High frequency BUZ routes (operating at 10-minute headways (time between services) during the peak and 15 minutes during off-peak periods) traverse the western Brisbane area. Services include Route 345 (Newmarket/Stafford/Aspley), Route 385 (The Gap) and Route 444 (Toowong/Indooroopilly/Moggill);
- A comprehensive feeder and local bus network, operated by Local Government and private bus companies to support the rail network, provides a good level of network coverage;
- Local and commuter bus services in the western and northern suburbs of Brisbane primarily providing access to the Brisbane CBD and major destinations such as shopping centres and university campuses;
- Eleanor Schonell Bridge (a bus and walk/cycle only bridge) provides direct access from the east to University of Queensland campus at St. Lucia, but does not link to bus services from Toowong or Indooroopilly;
- In the south-western region, buses provide direct (and express) services from Inala, Mt. Ommaney, Kenmore, Indooroopilly and Toowong to the Brisbane CBD. Centenary Motorway/Milton Road and Moggill Road/Coronation Drive are two major bus corridors, with each carrying significant bus and passenger volumes;
- In the north-western region, buses provide direct (and express) services from The Gap, and are concentrated on the Enoggera Road/Kelvin Grove Road corridor and the Waterworks Road/Musgrave Road corridor; and
- Limited inter-regional or cross-town bus services.

The passenger rail lines serving the western Brisbane area, which are part of a wider rail system, include:

- An urban narrow gauge line primarily for passenger transport across the greater metropolitan area of Brisbane with medium to long distance, radial suburban train services into the Brisbane CBD from Ipswich, Ferny Grove and Caboolture; and
- A dual gauge rail line from Salisbury to Roma Street for interstate and CityTrain passenger trains.

The Ipswich to Brisbane passenger rail line is the major public transport corridor providing a high capacity line haul route from Ipswich and other areas located on the periphery of south-west Brisbane to the Brisbane CBD. The line runs from the inner city suburbs of Milton, Auchenflower, Toowong and Indooroopilly to the south-west of Brisbane, and through Corinda in a westerly direction to Ipswich.

All train stations on the Ipswich line between Ipswich and Corinda have Park 'n' Ride facilities. In addition, stations at Chelmer, Taringa, Toowong and Auchenflower offer commuter parking. Most stations have connecting bus services of variable service levels.

The Ferny Grove passenger rail line provides access from the north-west including Ferny Grove, Keperra, Mitchelton and Enoggera to the Brisbane CBD.

On the Ferny Grove line, Park 'n' Ride facilities exist at all railway stations except Oxford Park and Newmarket. Most stations have connecting bus services of variable service levels.

The Caboolture passenger rail line runs on the periphery of the western Brisbane area and offers services to the north-eastern Brisbane suburbs and to Moreton Bay Regional Council areas such as Strathpine, Petrie, Narangba, Burpengary and Morayfield. The Caboolture rail line continues northwards to the Sunshine Coast with commuter services from Nambour.

CityCat ferries provide services between UQ and the Brisbane CBD and frame. They have only a marginal role in providing public transport services to western Brisbane.

3.2.2 Road network and hierarchy

The principal road network in the western Brisbane area is shown in Figure 3.1. The main characteristics of the network are:

- The motorway/highway road system (Ipswich, Logan and Gateway Motorways) along the south and east of Brisbane provides regional connectivity and serves as orbital links for cross-metropolitan and longer distance trips;
- The Ipswich, Logan and Gateway Motorways orbital system serves as the primary connection between the Ipswich region and the Australia TradeCoast;
- Centenary Motorway provides motorway-standard access from the south-west to the Toowong roundabout where it becomes an urban arterial;
- A radial road system which links to the Brisbane CBD consists of urban arterials such as Milton Road, Moggill Road/Coronation Drive, Waterworks Road, Old Northern Road and Samford Road to Enoggera Road/Kelvin Grove Road, Albany Creek Road/Beckett Road and Gympie Road/Lutwyche Road;
- The Frederick Street/Jubilee Terrace/Wardell Street corridor (Metroad 5) is the key route for carrying north-south traffic between the western and north-western suburbs;
- Stafford Road is a key traffic link from the north-western suburbs to the east;
- The radial urban arterials in the inner western and inner north-western suburbs are constrained by abutting land uses and/or topography; and
- The Brisbane Valley Highway connects the Warrego Highway west of Ipswich to the D'Aguilar Highway at Kilcoy, passing the towns of Fernvale and Esk. It is a two lane rural road following the Brisbane Valley adjacent to the Somerset and Wivenhoe dams. The D'Aguilar Highway connects Kilcoy to the Bruce Highway at Caboolture.

Currently, two motorways access western Brisbane and connect into urban arterials with a lower speed environment:

- Ipswich Motorway at the southern end of the western Brisbane area connects Ipswich with the Greater Brisbane metropolitan area; and
- Centenary Motorway which connects to Milton Road and Metroad 5 (Frederick Street to Stafford Road).

Western network's lack of hierarchy

Due to the hilly topography and the sensitive landscape, land use in the western Brisbane area has developed in a way that inhibited a direct and legible road hierarchy and connection between the suburbs south-west and east of Mt. Coot-tha, and the northern and north-western suburbs. All cross-city travel in the western Brisbane area has to utilise Metroad 5, or Inner City Bypass and Coronation Drive, which provide a local urban arterial function as well as an orbital function for regional traffic. Heavy vehicles often circumvent western Brisbane altogether by utilising the Gateway and Logan Motorways. However, local truck deliveries to suburban centres continue to use existing arterial roads.

3.2.3 Active transport

The term active transport is used to describe walking and cycling. The lack of pedestrian and cycle facilities and undulating topography are not encouraging high volumes of pedestrian and cycle movements. A review of the condition of facilities in western Brisbane showed:

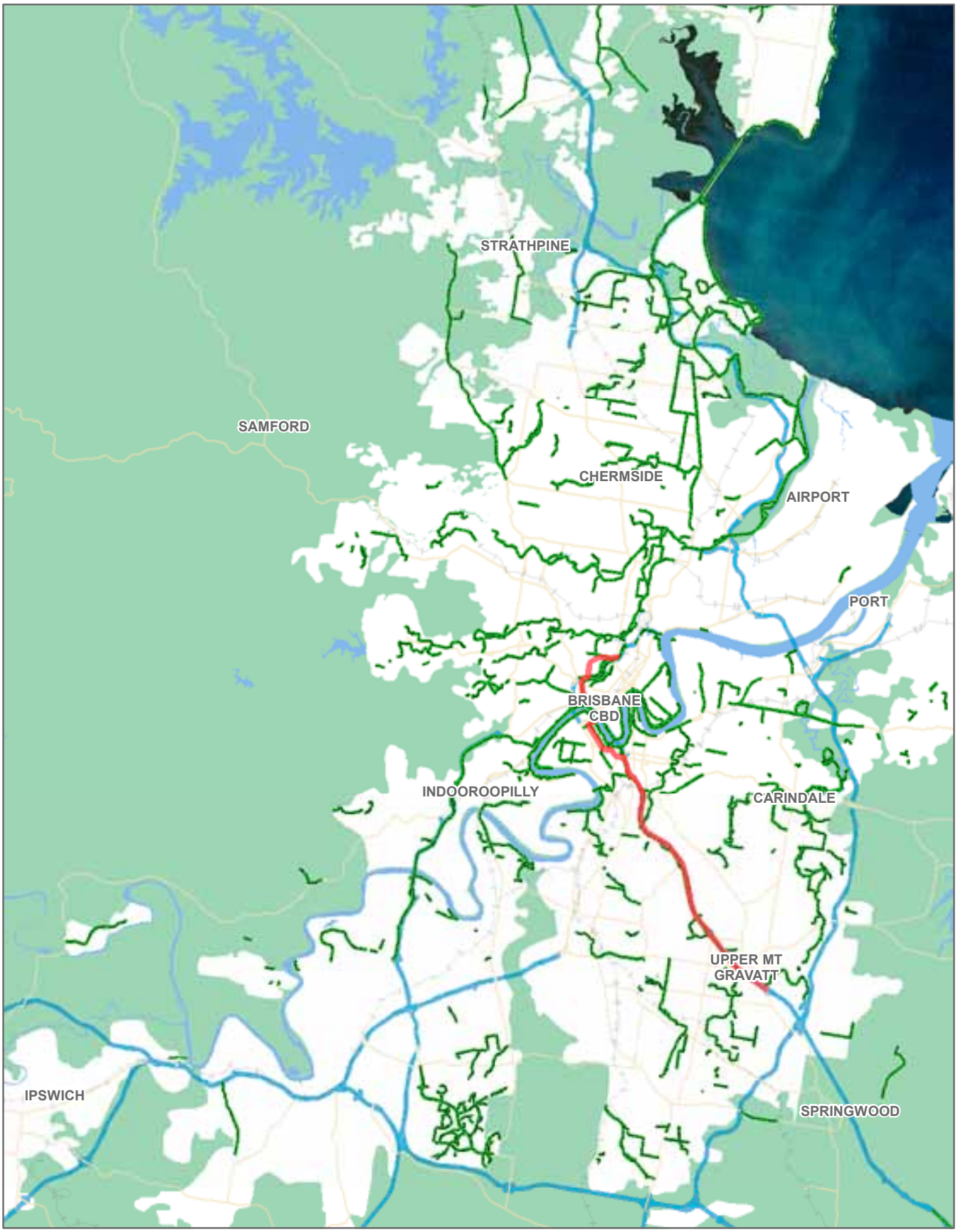
- A fragmented network of narrow paths, often not wide enough for two people to walk side by side;
- Limited mid block crossing places (so pedestrians have to walk further than necessary);
- Lack of facilities for persons with visual or hearing impairments;
- Obstructed paths (wheelie bins, parked vehicles, street furniture, vegetation) making them impassable by wheelchair users, pedestrians with prams and those with visual impairments;
- Non connecting footpaths and grass verges for pedestrians in suburban areas;
- High quality footpaths in recreational areas including parks and reserves; and
- Facilities of a much higher standard around retail and commercial centres, universities, schools and at public transport interchanges.

Comments from community groups confirm the lack of quality pedestrian and cycling facilities in western Brisbane.

However, the western Brisbane area currently has some major cycling infrastructure:

- Off-road cycle network from Jamboree Heights to the CBD, and on to New Farm Park;
- Off-road cycle path from Keperra through to Virginia;
- On-road cycle lanes in commercial centres and residential suburbs with some, but not all, linked and connected (designed and suitable for confident, serious cyclists); and
- Off-road mountain bike trails through forest parks.

Some cycle paths lead to major interchanges, commercial areas and attractions such as UQ. Figure 3.2 illustrates the existing major cycle path network in Brisbane.



WESTERN BRISBANE TRANSPORT NETWORK INVESTIGATION

LEGEND

2005 Existing Urban Area
Waterbodies

2005 Existing Transport Network
Motorway & Highway
Arterial Road
Railway
Busway
Cycle Routes

Figure 3.2

Existing strategic cycle path network in western Brisbane and beyond

Queensland Government

connect west consortium

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Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

3.2.4 Designated freight routes

Freight movements across SEQ are forecast to double by 2020 with a rapid increase in import and export activities at the Australia TradeCoast. In order to move freight as efficiently as possible around the Greater Brisbane area and SEQ, the Queensland Government designated Priority One and Priority Two freight routes. Figure 3.3 presents the existing designated freight routes. Priority One freight routes facilitate high volume, business-to-business freight movements. Priority Two freight routes allow freight to be distributed from factories, distribution centres and intermodal freight hubs to retail outlets or warehouses.

The main road freight routes mainly serve activity from intra-city trade in the south-east. The primary routes are therefore to and from the south and Brisbane via the Pacific Motorway, the north and Brisbane via the Bruce Highway, and Ipswich and Brisbane via the Ipswich Motorway. The Logan Motorway and Gateway Motorway provide the only bypass of Brisbane for freight travelling between the north and south of Brisbane and to the Port of Brisbane.

The Brisbane Urban Corridor (BUC) (Ipswich Motorway to Gateway Motorway via Kessels Road) is currently restricted for heavy freight by legislation.

There are no major freight and distribution centres in western Brisbane. Freight and commercial vehicles which are not weight restricted can use all roads in the western Brisbane area, mostly for pick up and delivery across the network.

Articulated vehicle freight routes, catering for mostly bulk freight en route to/from distribution and production centres, mainly use the major corridors of the Ipswich, Logan and Gateway Motorways. The Centenary Motorway caters for articulated freight to the west of Brisbane but there is no connection to the freight network beyond the Toowong roundabout. This creates the need for freight to either transit the city or use the Gateway Motorway to the east as there is no viable alternative bypass route of the Brisbane CBD to the west.

All north-south freight rail routes run currently through the Brisbane CBD. There is no eastern or western rail bypass. The Queensland Rail network is primarily a narrow gauge system with significant portions electrified, particularly in the Brisbane metropolitan region. This precludes double stacking of freight containers.

A dedicated dual gauge freight link exists between Dutton Park and the Port of Brisbane. The critical rail corridor in SEQ is the section between Salisbury and Dutton Park where passenger and freight services share the network, with priority given to passenger trains.

The viability of any freight rail options from the west, providing connectivity to the Australia TradeCoast or other eastern destinations, would have to address the critical need to traverse the Toowoomba range, the topography of which precludes efficient freight rail operations.

3.3 Summary of existing transport conditions

A detailed review of the existing transport conditions is reported in the Existing Conditions Report.

The major issues that have been identified are summarised below.

Continuing dispersed land use

The land use structure in western Brisbane is characterised by low to medium density residential development. The urban land use pattern has been dominated by significant low to medium density residential development in the southern and eastern part of the western Brisbane area and extensive park residential and open space in the western and north-western parts.

The lower density living in the western suburbs and undulating terrain creates different transport travelling conditions compared with travel to/from Ipswich, North Moreton or the inner-west.

The Brisbane Valley area is a largely rural area and not strongly linked in daily travel to western Brisbane and the remainder of the study area.

The existing topography is dominated by the D'Aguilar Ranges including Mt. Coot-tha and the Brisbane River, and the pattern of development has largely influenced the location of transport infrastructure.

WESTERN BRISBANE TRANSPORT NETWORK INVESTIGATION

LEGEND

- 2026 Urban Footprint
- Waterbodies

Priority Freight Routes

- Proposed Infrastructure
- Rail Freight
- Road, Priority One
- Road, Priority Two

Figure 3.3

Existing freight routes in metropolitan Brisbane

Queensland Government

connect west consortium

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Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

The existing strategic transport networks are also influenced by the attraction of the high activity centres in and around the Brisbane CBD. A key network characteristic is the physical constraint in accessing the Brisbane CBD from the south-west, caused by the locality of the Brisbane River. Although its population is relatively small, the inner city area dominates both in terms of population density and employment location.

A number of unused transport corridors have been preserved by the Department of Main Roads for several decades. In protecting these corridors from development, the Queensland Government has purchased a significant number of affected properties.

Dominance of Brisbane CBD and risk of self-containment in Western Corridor not being achieved

'Employment self-containment' refers to the process of providing more jobs in proximity to where people live and thus reducing the demand for long distance commuter travel.

At present, employment self-containment in the Ipswich region is higher than in other Local Government areas abutting the Brisbane City Council area and the intent of the Regional Plan is to continue this trend.

Although the Brisbane CBD continues to dominate as the primary activity centre and major employment node, the Australia TradeCoast is also becoming a dominant industrial and employment node, while over 50 per cent of jobs in SEQ are widely distributed.

If the growth in employment in the Brisbane CBD, the Australia TradeCoast and other areas continues at the expense of Ipswich, then the increase in travel demand between Ipswich, Brisbane and Australia TradeCoast could be significantly larger than would result under the Regional Plan.

This is a significant issue for the determination of appropriate network improvement options in western Brisbane.

Increasing transport demand to Brisbane CBD

The Brisbane CBD is by far the largest trip generator, as a consequence of it being the largest existing employment centre in SEQ.

Western Brisbane contains a number of significant regional trip generators in the education, retail, health and entertainment sectors, however most of the significant trip generators in the Brisbane metropolitan area lie outside western Brisbane.

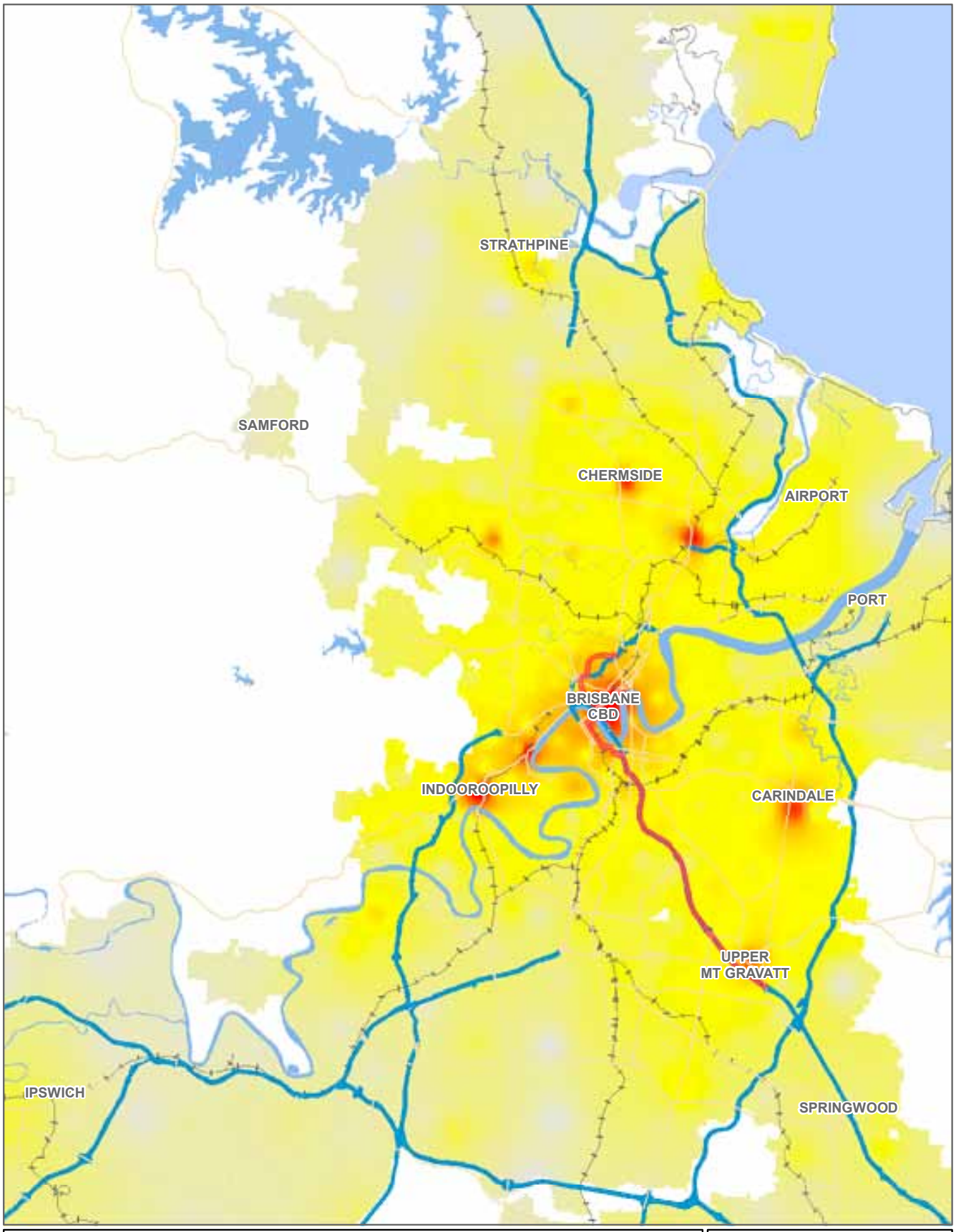
The Brisbane CBD and frame are the dominating trip generators with secondary trip generators at Ipswich, Indooroopilly, Toowong, UQ, Brookside and Chermside.

Other important trip generators include the Australia TradeCoast, QUT campus at Kelvin Grove, Royal Brisbane Hospital and Prince Charles Hospital, and events locations (Suncorp stadium and RNA showgrounds).

The highest demand of work-related trips in western Brisbane is from the west and north-west to the Brisbane CBD.

Analysis of trip demand between different locations within the western Brisbane area is illustrated in Figure 3.4 and shows that:

- The Brisbane CBD is a major attractor with around 23,000 daily trips from the Ipswich region and 84,000 trips from the inner western suburbs;
- The inner north-western suburbs generate around 145,000 trips a day to the Brisbane CBD;
- The travel demand between the Ipswich region and the inner west is around 88,000 trips per day;
- Travel demand from the Ipswich region and from the inner west to the Australia TradeCoast is low with about 4,000 trips and 6,000 trips respectively;
- Travel demand from the north-western suburbs to the Australia TradeCoast is around 22,000 trips per day; and
- Almost 67,000 trips a day occur between the inner west and the north-western and northern suburbs.



WESTERN BRISBANE TRANSPORT NETWORK INVESTIGATION

LEGEND

Trip End Densities (Trip Ends/Km²)
- < 10,000
- 10,000
- 50,000
- 100,000
- >100,000

Waterbodies

2005 Existing Transport Network
- Motorway & Highway
- Arterial Road
- Railway
- Busway

Figure 3.4

Existing major trip densities

Queensland Government

connect west consortium

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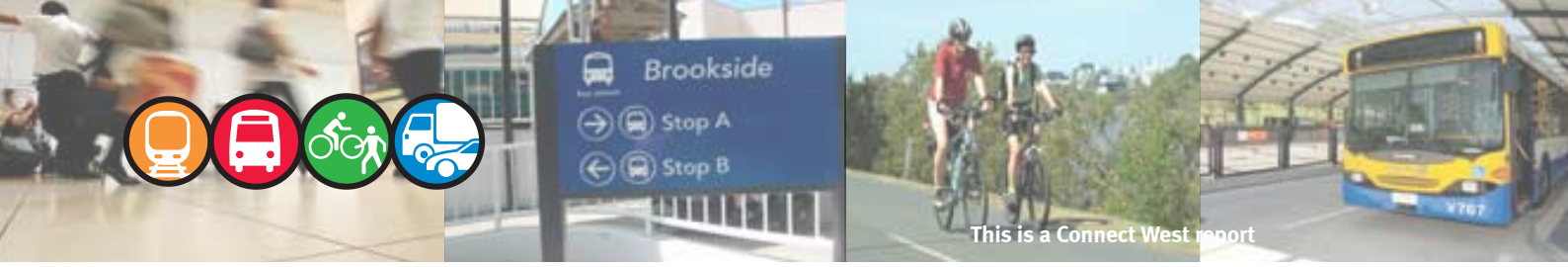
Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study



Low travel demand for through trips to the west of Brisbane

There are currently a relatively small number of long-distance trips between Ipswich and the areas north of Brisbane such as Strathpine, Caboolture and the Sunshine Coast compared to travel to the Brisbane CBD. The demand for travel between the Ipswich region and areas north of the Pine River, and areas further north to the Sunshine Coast is less than 5,000 trips per day.

Radial, CBD-centric nature of the public transport network

Public transport demand is radial to the Brisbane CBD with the existing passenger rail corridors carrying up to 70 per cent of public transport commuter trips from western Brisbane to the Brisbane CBD. Buses in western Brisbane mainly share the arterial road space with cars and freight vehicles, with the exception of the Inner Northern Busway and Eleanor Schonell Bridge.

Public transport mode share on all corridors to the Brisbane CBD is typically at about 40 per cent during commuter periods and is significantly higher than the daily average public transport mode share of around 7 per cent. Public transport mode shares on the western Brisbane network are similar to the metropolitan average. Figure 3.5 shows the existing mode shares for each transport mode across SEQ and to the Brisbane CBD.

Consequences of low levels of public transport services

Public transport services are designed for the journey to work trip with sharp peak demand in the morning and afternoon peaks and low off-peak demand. This results in the need for significant investment in infrastructure and rolling stock that remains underutilised during off-peak periods. It would not be financially feasible to operate public transport at high levels of service during the off-peak with low public transport demand and more dispersed trip ends.

Low public transport services results in a high dependence on cars and public transport remains an unattractive option for a lot of trips.

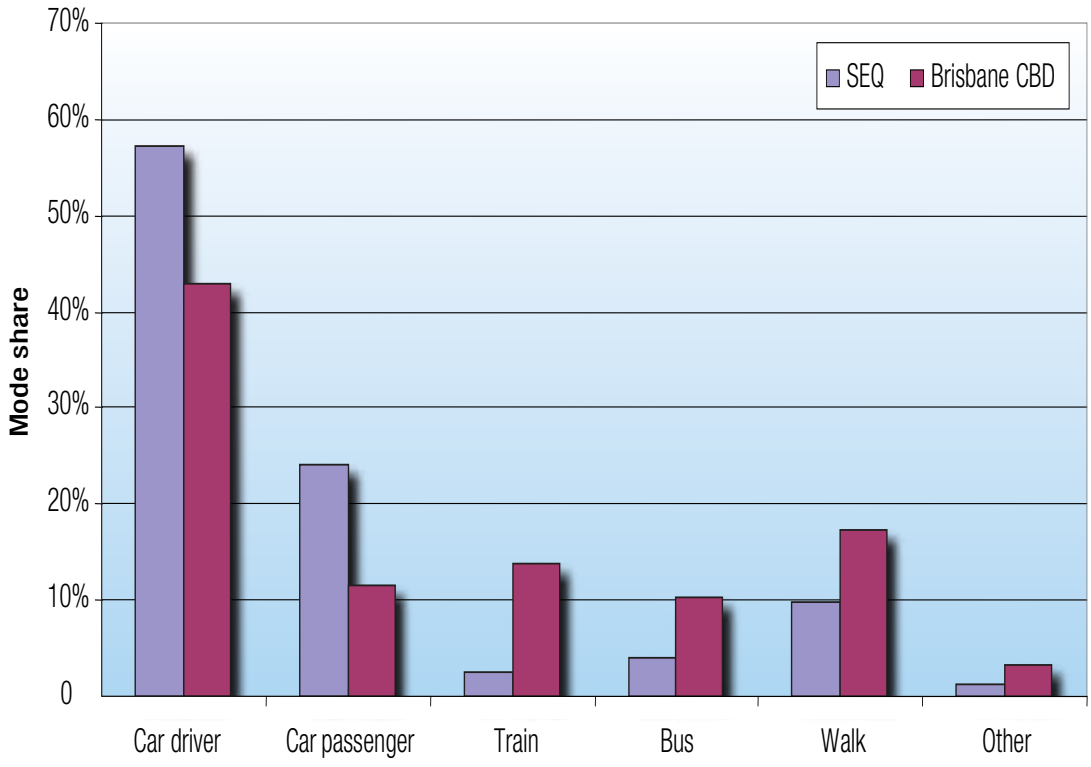


Figure 3.5 Existing SEQ-wide mode shares and mode shares for trips to the Brisbane CBD (Source: 2003/4 SEQ Travel Survey)

Rail overcrowding

Overcrowding on the Ferny Grove, Caboolture and Ipswich rail lines on peak services is becoming an increasing issue. A growing volume of passengers want to travel by rail to the CBD, with specific services more attractive than others which results in uneven loadings of trains.

Low density living does not support public transport investment

Levels of service on the Ipswich, Caboolture and Ferny Grove rail lines are high during peak periods and moderate during off-peak periods. The large areas of relatively low density suburbs in south-western Brisbane have relatively low levels of bus services to rail stations and activity centres in western Brisbane and relatively low off-peak levels of service across western Brisbane. Low density living for much of the western and south-western areas and the dispersed nature of trips does not support high levels of public transport investment.

Limited inter-regional cross-town public transport services

There are limited inter-regional and cross-town services catering for trips between activity centres and other areas of western Brisbane.

Congested roads means bus services suffer

Bus services provide a high level of service during the morning peak along certain corridors (Moggill Road, Milton Road, Coronation Drive, Latrobe Terrace, Waterworks Road, Enoggera Road, Old Northern Road, Appleby Road/Shand Street, Gympie/Lutwyche Road).

These main bus corridors use arterial roads which are congested in peak periods. Buses share roads with general traffic and with the congestion on the road network, issues arise of lack of bus capacity and opportunity to implement bus priority measures. Under these conditions public transport is not always a first choice.

Walking and cycling are sustainable and reduce car dependence in neighbourhoods

The Queensland Government and Local Councils are promoting 'active transport' which includes walking and cycling. Increased walking and cycling helps to reduce dependency on car travel at the local level. It also helps to reduce user health problems such as obesity, asthma and heart conditions.

Existing pedestrian infrastructure is limited

The existing pedestrian infrastructure in western Brisbane consists of:

- A fragmented network of pedestrian paths;
- Limited pedestrian paths in shopping and commercial centres;
- Non connecting footpaths and grass verges for pedestrians in suburban areas; and
- High quality off-road footpaths in recreational areas including parks and reserves.

Existing cycling infrastructure lacks connectivity

The existing cycling infrastructure in western Brisbane is characterised by:

- Fragmented network of bikeways;
- Lack of linkages between the city centre and suburban areas and between suburbs;
- Lack of connectivity to facilities such as shopping centres, education and sports centres; and
- Lack of connectivity to and a lack of secure and sheltered cycle parking facilities at transport nodes.

Road network lacks a sense of hierarchy

The roads within western Brisbane can be described as predominately radial in nature functioning as primarily Sub-Arterial links from the suburbs into the city through suburban centres.

The motorway network is not continuous between the Centenary Motorway and the Inner City Bypass and between the Centenary Motorway and the Bruce Highway, which reduces north-south accessibility and results in high levels of road congestion.

Western Brisbane roads experience congestion with the peak period generally lasting approximately two hours. Due to the proportionately high commuter demand there is relatively little off-peak network congestion experienced, however local intersections across the network experience congestion and delay during most periods of the weekday and at weekends.

Some roads have more than one function

While radial in nature, some roads in western Brisbane (i.e. Coronation Drive, Milton Road, Gympie Road and Inner City Bypass), also operate as orbital roads serving regional traffic not associated with the city centre. This is due to the lack of orbital capacity/function in western Brisbane which means vehicles are diverted into the city centre and frame.

Orbital links which lack route definition

Orbital travel is catered for by a limited arterial road network with no motorway connection, including Metroad 5 and Gympie/Lutwyche Road. As with the radial links, orbital links operate as a constrained system with limited mid block spare capacity, congested intersections and lack of access and priority control. Lack of route definition, continuity and consistent road widths significantly constrain the capacity of the network. Metroad 5 is currently operating at capacity on a substandard alignment. The standard of the existing road is inappropriate for the role it is intended to play in the network.

Choice of cross-city route is limited

Most cross-city travel in western Brisbane use the only arterials in the area, i.e. Metroad 5, Milton Road, Coronation Drive and Inner City Bypass, which provide a local urban arterial function as well as an orbital function for regional traffic.

Limited inter-regional routes

The only major road connections from the Western Corridor to western, north-western and northern Brisbane are the Ipswich Motorway/Centenary Motorway and Moggill Road (via the Moggill ferry). The Ipswich and Logan Motorways are the major east-west connectors south of the Brisbane CBD.

The main road connections from the north-western and northern areas to Brisbane are Gympie Arterial/Lutwyche Road, Old Northern Road, Samford Road/Enoggera Road, and Waterworks Road which also function as local traffic distributors.

Limited role of rail freight

Urban freight movement is largely the preserve of road transport. Rail carries very little of the urban freight task. There is therefore a limited role for rail to play in the Brisbane area pick up and delivery (P-U-D) which thus necessitates good road connections. Given the high cost of road freight operations, good access to the strategic road network is vital.

Freight generating land uses are outside western Brisbane

Freight generating and attracting land uses are located along the Ipswich Motorway in the Western Corridor, at Archerfield/Acacia Ridge, and at the Australia TradeCoast. Purga and Bromelton have currently inadequate connections to the strategic road and rail freight network around the Greater Brisbane area. Brendale industrial area at Strathpine does generate freight traffic but is relatively small compared to the Australia TradeCoast and Acacia Ridge areas.

Lack of well defined freight routes

The more heavily trafficked freight routes in western Brisbane include Ipswich Road, Centenary Motorway, Gympie Road, Samford Road, Enoggera Road, Waterworks Road, Milton Road and Coronation Drive.

There is no viable alternative freight route to the west of Brisbane which connects the industrial south-west (Darra/Wacol/Sumner Park and Ipswich) to the northern hubs (Brendale and Narangba) and to the Australia TradeCoast. These areas are becoming the fastest growing freight generating areas in Brisbane. The most efficient freight route from the west is via the Logan and Gateway Motorways. That involves transiting several suburbs and follows a relatively indirect route. The lack of well defined freight routes and increasing truck volumes in residential areas are growing concerns.

Safety and security

In general the increasing number of passenger trips being made each year results in a greater number of risks to manage.

Some of the key existing safety and security issues include:

- Road crashes and trauma, particularly in the 17–24 age group;
- Safety at 22 rail level crossings in western Brisbane;
- Safety and security of passenger rail travel, especially at night;
- Safety and security of bicycle facilities at rail stations; and
- Poorly lit and defined pedestrian and cycle routes.

Environmental issues

A number of significant areas with sensitive biodiversity values and habitats for rare and threatened species exist across western Brisbane.

The major environmental constraints to developing the transport networks relate to the location of the D'Aguilar Ranges and the Brisbane River as well as national parks and significant ecology.

Total emissions from private vehicles on the SEQ road network amount to around 800 tonnes of CO_2 each day. Increasing emissions as a result of increasing kilometres travelled are a growing issue affecting global warming.

Other important environmental effects such as air and water quality, traffic noise and severance vary across the network and their impacts are more local.

All of the above issues have been investigated and have formed the basis of defining network performance objectives (Chapter 5.1) and development options on the network (Chapter 6).

4.0 Future transport conditions in western Brisbane

4.1 Introduction

The investigation modelled the future transport network with and without major improvements to determine changed network conditions in terms of changes in demand, network congestion and travel time for the future population and land use. In order to compare how conditions varied by the different options and assumptions being investigated, a Base Case was established for the network in 2026, a year for which population and employment forecasts are available, consistent with the Regional Plan and SEQIPP.

The purpose of the 2026 Base Case was to provide a consistent reference for the identification of transport improvement options and the assessment of alternative network improvement options and strategies. It is a do-minimum or business as usual scenario. A range of assumptions underpinned the 2026 Base Case and forecast transport demand.

The 2026 Base Case assumes that:

- SEQIPP projects are implemented by 2026;
- Land use and demographic forecasts are realised as per the Regional Plan;
- Travel behaviour and travel patterns stay similar to today;
- Transport technology and fuel supply would not significantly change from today;
- Economic activity remains similar to today; and
- Public transport patronage growth trends continue up to 2026 at an average of 2.7 per cent compound per annum growth.

The reason for maintaining similar conditions in 2026 as they exist today is to provide a consistent basis from which to compare different options and strategy choices. Changes in these assumptions are tested through sensitivity tests.

A detailed review of the key strategic aspects of the likely 2026 Base Case transport network is reported in the 2026 Base Case Report.

This chapter describes the critical factors influencing the 2026 Base Case and forecast conditions on the future network without major improvements on the western Brisbane network.

4.2 Assumptions

The investigation was based on the Regional Plan and Amendment 1 of the Regional Plan. These are statutory planning documents that set out the year 2026 preferred pattern of development (PPOD) for the region in response to strong population growth forecasts over the next 20 years. The Regional Plan defines a network of regional activity centres and provides for future population growth to be contained within the existing urban footprint and identified urban growth areas.

Population growth and land use

It is expected that the Queensland Government would implement the Regional Plan. This would generate significant population and employment growth in the Western Corridor (particularly in Springfield and Ripley Valley). However, the Regional Plan would not result in any large changes in population and employment density in western Brisbane.

The population forecasts to 2026 that have been used for the investigation cover the SEQ region with the exception of Toowoomba, Boonah and Esk. The 2026 population forecasts were based on the medium growth series projections developed by the Queensland Government's Population and Information Forecasting Unit (PIFU) for the SEQ region. In adopting the PIFU population forecasts, the assumption has been made that population growth and urban development would occur in a manner consistent with the land use pattern of the Regional Plan.

Based on PIFU forecasts, the Brisbane Local Government area (LGA) is expected to remain the most populated LGA in SEQ with a population increase of 20 per cent over existing levels. Both Brisbane and Ipswich LGA's are projected to grow by approximately 200,000 residents, respectively. Ipswich LGA is projected to be the highest growing LGA with a population increase of 149 per cent. Gold Coast LGA would maintain its prominence as the second most populated LGA in the region with growth of around 277,000 residents (57 per cent growth).

To the north, the Moreton Bay Regional Council and the Sunshine Coast Regional Council are forecast to accommodate a large proportion of the expected future population growth. Demographics for the Sunshine Coast show a population increase of 71 per cent (100,000 residents) in Maroochydore alone, the Caboolture area is expected to increase by 53 per cent (80,000 residents) and the former Pine Rivers area by 49 per cent (70,000 additional residents).

By contrast, the population growth in the western Brisbane area would be less than the regional average with approximate growth of 11 per cent or 43,000 residents (from 380,000 to 423,000 residents). Whilst the proportion of growth within the western Brisbane area would not be as great as the Ipswich region or North Moreton, population growth in western Brisbane would be in a more densely developed urban environment. Based on the Regional Plan, the forecast population growth would, however, not substantially alter future land use distribution and population densities in western Brisbane and the SEQ region (refer Figure 4.1).

The study team was directed to base the overall 2026 Base Case on the assumption that land use and demographic forecasts are consistent with the Regional Plan. As the region matures, the metropolitan area would develop into a denser region with strong linkages between land use and transport.

The urban land use structure and spatial distribution of activity centres determine the overall demand for travel and the distances people and goods have to travel to reach their destinations. In SEQ, high population growth would continue to generate a need for well integrated and sustainable urban infrastructure. The challenge in the western Brisbane area is to develop a sustainable transport system that provides high levels of accessibility to employment, goods and services.

The investigation assumed that the Queensland Government's specified land use targets for 2026 would remain unchanged, though marginal variations in land use can be assessed by way of sensitivity testing within the SEQ Strategic Transport Model (SEQSTM).

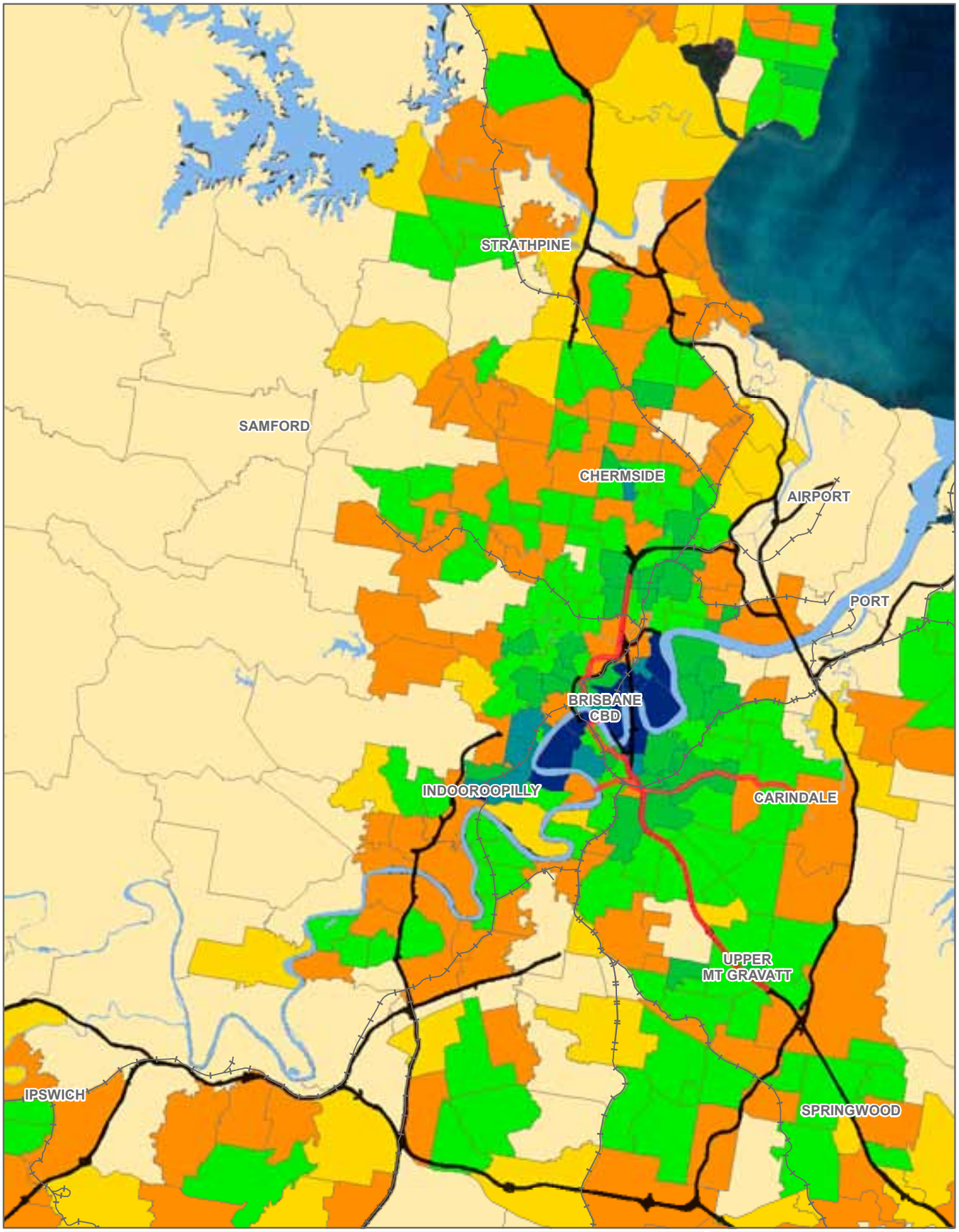
The March 2007 release of demographic projections by PIFU were the current population projections for SEQ at the time and formed the basis of the 2026 Base Case demographics for the investigation. For parts of western Brisbane not covered by this data, i.e. Cooloola Shire and part of Tweed Shire, the most recent projections were available from the respective Local Government websites and the Cooloola Regional Development Bureau.

For education enrolments in 2026, it was assumed that existing education establishments recognised in the 2005 enrolment data will remain in 2026, and will cater for increased enrolments generated by the population in each school's catchment area. It was also assumed that new growth areas planned to develop between 2005 and 2026 would contain new education establishments. Approximate enrolment projections can be developed from current planning information available for these growth areas.

A key assumption of the 2026 Base Case demographics was that the population would be wholly accounted for in the dependent and worker categories. The sum of these categories therefore equals the persons per household for each modelled zone.

It was assumed that the proportion of white and blue collar workers per modelled zone will remain constant between 2005 and 2026. It was also assumed that the breakdown of employment by employment type would remain constant between 2005 and 2026.

It was assumed that the 2026 employment projections for the Australia TradeCoast, sourced from PPOD, are conservative and do not reflect current strategic estimations. Accordingly, the figure of 100,000 jobs was adopted for the study as this more closely reflects the projections contained in the Australia TradeCoast Transport Study.



LEGEND

2026 Population Density (Persons/Km^2)

- < 500
- 500.1 - 1,000
- 1,001 - 2,000
- 2,001 - 3,000
- 3,001 - 4,000
- 4,001 - 5,000
- > 5,000

Waterbodies

2026 Future Transport Network

- Motorway & Highway
- Railway
- Busway

WESTERN BRISBANE TRANSPORT NETWORK INVESTIGATION

Figure 4.1

Expected future population densities under the 2026 SEQ Regional Plan

Queensland Government

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Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

'Employment self-containment' refers to the process of providing more jobs in proximity to where people live and thus reducing the demand for long distance commuter travel. Whilst employment self-containment levels throughout the western Brisbane area were based on the Regional Plan and supporting data, it should be noted that no incentives other than reduced commute distances/times, have been modelled to encourage workers to work locally (i.e. salaries, more leisure time and so on are not addressed).

Transport networks

The 2026 transport network was based on the existing public transport and road network, and additional transport infrastructure improvements and new links that are currently being considered within programs or under construction within the western Brisbane area. The relevant capital works programs include:

- SEQIPP (2007–2026) road, rail and bus infrastructure projects;
- Brisbane City Council (BCC) projects;
- Department of Main Roads (DMR) Roads Implementation Program (RIP) projects and relevant other projects such as the Kenmore Bypass (currently subject to a feasibility study);
- Ipswich City Council (ICC) investment strategy projects; and
- Former Pine Rivers Shire Council (PRSC) Priority Infrastructure Program (PIP) transport projects.

Travel behaviour and travel patterns

For the purpose of assessing future transport investment it was assumed in the 2026 Base Case that there would be no significant changes in travel behaviour or changes in current relationships of trip generation and trip attraction for home based trips and non home based trips for the various trip purposes.

This means for example, that it was assumed in the 2026 Base Case that in the future most people would continue to work, study and shop outside their homes, as they do today. Future travel demand patterns were assumed to be similar to existing patterns, with strong Brisbane CBD-centric travel during peak hours and other trips being dispersed. The existing travel patterns and relationships were based on the 2003/2004 SEQ Travel Survey conducted by The Department of Transport and Main Roads across SEQ and on the Australian Bureau of Statistics 2001 Census of Population and Housing (including Journey to Work data). 2006 Census data was not available at the time of model development.

The above was based on the assumption that current transport prices (such as fares, parking charges, access charges, and taxes) would remain unchanged in real terms to the existing situation.

Significant changes in property values can affect the decision of where to live in respect to job location and hence impact on travel demand. For this investigation, it was assumed that current levels of housing affordability within the urban footprint would be maintained for the time frame of the study.

Public transport mode share

The 2026 Base Case assumes that the public transport mode share of 7 per cent would be maintained. Growth in public transport use in western Brisbane would be higher, at an average daily mode share of about 13 per cent. This is due to the future Base Case being a do-minimum scenario. Public transport travel patterns, i.e. radial demand to the Brisbane CBD, and equally high reliance on rail and bus are assumed to remain substantially the same as they are today.

An assumption of the 2026 Base Case was that the public transport capacity issues in the CBD and the transport network overall will be improved by 2026 to enable the efficient operation of additionally required passenger rail stock. Also, it was assumed that TransLink's bus and rail rolling stock procurement programs can be achieved. This assumption was based on the fact that a number of inner city capacity studies are being conducted concurrently to this investigation (i.e. the Inner City Rail Capacity Study and the Bus Access Capacity Inner City Study).

Transport technology and fuel supply

For the 2026 Base Case, it was assumed that current motor vehicle technology would remain for the time frame under consideration. One of the consequences of this assumption is that relative travel costs would remain much the same as today in real terms and sustained high fuel prices would not significantly change how we use the passenger car. The 2026 Base Case therefore assumes that over the next 20 years, technology, including vehicle technology, would both maintain our current lifestyles and allow transport to be affordable. In examining the preferred strategy, sensitivities to these assumptions were tested (see Chapter 15).

The strategic nature of the study requires that the maximum capacity of the infrastructure be investigated. For the purpose of the 2026 Base Case, it was therefore assumed that the ratio of capacity of general purpose lanes and of alternative lane types such as High Occupancy Vehicle (HOV) lanes is the same. An implicit assumption was that future road capacity per lane remains as it is today, notwithstanding potential advances that may occur in intelligent transport system management which could increase the efficiency of existing roads.

Economic activity

Under the 2026 Base Case it was assumed that economic activity would continue in accordance with current activity. This assumption was used to model the future state of the road network. If economic activity changed significantly in the future, then the transport need would change with it. There is a significant body of evidence to suggest that the State economy (Gross State Product, GSP) and the SEQ economy would continue with strong growth for the foreseeable future.

Population and employment growth in western Brisbane is expected to be lower than the regional average. Ipswich is forecast to grow significantly but is expected to retain a high level of employment self-containment. While the Brisbane CBD would remain the major employment centre in SEQ, the Australia TradeCoast would grow to become a significant employment centre by 2026.

Sensitivity testing

The assumptions listed above have guided the development of the 2026 Base Case. As the transport model has been developed using data which is based on current behaviours, it is appropriate that the 2026 Base Case assumptions be based on those same behaviours.

Future changes in areas such as technology, social behaviours and economic activity would result in changes to travel behaviour and demand. Sensitivity testing involved varying the base assumptions within the model to account for possible future changes in condition such as user behaviour, vehicle technology and fuel prices. The model outputs were compared to gauge the shifts in demand and required response. The results of sensitivity testing informed the development and assessment of the preferred strategy and ensure that the outcome will be appropriate for a range of possible future conditions. These changes are described in Chapter 15.

4.3 Forecast transport conditions in 2026

The key findings of the 2026 Base Case are summarised below.

Growth in trip making

- The trip demand between the Ipswich region and Moreton Bay Regional Council area would remain low in the future.
- Total person trips across SEQ would increase by about 45 per cent between 2005 and 2026. However, overall travel would increase by about 40 per cent across western Brisbane.
- Future growth in the Ipswich region is forecast to have high self-containment compared to other areas. Nevertheless, the growth in the Ipswich area would result in about a 130 per cent increase in trip demand to the Brisbane CBD compared with today.
- The daily increase in cost of private car travel time is forecast to be $4m at 2005 prices.
- Future growth in Moreton Bay Regional Council would lead to a 50 per cent increase in trip demand into the Brisbane CBD compared with today.
- While the Brisbane CBD would continue to be the major generator of trips and the Australia TradeCoast would become increasingly significant over 50 per cent of trips will continue to be dispersed.

Walk/cycle

- The number of walk and cycle trips would increase as a result of current policies, but would not significantly change existing walk/cycle mode shares of about 11 per cent of total trips on the network.
- The intra-zonal local trips would be expected to increase significantly however and local trip mode shares could reach targets of 20 per cent for active transport.

Public transport

- Public transport patronage in the western Brisbane area is assumed to grow at 2.7 per cent compound per annum in line with TransLink's 'Low' growth scenario. This growth would increase public transport patronage across SEQ by about 70 per cent while maintaining current daily mode share at about 7 per cent. Growth in public transport use in western Brisbane would be higher, at an average daily mode share of about 13 per cent.
- The AM peak mode share to the CBD and frame from the western Brisbane area would be 64 per cent, a significant increase on the existing levels of 39 per cent.
- Overall, western Brisbane area mode share for short local trips would be low at around 5 per cent for daily trips.
- Public transport travel patterns (radial demand to the CBD) and public transport use (60/40 rail/bus split in western Brisbane) are expected to remain substantially the same as they are today. This was tested in the sensitivity analysis (Chapter 15).
- This would require a significant increase in bus and rail rolling stock. An assumption of the 2026 Base Case was that the capacity of the CBD and the transport network would be improved by others by 2026 to enable the efficient operation of this additional rolling stock.

Private vehicle

- Growth in private vehicle trips in western Brisbane would be less than regional averages but would still be significant.
- Off-peak trips on many road links would grow to levels higher than current peak trips leading to increased congestion outside of peak times.

Freight

- Freight transport is expected to nearly double by 2026 across SEQ, but only by about 50 per cent on major freight corridors in western Brisbane.
- While the 2026 Base Case shows improvements in freight efficiency for vehicles travelling from the north and the west to the Brisbane CBD there would be significant increases in travel time for freight travelling to the Australia TradeCoast.

SEQIPP and other committed projects would improve future network travel conditions in some areas but more is needed

- Current SEQIPP investment is included in the 2026 Base Case and would improve conditions in many of the strategic road corridors compared with today. However, western Brisbane corridors would need further investment over and above the 2026 Base Case assumptions to minimise increased congestion and improve services.
- With the additional SEQIPP investment in roads and public transport, and a projected annual public transport patronage compound growth of 2.7 per cent, a number of major roads would experience an improvement in level of service, such as Moggill Road west of Centenary Motorway, Metroad 5 south of Waterworks Road, Kelvin Grove Road and Lutwyche Road. However, the number of strategic arterial roads where congestion would worsen include Centenary Motorway, Coronation Drive, Inner City Bypass and Moggill Road east of the Centenary Motorway.
- Off-peak traffic levels are expected to exceed current peak period traffic levels, so traffic congestion during off-peak periods would worsen. This would have implications for the economic vitality of the city as goods and businesses experience delay throughout the day.
- Further investment over and above the 2026 Base Case assumptions would be required to address increased congestion and improve services during peak and off-peak periods.
- The 2026 Base Case road network does not resolve the current discontinuous road network standards experienced between the Centenary Motorway and Gympie Road.
- Works would be required on rail corridors to enable higher frequency passenger services and provide for the additional rolling stock needed to achieve the significant increase in public transport patronage envisioned by the 2026 Base Case.
- Works on road corridors would need to reduce congestion to enable efficient operation of the additional bus services required as well as to accommodate increased freight and private transport.

As a result of growth in western Brisbane, the 2026 Base Case transport network is forecast to be subject to a number of critical travel demands (refer Figure 4.2). These include:

- Strong demand between north of Brisbane and the CBD;
- Relatively small demand for bypassing Brisbane between west and north;
- Strong demand between west of Brisbane and the CBD; and
- Less strong but significant demand between west of Brisbane and the Australia TradeCoast.

The requirement to cater for these travel demands is the key transport planning issue for western Brisbane.

4.4 Public transport mode share scenarios

The study team was directed to use two public transport mode share scenarios developed by TransLink to test possible transport network improvement options and strategy choices for the investigation. These scenarios comprised:

- 'Low' growth public transport scenario based on historic trend – based on an average compound growth rate of public transport trips of 2.7 per cent per annum which would maintain the current public transport mode share into the future (the scenario used in the 2026 Base Case); and
- 'High' growth public transport scenario – based on an average compound growth rate of public transport trips of 6 per cent per annum which would result in a significant mode shift to public transport.

The 'Low' public transport growth scenario represents the 2026 Base Case mode share target. The 'High' public transport growth scenario was used to reflect the strong public transport patronage increases over the last four years and assumes that this would continue to 2026.

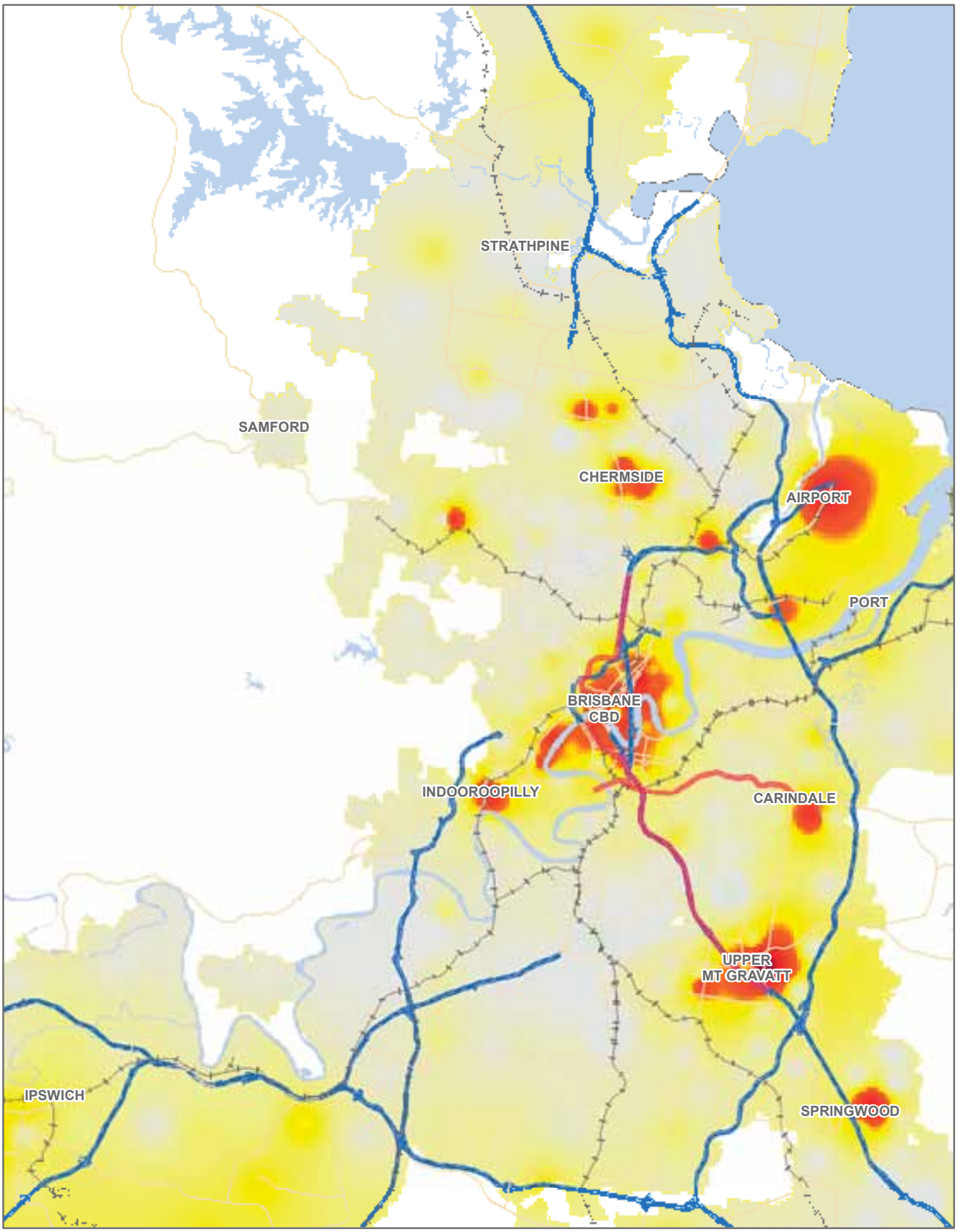
Table 4.1 shows the daily motorised trips for SEQ and western Brisbane under the 'Low' and 'High' public transport growth scenarios.

2026 scenario	'Low' PT growth scenario	'High' PT growth scenario
SEQ		
Total Daily Person	12.9 million (100 per cent)	12.9 million (100 per cent)
PV Daily Person	12 million (93 per cent)	11.4 million (88 per cent)
PT Daily Person	0.9 million (7 per cent)	1.5 million (12 per cent)
Western Brisbane		
Total Daily Person	2.7 million (100 per cent)	2.7 million (100 per cent)
PV Daily Person	2.4 million (89 per cent)	2.2 million (81 per cent)
PT Daily Person	0.3 million (11 per cent)	0.5 million (19 per cent)

Source: SEQSTM.

Note: Public transport growth scenarios are based on TransLink

Table 4.1 SEQ total daily motorised person movements for 2026 'Low' and 'High' public transport growth scenarios



WESTERN BRISBANE TRANSPORT NETWORK INVESTIGATION

LEGEND

Trip End Densities (Trip Ends/Km^2)

- <5,000
- 5,000
- 10,000
- 20,000
- >20,000

- Waterbodies

2026 Future Transport Network

- Motorway & Highway
- Arterial Road
- Railway
- Busway

Figure 4.2

Forecast change in major trip densities under the 2026 Base Case

Queensland Government

connect west consortium

N 0 2 4 Km 1:200,000 on A4

Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

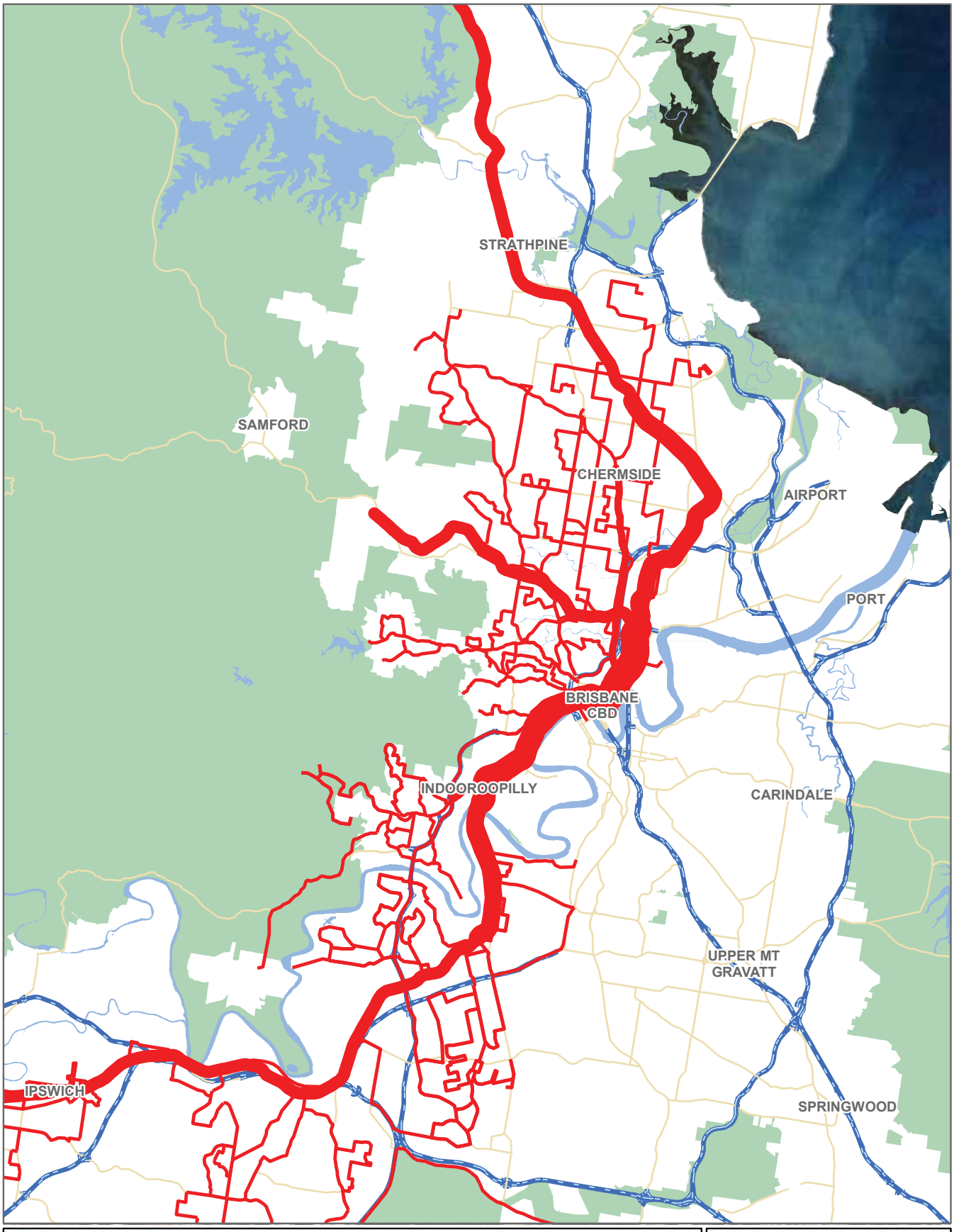
4.4.1 'Low' public transport growth scenario

The 2026 Base Case would maintain the same public transport mode share as today of around 7 per cent, and in effect would mean a doubling of existing rail and bus patronage by 2026, compared to overall travel demand which is expected to grow by about 50 per cent. While there are large increases in population and employment growth planned for the Ipswich region, these have been forecast to have high self-containment and thus are projected not to substantially affect travel patterns. Future population and employment growth in the remainder of the western Brisbane area (including the Brisbane CBD) are considered moderate. Hence, future public transport travel patterns (radial demand to the CBD) and public transport use (60/40 rail/bus split) were assumed to remain substantially the same as they are today.

Future public transport would continue to be geared towards journey to work and education trips. The AM peak would comprise about 50 per cent of total inbound daily trips, inter-peak about 40 per cent of total inbound flows and PM peak about 10 per cent of total inbound daily flows. In the PM peak, a similar pattern in the non peak direction would occur.

Whilst overall demand for journey purposes other than journey to work and education and outside of peak hours would be small compared to overall demand, they would become an increasingly important movement.

Figure 4.3 illustrates the forecast 2026 Base Case public transport demand for the major rail and bus corridors across western Brisbane. The 2026 Base Case public transport trip distribution continues to exhibit a radial pattern to the CBD.



WESTERN BRISBANE TRANSPORT NETWORK INVESTIGATION

LEGEND

- 2026 Urban Footprint
- Waterbodies

2026 Future Road Network

- Motorway & Highway
- Arterial Road

BPT Passenger Demand (Passengers/AM Peak Period)

- < 5,000
- 5,000 - 10,000
- 10,000 - 15,000
- 15,000 - 20,000
- 20,000 - 30,000
- > 30,000

Figure 4.3
Projected AM peak period public transport demand for 2026 under 'Low' PT growth scenario

Queensland Government

connect west consortium

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Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

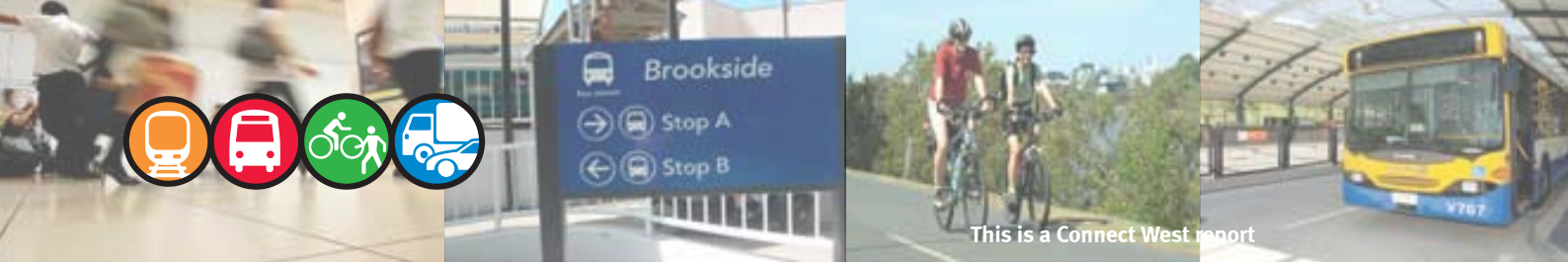


Table 4.2 presents the modelled 2026 public transport mode shares between western Brisbane sub-areas (sectors), the Brisbane CBD and frame, and the remainder of the region. The data shows a continuing strong role of the Brisbane CBD and frame for public transport trips. Across SEQ, daily public transport mode share for trips to the Brisbane CBD would be 41 per cent and from western Brisbane 44 per cent. The AM peak mode share to the Brisbane CBD from the western Brisbane area would be 64 per cent compared to an SEQ-wide mode share of 60 per cent. Daily public transport mode shares to other areas in SEQ from western Brisbane would be at around 5 per cent. The Brisbane CBD and frame would have 41 per cent of internal trips by public transport.

The Brisbane CBD would continue to be the major destination for public transport trips from the western Brisbane area due to its status as a major employment area and due to existing transit service and infrastructure provision. On the other hand, public transport travel demand from Ipswich and Springfield to the CBD and elsewhere in the region would be moderate, due to a high level of self-containment as a result of co-location of a high number of jobs in close proximity to residential development. Whilst overall demand for cross regional trips is small compared to the demand to the Brisbane CBD, it would become an increasingly important movement that would need to be accommodated.

The inner city entry capacity for both bus and rail and bus stop/rail station capacity is likely to emerge as a key issue for the inner city with about one third of all SEQ public transport trips starting or ending in the Brisbane CBD by 2026.

Passenger rail would continue to be the most important public transport mode in the western Brisbane area, particularly in the AM and PM peaks when passenger rail would need to accommodate about 60 per cent of the total public transport task. Both the Ipswich and Ferny Grove rail lines would require increased frequency in AM and PM peaks and inter-peak services to accommodate increased demand.

Bus however would provide an important public transport service in the inner suburbs of Brisbane, serviced by the Northern Busway. Bus would also need to play an important feeder role in areas such as Ipswich and Springfield and by providing direct services to areas not serviced by rail or busway including Mt. Ommaney, Kenmore, The Gap, Stafford and Albany Creek.

A number of road corridors emerge that would require bus priority to improve reliability and bus travel times such as:

- Moggill Road/Coronation Drive from Centenary Motorway (Indooroopilly) to the CBD;
- Kelvin Grove Road from Samford Road to the CBD; and
- Waterworks Road/Musgrave Road from Stewart Road to the CBD.

The modelled demand forecasts for key corridors in western Brisbane, under the 'Low' public transport growth scenario for the AM peak period are shown in Table 4.3. In addition, the extrapolation of current performance with an annual compound growth rate of 2.7 per cent are also described. This rate equals the average city wide public transport growth rate of 'Low' public transport.

Table 4.2 Modelled 2026 PT mode shares by sector under 'Low' growth scenario

Sector	Intra-sector per cent		CBD & Frame per cent		Other SEQ sectors per cent		All sectors per cent
Period	AM	Daily	AM	Daily	AM	Daily	Daily
CBD & Frame	53	47	53	47	19	41	44
Ipswich	4	3	70	46	6	3	3
Springfield/Ripley	1	1	37	23	2	1	2
Kenmore/Moggill	8	6	50	33	5	6	8
Toowing/Indooroopilly	8	6	49	32	5	7	11
Ferny Grove/The Gap/Enoggera	11	7	64	46	6	8	12
Kedron/Chermside	14	10	77	53	8	8	12
Samford Valley	1	1	47	34	3	2	4
Strathpine	6	3	78	55	10	4	5
Western Brisbane (excl. CBD & frame)	8	5	64	44	7	5	7 (13)*
SEQ average (excl. CBD & frame)	5	3	60	41	6	4	5 (7)*

Source: SEQSTM, based on Translink 'Low' public transport growth scenario.

Note: Intra-sector - trips made within sector. City Centre - trips made to city centre. Other - all trips made excluding 'within sector' and city centre

*Including CBD and frame.

Table 4.3 Comparison of corridor demand for the AM peak period (inbound 7.00am-9.00am) under the 'Low' 2026 public transport growth scenario

Corridor	Existing demand	2026 'Low' PT SEQSTM demand	2026 low growth (2.7%) extrapolation
Coronation Drive & Milton Road	6,700	10,200	11,300
Musgrave Road	2,600	4,200	4,400
Kelvin Grove Road	2,600	4,300	4,500
Lutwyche Road	4,300	9,100	7,200
Ipswich Rail	8,600	32,200	14,700
Ferny Grove Rail	6,300	12,300	10,700
Caboolture Rail	12,400	38,200	21,100
Other Rail	12,100	32,900	21,000

Source: SEQSTM, based on Translink 'Low' public transport growth scenario.

4.4.2 'High' public transport growth scenario

Under the 'High' public transport growth scenario of 6 per cent compound growth per annum, the public transport mode share would be 12 per cent across SEQ in 2026, which in effect would mean a 320 per cent increase in existing rail and bus patronage by 2026. Figure 4.4 illustrates the estimated 2026 'High' growth public transport demand for the major rail and bus corridors across western Brisbane.

Table 4.4 presents the estimated 2026 public transport mode shares for western Brisbane sub-areas, the Brisbane CBD and the remainder of the region. Public transport mode shares from many sectors to the CBD and frame would reach significant proportions of up to 80 per cent during the AM peak. Inner northern and inner western Brisbane would reach public transport mode shares up to 28 per cent during the morning peak.

The table shows the public transport mode shares would be relatively low in Ipswich and Springfield, however Strathpine would exhibit relatively high public transport mode shares similar to inner western and inner northern suburbs. More than half of all public transport trips in SEQ would be starting or ending in the Brisbane CBD under the 'High' public transport growth scenario.

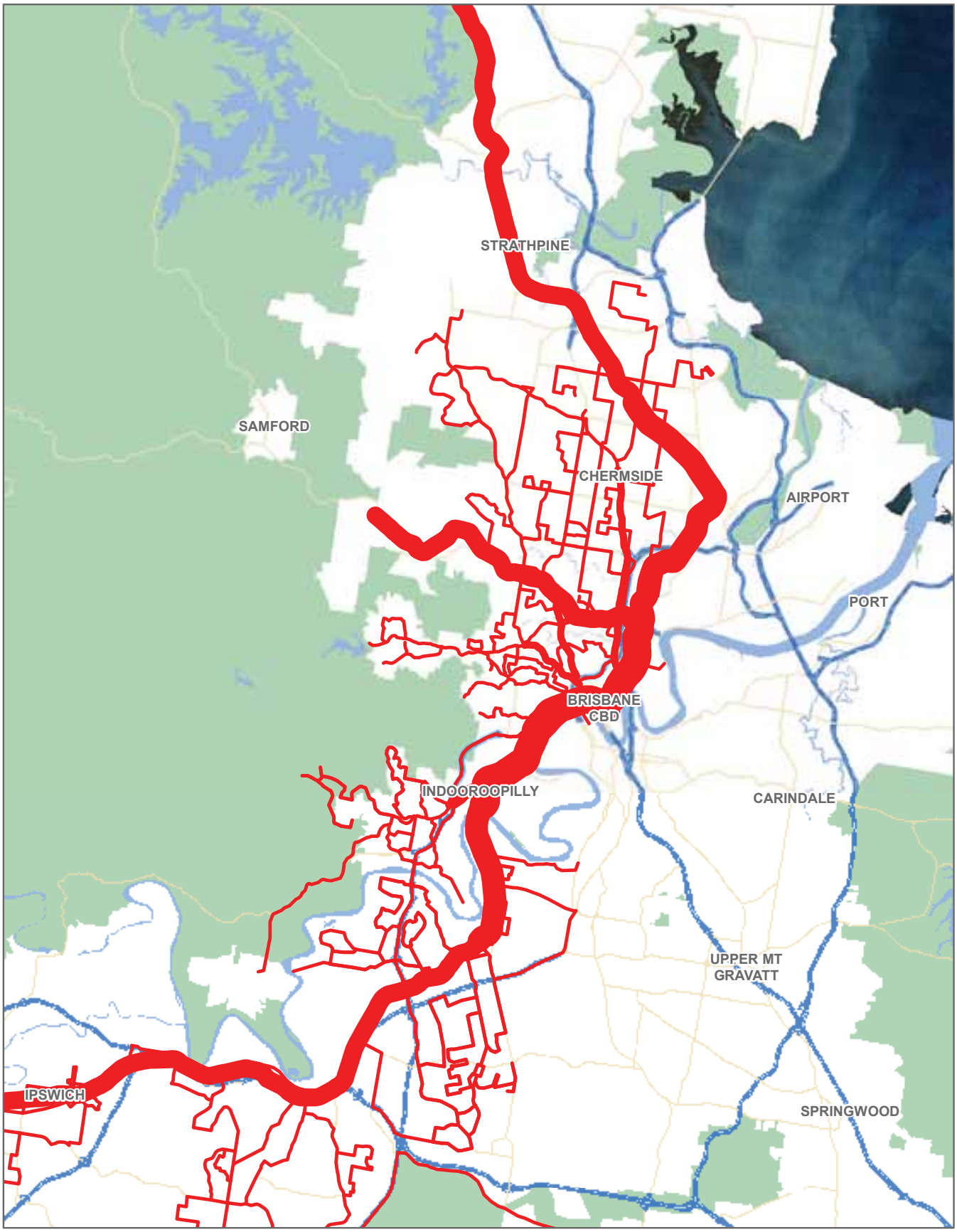
Table 4.4 Modelled 2026 PT mode shares by sector under 'High' growth scenario

Sector	Intra-sector per cent		CBD & Frame per cent		Other SEQ sectors per cent		All sectors per cent
Period	AM	Daily	AM	Daily	AM	Daily	Daily
CBD & Frame	80	76	80	73	32	63	69
Ipswich	8	5	80	62	11	6	6
Springfield/Ripley	2	1	53	35	4	3	3
Kenmore/Moggill	13	10	79	57	9	10	14
Toowing/Indooroopilly	14	11	79	55	9	12	19
Ferny Grove/The Gap/Enoggera	17	12	80	69	11	14	19
Kedron/Chermside	28	20	80	74	18	15	22
Samford Valley	2	1	75	56	6	3	7
Strathpine	21	14	80	65	18	9	13
Western Brisbane (excl. CBD & frame)	16	11	78	34	25	16	13 (22)*
SEQ average (excl. CBD & frame)	9	6	77	60	11	7	8 (12)*

Source: SEQSTM, based on TransLink 'High' public transport growth scenario.

Note: Intra-sector – trips made within sector. City Centre – trips made to city centre. Other – all trips made excluding 'within sector' and city centre

*Including CBD and frame.



WESTERN BRISBANE TRANSPORT NETWORK INVESTIGATION

LEGEND

- 2026 Urban Footprint
- Waterbodies

2026 Future Road Network

- Motorway & Highway
- Arterial Road

HPT Passenger Demand (Passengers/AM Peak Period)

- < 5,000
- 5,000 - 10,000
- 10,000 - 15,000
- 15,000 - 20,000
- 20,000 - 30,000
- > 30,000

Figure 4.4
Projected AM peak period public transport demand for 2026 under 'High' PT growth scenario

Queensland Government
connect west consortium

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Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

The modelled demand forecasts for key corridors in western Brisbane under the 'High' public transport growth scenario for the AM peak period are shown in Table 4.5. In addition, the extrapolation of current demand with an annual growth rate of 6 per cent are also presented. This rate equals the average city-wide public transport growth rate of 'High' public transport.

Table 4.5 Comparison of corridor demand for the AM peak period (inbound 7.00am–9.00am) under the 'High' 2026 public transport growth scenario

Corridor	Existing demand	2026 'High' PT SEQSTM demand	2026 high growth (6%) extrapolation
Coronation Drive & Milton Road	6,700	17,200	21,300
Musgrave Road	2,600	5,200	8,200
Kelvin Grove Road	2,600	5,400	8,500
Lutwyche Road	4,300	9,400	13,600
Ipswich Rail	8,600	40,600	27,700
Ferny Grove Rail	6,300	15,500	20,200
Caboolture Rail	12,400	39,600	39,700
Other Rail	12,100	38,500	38,800

Source: SEQSTM, based on TransLink 'High' public transport growth scenario.

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5.0 Strategic network objectives and network planning principles

5.1 Network performance objectives

The strategic network objectives developed for public transport, active transport, roads and freight and which provide the framework for the investigation are presented in this chapter. The strategic network objectives are based on current SEQ planning policy as expressed in the Regional Plan. Table 5.1 presents the objectives for the region and for western Brisbane. In addition, mode specific network planning principles were developed which are summarised in this chapter. These mode specific objectives were used to develop a large number of network improvement options and selected strategy choices, and to assess how these options and choices would meet these objectives. Chapter 9 describes the assessment.

5.2 Public transport planning principles

The following principles and policies adopted from the TransLink Network Plan (2007), and knowledge of other successful public transport networks around the world, were applied to develop the 2026 western Brisbane public transport network strategy:

- Adopt a long term transit vision when developing the 2026 network;
- Integrate regional land use with the transportation network;
- Maximise the utilisation of existing assets prior to investing in new facilities;
- Invest in the rail and busway network to form the 'backbone' of the transit network;
- Ensure service reliability and improve travel speeds by investing in bus priority measures;
- Support a radial network and invest in circumferential connections to regional centres;
- Operate public transit as an integrated service network;
- Provide quality of service coverage rather than total network coverage;
- Provide high speed travel for long distance trips and frequent services for shorter trips;
- Provide good interchanges that make transfers easier;
- Encourage walking by good and direct pedestrian facilities;
- Encourage cycling with adequate facilities;
- Only accommodate commuter parking in outlying areas;
- Develop simple fare systems and continue implementing integrated ticketing;
- Simplify access to travel information; and
- Make the customer feel comfortable and safe.

The following section describes the public transport planning principles used to develop the public transport network options.

Table 5.1 Network improvement objectives for western Brisbane

(a) Transport Planning Objectives
• To cater for strong demand between north-western Brisbane and the CBD • To cater for strong demand between western Brisbane and the CBD • To provide additional capacity on key transport corridors • To cater for demand from the west and north-west of Brisbane to the Australia TradeCoast
(b) SEQ Transport Objectives
• Strategic fit – provide integrated networks for long distance travel, linking regions together • Economic – maximise use of existing transport assets and services. Invest in the transport system to maximise community benefit. Provide an efficient and integrated freight transport system • Social – improve accessibility and support the accessibility needs of all members of the community including walking, cycling and public transport use. Provide urban design opportunities to promote non-motorised travel • Environmental – provide sustainable travel solutions • Financial – provide travel solutions that minimise 'whole-of-life' asset costs
(c) Western Brisbane Transport Objectives
Economic objectives
1. Maximise use and effectiveness of existing infrastructure 2. Increase the overall efficiency of people movement by reducing existing levels of congestion at major intersections and at pinch-points on the road network (compared to the 2026 Base Case) and investing in public transport priority measures 3. Provide efficient and effective freight destribution routes serving freight nodes and centres in western Brisbane 4. Improve travelling conditions for long distance travellers in western Brisbane 5. Improve road and rail access to Brisbane CBD and to jobs outside western Brisbane
Social objectives
1. Provide a safe road network and rail service in western Brisbane 2. Improve access to public transport services 3. Provide higher levels of bus feeder services to rail stations 4. Improve accessibility to activity centres including local travelling conditions and facilities for cyclists and pedestrians in western Brisbane
Environmental objective
1. Provide transport infrastructure to facilitate and enable more sustainable transport and lifestyles

Adopt a long term transit vision when developing the 2026 network

An analysis of existing conditions, opportunities and constraints provides the platform for the generation of a 'bottom-up' planning approach. Although the outcome of the investigation is focused on implementation priorities for the future 2026 network, it is framed within an integrated long term land use/transport vision for Brisbane focusing on the next 50 years.

Integrate regional land use with the transportation network

Public transport outcomes are heavily influenced by land use patterns. Transport supply should therefore be integrated with land use development at both the local and regional levels.

The 2026 network is based on the Regional Plan population and employment forecasts. Beyond 2026 increased densification along existing and proposed public transport corridors will ensure that high capacity, high frequency quality public transport services can be supported.

In a similar way, land use and other development control policies should support transit, by means such as reducing parking requirements within developments in close proximity to stations, increasing density of development along key transport corridors and locating the highest density sites at the high access inter-modal interchanges. Integrating employment and residential land uses and transport planning could also increase the self-containment of sub-areas and reduce the aggregate kilometres of vehicle travel without sacrificing accessibility. This in turn leads to improved quality of life for all residents and workers. It is particularly important however that land use and transport are integrated at the local design level due to the importance of walk and cycle trips to feed transit.

Invest in passenger rail and busway network to form the 'backbone' of the transit network

The passenger rail and busway network should form the backbone of the transit network in the long term. This however cannot be undertaken at the expense of providing a good local bus network or good road system. However, competing services should be reduced or eliminated and feeder services provided to support high capacity modes, phased in as services improve so passengers are not disadvantaged.

While it is acknowledged there can be some duplication of services along the passenger rail line/busway catchment to serve intermediate destinations, the majority of services competing should be eliminated as levels of service improve. Similarly the walk in catchment for higher quality services can be expanded to approximately 800 metres. Mode interchange facilities should be provided at major rail stations to accommodate the feeder network concentrating on achieving maximum network coverage. This principle is complementary to the principle of investing in existing infrastructure prior to embarking on new investments.

Maximise the utilisation of existing assets prior to investing in new facilities

Western Brisbane has significant investment in public transport, particularly rail. A number of road corridors carry significant volumes of bus traffic. Maximising the utilisation of existing infrastructure prior to investing in new or additional corridors would expand patronage in an area of guaranteed demand as well as minimising capital and operating expenditure. This strategy would however need to be complementary with the longer term public transport vision of expanding public transport to new areas.

Ensure service reliability and improve travel speeds by investing in bus priority measures

Reliability of service is important for all modes and services but it is particularly important on less frequented routes. Reliability and speed concerns are often associated with buses operating in mixed traffic on congested roads. Bus priority should be implemented along all key bus corridors and at other congested points to ensure reliability and speed of buses can be improved. Measures could comprise bus only signals, bus only turns and other responsive technology to improve bus priority in a coordinated signal network; queue jumper lanes at congested intersections or merges; bus lanes with indented bus bays to ensure that overtaking by express services can occur within existing road reserve; or separate right-of-way capacity on highly frequented bus corridors.

Support the radial network and invest in circumferential connections to regional centres

Brisbane passenger rail and bus services were developed over a long time and are based on a radial network to support heavy concentration of employment in the Brisbane CBD. Continued improvement of radial services to the CBD is required.

However there is a general lack of direct, cross regional suburban routes to other centres. New cross suburban links should be introduced to connect regional centres. Similarly connecting existing, committed and planned busways to one another would increase connectivity between regional centres.

Operate public transit as an integrated service network

The ability to easily interchange between modes and services creates opportunities for increased journey combinations and destinations, maximises the use of the network and expands network coverage. This can only be successful where interchange opportunities are physically co-located in close proximity to one another, services are timed to connect to one another or are operated at sufficient headways to allow a 'turn-up-and-go' philosophy, fares are integrated and information presented in a consistent and continuous manner. Physical integration includes providing convenient, safe and comfortable interfaces (bus stops, stations, interchange and transfer facilities) and managing how passengers move between the links in their trip. The use of a single integrated fare and coordinating transfers minimises the disutility associated with the interchange. Similarly the provision of simple route and trip planning information will ensure that passengers can make informed decisions about public transport travel.

It is however not possible to cater for every trip from each origin to every destination with direct services. Hence feeder services that support a few high capacity and high quality corridors provide a more cost effective way of providing public transport coverage across the region.

Provide quality of service coverage rather than total network coverage

In order to attract an increasing share of the total travel market, public transport needs to provide a high quality alternative to car users. This will require high quality separate rights-of-way and dedicated infrastructure to ensure that public transport provides competitive travel times and operates reliably. High quality public transport is valued highly by passengers who are often prepared to walk longer distances to the service. Thus under a cost neutral strategy it may be more effective to provide fewer high frequency quality services rather than many low frequency services. TransLink's minimum transport service provision would however still be required.

Provide high speed travel for long distance trips and frequent service for shorter trips

Existing express services operated by passenger rail offer patrons few travel time advantages. Travel speed is more important than frequency for long distance trips as average wait times are a small proportion of total travel time. As trip length decreases, frequency becomes a more important factor in total trip times. Thus express services and limited stop services should be considered for longer distance trips and high frequency trips for shorter trips. Accommodating express services on the same rail track can only be achieved at the expense of headways. Therefore there is a need to balance competing needs of users on the system. Current express bus services offer considerable travel time savings and are the preferred mode of travel for many patrons.

Provide good interchanges that make transfers easier

Transfer between the various layers of the network, services and modes, creates opportunities for increased journey combinations and destinations. The design of an interchange will need to balance the needs of the operator who provides the service, passengers who use the system, and surrounding communities who may be affected by establishment/expansion of an interchange. There is also a need to provide consistent quality of facility, and availability of services and information, at each category of stop/interchange.

Encourage walking with good and direct pedestrian facilities

Walking is the preferred and most flexible method for passengers to travel to and from final origins and destinations. Walking access can be limited by steep grades, missing or indirect connections, physical barriers and lack of weather protection but it can be improved by providing pedestrian grade-separated access to major destinations, lighting and providing protection against the elements. Bus stops and terminals have a primary catchment of about 400m based on a five-minute walk. It is generally accepted that passengers are prepared to walk further to a better quality (faster, more reliable) service such as rail, and the catchment expands to a 10-minute walk or 800m. Priority should be given to maximising walking access before considering improvements to other access modes. Similarly, walking should given the highest priority in interchange and station design.

Encourage cycling with adequate facilities

Cycling can extend the catchment of interchanges by enabling travel of 2–3 km within 5–10 minutes and should be given the next highest priority after walking within interchanges. Suitable cycling facilities should be provided at key interchanges and major stations including lockers and racks. Adequate off-road cycle paths should be provided in the vicinity of key stations.

Only accommodate commuter parking in outlying areas

The primary purpose of commuter parking is to intercept car journeys and encourage a transfer to public transport. Commuter parking can effectively expand the catchment area of an interchange allowing people living in low density areas or distant from line-haul services to catch public transport. Commuter parking is particularly important for persons of reduced mobility (such as parents with children, people with physical disabilities, the elderly and persons with large shopping or personal baggage). The provision of parking and drop off/pick up facilities can sometimes undermine more sustainable modes such as walking and cycling and the viability of feeder bus services.

Commuter parking should be encouraged in low density outlying areas where land is plentiful. It should not be encouraged within about 10 km of the CBD where there are higher land use densities. It requires a good arterial and distributor road system that provides direct access to the Park 'n' Ride facility without adversely affecting the surrounding communities.

Develop simple fare systems and integrated ticketing

Integrated ticketing is an important factor in providing integrated transit. Introduction of integrated ticketing typically results in increased ridership of approximately 10–15 per cent. The continued implementation of the Go Card will allow even more passengers to make multi-modal trips with greater convenience.

Simplify access to travel information

Passenger information services should be provided to improve the public's knowledge of travel alternatives. Good passenger information must be readily accessible to all public transport users throughout their journey, but particularly before their trip is made and their mode selected. Potential users should also be able to easily locate information sources. Information should be accurate, timely, consistent and easy to understand. This is particularly important for occasional users.

Brand transit levels consistently

Differentiating public transport services can overcome some of the reluctance to try new public transport services by simplifying the product and setting appropriate service expectations. The BUZ high frequency bus network is a good example of brand differentiation meeting community expectation.

Make the customer feel comfortable and safe

The real or perceived perception of public transport safety and security are important elements in the decision to use public transport. These can be influenced by the design of public transport infrastructure, activity levels at transport facilities, especially at night, and the quality and maintenance of vehicles and stops/stations.

5.3 Role and function of public transport modes

The function, role and operating characteristics of common public transport systems within western Brisbane are described in Table 5.2.

There is no light rail network in western Brisbane. The role and function of light rail transit is generally to provide public transport capacity for short to medium distance trips within inner city, high density areas and between the CBD and higher density inner city suburbs. The operating characteristics of light rail require extensive hours of service across a relatively low coverage area, with frequent, high amenity stops. Light rail operates at low to moderate speeds, depending on whether the light rail has its own right-of-way or runs on-street within general traffic. A range of vehicle styles exist from traditional trams to low floor, high speed rail cars offering low to medium capacity. Overall light rail capacity depends on the vehicle type, service coverage and whether it operates within a separate right-of-way.

Table 5.2 Features of public transport modes within western Brisbane

Network Type	Railway/Busway Network	High Frequency Bus Network	Local Connector and Feeder Network
Function			
	• Transit network backbone • Radial network connecting regional centres to the CBD along high density corridors with multiple centres • Permanence creates opportunities to focus future development patterns	• Supplementary high quality network with radial focus to regional and district centres and activity nodes, providing coverage to medium/high density corridor areas not served by the railway/busway • Implemented in medium demand corridors, potentially as a fore runner to busway to build up patronage	• Minimum level of service • Network centred on local node and/or providing feeder connections to railway/busway and BUZ network • Emphasises coverage of low density areas
Typical trip length	Long/medium distance	Medium distance	Short distance
Operating Characteristics			
	High speed	Moderate speeds	Moderate speeds
	High frequency (timetables not consulted)	High frequency (timetables not consulted)	Low frequency (timetable consultation required) with higher frequencies during peaks
	High reliability	Good reliability	Moderate reliability
	High capacity	Moderate capacity	Low capacity
	Modern vehicles/ passenger rail stock	Modern 'standardised' vehicles	Standard vehicle
	Extensive hours of service	Extensive hours of service	Moderate hours of service
	Low coverage	Moderate coverage	High coverage
	High quality service	Planned, operated and 'branded' as a superior bus service	Typical bus service
	Integrated ticketing/fares	Integrated ticketing/fares	Integrated ticketing/fares
Right-of-way and infrastructure requirements			
	Separate right-of-way	On street running with extensive priority including bus lanes and signal priority in congested areas	On-street running
	High amenity and capacity at stops and stations	Good amenity and information at stops	Moderate amenity and static information at stops – may need priority protection at interchanges
Example			
	Ipswich and Ferny Grove passenger railway; proposed Northern Busway	BUZ network	Feeder and local bus services

5.4 Active transport planning principles

A transport network that is conducive to cycling and walking can reap many benefits in terms of reduced traffic congestion and improved quality of life.

A central premise of many sustainable development concepts is to reduce automobile dependence by designing places that are well suited to walking and cycling. While road access is still provided, streets are more permeable and designed to connect the development using a grid system that maximises choice of route and direct walking and cycling connections. Improving permeability involves significant effort to integrate pedestrian, bicycle and vehicular travel. This improves permeability and also enhances legibility and personal security, for example, by removing the need for public access ways. Indeed it has been shown that cities with well planned walking and cycling facilities often experience supplementary benefits that promote culturally diverse places with a strong sense of community and identity.

The arguments for reducing automobile dependence and subsequently increasing sustainability are compelling. As development moves to reinforce more sustainable patterns of growth and behaviour, the importance of walking as a viable mode of transport has become increasingly recognised. The benefits of walking and cycling are well understood and documented in today's society and include the following:

A viable alternative

Short and local trips, such as a trip to the shops to purchase a newspaper, the journey to school or visiting friends in the same neighbourhood are conducive to walking and cycling. Generally, walking is a viable mode of transport for trips less than 1 km and for trips of up to 5 km cycling is a viable alternative to the car. A range of factors determine choice such as trip purpose, the level of fitness and age, weather, safety, availability and physical condition of pedestrian and bicycle infrastructure.

Social equity and access

Walking is free and is a mode of transport available to all ages and groups in society, including those with disabilities, who may be denied independent access to public transport if paths are not provided.

Health benefits

Walking and cycling are easily accessible and are valuable forms of exercise. Around 60 per cent of men and 70 per cent of women are currently not physically active enough to benefit their health (World Health Organisation 2007). According to the Australian Government Department of Health and Ageing 2007, 58 per cent of men, 42 per cent of women and up to 25 per cent of children in Australia are overweight or obese. This obesity epidemic could be ameliorated with increased levels of walking and cycling.

Improved road safety

Good walking and cycling environments are safer for all users as drivers tend to slow down in 'people places'. Roadway improvements to accommodate pedestrians and cyclists can also enhance safety for motorists.

Sense of community and place

Good pedestrian environments and a greater number of pedestrians using the streets encourage social interaction and an increased sense of 'community'.

Security

More people using the streets and better sense of community can help to improve passive surveillance and security.

Access for the aged and children

Good walking and cycling environments make it safer and easier for children to access schools, and for the increasing ageing population to reach local services, shops and friends. Schools generate a considerable number of vehicle trips, particularly as the number of children driven to school by their parents is increasing while those who cycle and walk are in decline.

Recreation opportunities

Walking is an extremely popular recreation activity in SEQ and its potential for growth in western Brisbane is significant.

Reduced air pollution

Good walking and cycling environments reduce the need for short car trips, which contribute greater volumes of pollutants per kilometre than longer car trips.

Benefits for local economy

Walking to local activity centres has well documented benefits for improving the local economy.

Reduced traffic congestion

Walking and cycling could replace many short trips, especially during peak periods, and for specific activity generators such as schools.

Improved access to public transport

Walking makes up a portion of every public transport trip. Making walking and cycling to public transport stops safer and easier can help to encourage public transport use.

Accommodating future growth

Population growth will increase the need for good walking access (and less local car use) to all destination types including schools, shops, public transport stops etc.

Reduced infrastructure costs

Providing for and promoting good walking and cycling environments is considerably less expensive than building/maintaining roads and car parking spaces.

A summary in the western Brisbane context

Increased walking and cycling levels will improve our local and metropolitan public space and the social interactions we have. Both modes allow us to stop and chat or just say 'hello' in a way which it is difficult to do when closeted in a vehicle. As such, they improve our sense of community. They also provide for more pleasant and sustainable public spaces, serve to support local facilities and improve our local and global environments.

5.5 Road corridor network planning principles

Road corridors have multiple functions within the overall transport network. They are essentially thoroughfares for the movement of people and goods, for connecting communities and supporting economic growth. Road corridors are traditionally seen as supporting private and commercial vehicular traffic. However, roads are also essential in allowing the movement of buses, cycling and walking thus covering the demand for most modes of transport. Therefore, important consideration needs to be given to the integration of all modes in planning for the road corridor network to maximise the capacity and effectiveness of the network.

Planning of the road network should accommodate several key objectives that deliver an effective road network, supporting bus transport and general traffic accessibility to:

- Support regional accessibility and economic growth in the western Brisbane area connecting activity centres and employment nodes;
- Facilitate and support the development and expansion of the strategic bus network;
- Deliver an effective strategic transport network within a defined hierarchical structure;
- Maximise the use of the existing or preserved transport (road and public transport) infrastructure and services, and ensure a high level of transport system performance within western Brisbane;
- Support regional north-south private and commercial movements west of Brisbane;
- Support liveable communities and reduce the dependence on private car usage;
- Develop an integrated transport network supporting the development and expansion of the public transport, cycling and walking network;
- Capture spare capacity created by tunnel projects to provide for opportunities to prioritise surface road space, for public and active transport, linking road corridor and bus priority as a 'package'; and
- Maximise the person movement capacity of the corridor through better utilisation of road space during peak periods.

Support regional accessibility and economic growth in the western Brisbane area connecting activity centres and employment nodes

Road corridors are essential for the movement of goods and freight, which is essential for strong sustainable economic growth, keeping Brisbane regionally competitive. Substantial amounts of freight within western Brisbane are local pick up and delivery and cannot be transferred to rail. A road network must support the movement of commercial traffic in both peak and off-peak periods connecting activity centres and employment nodes.

Facilitate and support the development and expansion of the strategic bus network

Road corridors support both public and private transport through combined or separated facilities. Planning must allow for all modes of transport within the existing transport corridor or through expansions to create additional capacity.

Deliver an effective strategic transport network within a defined hierarchical structure

Western Brisbane's road network structure does not currently allow for the efficient movement of people and goods through and around western Brisbane. Good network structure allows for better congestion management. Redundancy in the system creates a robust network which can better react to incidents and the redistribution of congestion. Further, creating a good network reduces rat running and provides capacity on higher order roads to carry orbital and longer distance private or commercial traffic. This supports more liveable communities, general social wellbeing and economic growth.

Maximise the use of the existing or preserved transport (road and public transport) infrastructure and services, and ensure a high level of transport system performance within western Brisbane

The Queensland Government manages significant transport assets. Maximising the use of these assets, whether through better management of capacity or space within an existing corridor or through realization of the potential of a preserved corridor, improves the existing transport network without disruptive and expensive creation of new corridors. The upgrade or development of these assets should consider the potential of all modes of transport to maximise their effectiveness.

Support regional north-south private and commercial movements west of Brisbane

Travel demand from the Western Corridor will place pressure on the need to provide a high standard road link west of Brisbane to reduce the dependence of travel through the city or along the Gateway Motorway. Connected motorway systems are essential for the continuity of capacity and legibility of travel. The forecast demand for regional and sub-regional travel through western Brisbane's road network supports the need to 'fill the gaps' in the transport network and support the orbital network for north-south travel.

Support liveable communities and reduce the dependence on private car usage

Road corridors serving the community should provide not only for private vehicle trips, but also for public and active transport to diversify travel options. Providing travel options along corridors allows for less private vehicle dependency and more attractive opportunity for higher occupancy modes and more sustainable transport.

The road corridor network should be supportive of local communities and integrate with the land use which it supports. Reducing congestion within urban centres by redirecting private and freight through traffic along more appropriate road corridors and supporting urban centres with local private, public and active transport is essential for creating liveable communities. In turn, land use development should be sensitive to facilitating a feasible and efficient transport network structure.

Develop an integrated transport network supporting the development and expansion of the public transport, cycling and walking network

Integrated planning is essential for a holistic approach to providing transport infrastructure cost effectively and to meet the needs of the community.

Road corridors support private, public and active transport, as well as freight, through combined or separated facilities serving all community needs. Planning must allow for all modes of transport within the existing road corridor or create additional capacity through expansions or better management of space. Further, the use of existing road corridors should be appropriate for their role in the overall transport network.

Capture spare capacity created by tunnel projects to provide for opportunities to prioritise surface road space for public and active transport, linking road corridor and bus priority as a 'package'

Linking the development of the road network creating additional private and commercial vehicle capacity, with public and active transport, creates opportunities to provide transport infrastructure more cost effectively and will impact less on the community.

It is assumed that the use of private vehicles will continue into the future which would in turn increase the demand on the transport network. However, as more private car capacity is added to the network this could further increase the reliance on the private car, especially for trips which could be supported effectively by public or active transport.

Making better use of existing surface road infrastructure where additional capacity is provided in tunnel or new corridors will help to reduce the reliance on the private vehicle and support the trend to public transport. By giving priority to high occupancy vehicles on the surface, the capacity of the existing corridor can be maximised taking further trips off the road and offsetting the reduction in private vehicle capacity.

This in turn further supports liveable communities by removing through traffic and allowing public and active transport to integrate with urban land use.

Maximise the person movement capacity of the corridor through better utilisation of road space during peak periods

The carrying capacity of a normal arterial road is approximately 2,000 people an hour. This is equivalent to the same road space for a bus lane which has the capacity to carry around 5,000 people an hour. Through better utilisation of road space the capacity of the transport system can be maximised, reducing the reliance on further investment in new infrastructure and impact on the community.

5.6 Freight planning principles

Planning for freight movements is closely related to road network planning. Although comprising only a relatively small proportion of the total traffic stream, freight activity and its interaction with other transport activity, is a vital component of any transport network. More than 90 per cent of freight in SEQ is moved on roads, 60 per cent of which is inter-regional activity.

Urban freight movement in Brisbane is largely the preserve of road transport. Rail carries very little of the urban freight task. The urban road freight task can be characterised into a few main groups:

- Urban goods movement – from docks to warehouses, to retailers, to consumers;
- Courier parcel services and mail delivery;
- Bulk materials associated with building, construction and waste management; and
- The urban component of long distance inner city freight transport.

Interstate and regional movements tend to be exclusively hauled by larger trucks (often B-Doubles and semi-trailers) while many cross city movements in Brisbane are performed by rigid trucks, vans and utility type vehicles. Hence, there are a relatively large number of individual truck trips given the size of the freight task.

Local movements are characterised by a very high number of origin and destination points each with a low traffic volume and small consignment size in comparison with interstate and regional movements where point to point load consolidation is the norm.

Driven by household demand growth, freight volumes are expected to double over the next 20 years (with an annual average growth rate of around 3.7 per cent), compared to overall traffic which is expected to increase by 30–40 per cent over the next 20 years. Truck operators are moving towards higher productivity vehicles such as B-Doubles to accommodate increased freight volumes. Therefore the volume of the overall freight task carried would increase and reinforce the strategic importance of B-Doubles, and over dimensional routes around Brisbane.

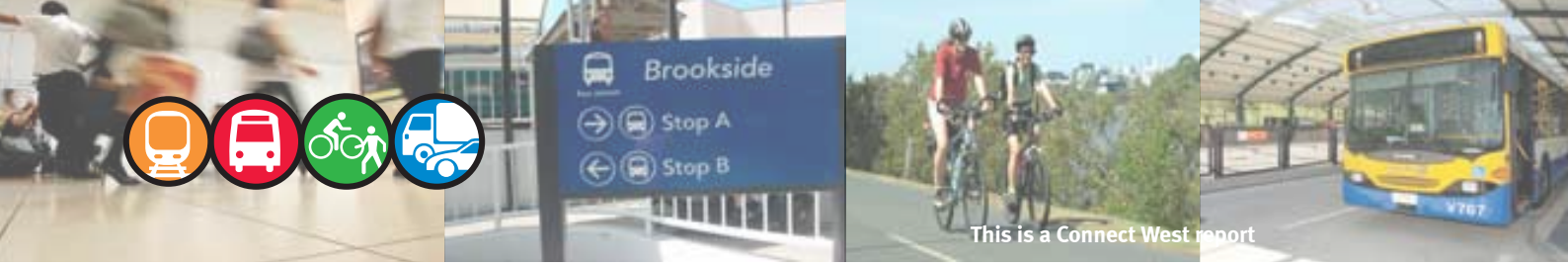
The forecast future freight task would add significant pressure to existing transport corridors that access households and freight hubs, such as the Australia TradeCoast, Western Corridor and Brisbane north and south.

There is currently no viable alternative freight route to the west of Brisbane connecting the industrial south-west (Darra/Wacol/Sumner Park and Ipswich) to the northern hubs (Brendale and Narangba) and Australia TradeCoast. Yet these are becoming the fastest growing freight generating areas in Brisbane. Currently, the most efficient route is via the Logan and Gateway Motorways, involving travelling through several suburbs and following a relatively indirect route.

As traffic becomes more congested in the Acacia Ridge area, (the main off-port industrial and logistics hub), more and more truck time will be consumed as a result of traffic congestion. The high cost of such delays (in terms of time, money and availability of freight) provides the opportunity for an alternative route to service western Brisbane without these problems.

Planning for freight should thus include the following principles as outlined in the Regional Plan:

- Providing an efficient and integrated freight transport system;
- Supporting the economic development of the Western Corridor by upgrading strategic road freight routes;
- Improving the connectivity between the Western Corridor and the rest of the region through additional road freight routes; and
- Protecting and enhancing the ability of freight to move competitively between manufacturing, production and export nodes.



6.0 Strategic network development options

6.1 Introduction

This chapter describes the long list of public transport, road and active transport options that were developed in the course of the investigation. These options were then assessed against qualitative and quantitative indicators and a short list determined. The assessment of options is discussed in Chapters 7.4 and 9.

6.2 Development of options

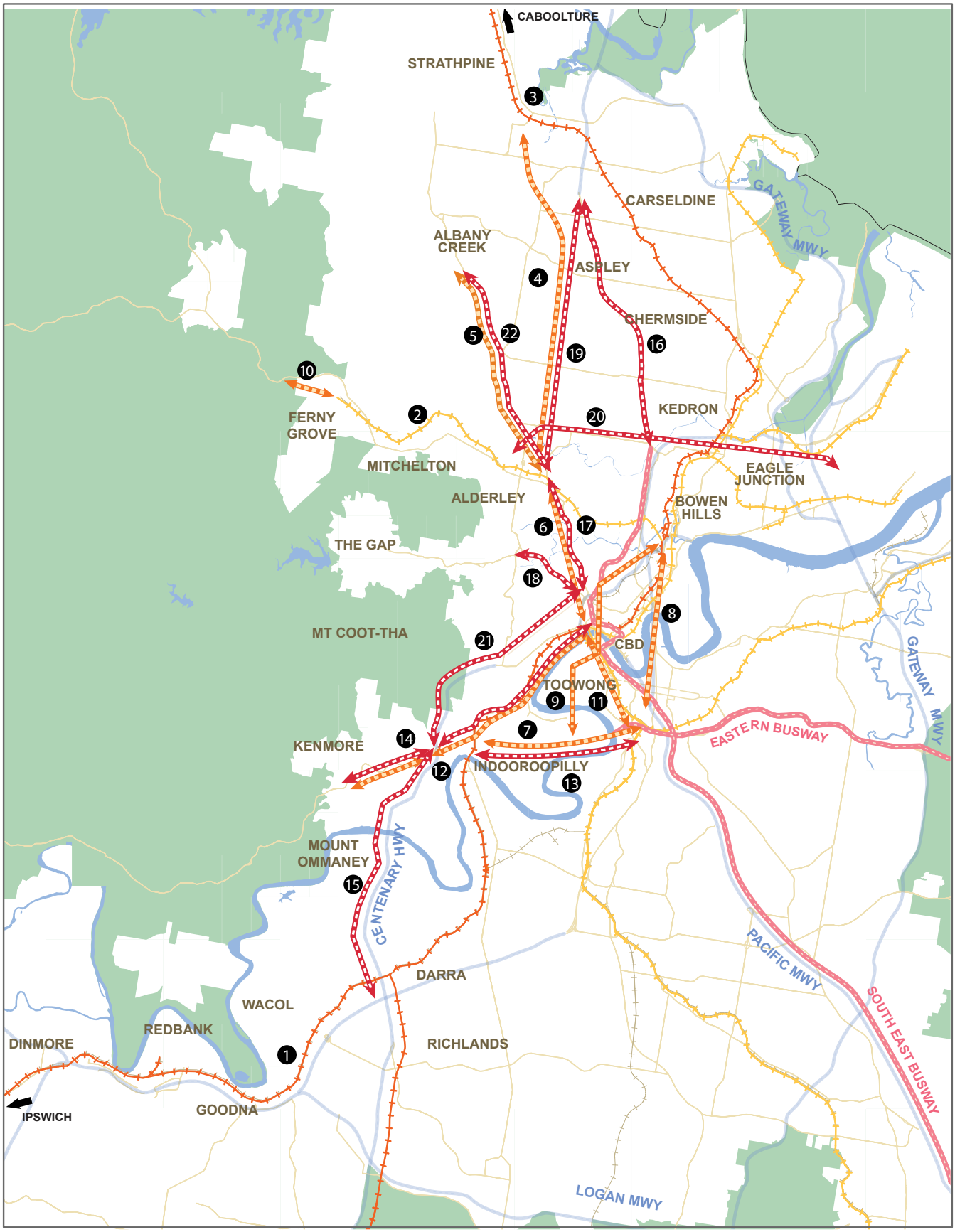
The first step in developing a network strategy to address future network performance was to develop a long list of bus, rail, active transport and road network improvement options as individual schemes, with some as alternative network solutions for the same identified problem, e.g. reducing congestion in any one corridor.

Over 30 different network improvement options (rail, bus, road and active transport) were identified for investigation through a process of review of existing transport proposals, technical analysis of existing and future transport conditions, and suggestions from the community. Each option was developed at a conceptual level.

6.3 Public transport improvement options

The following public transport network improvement options were developed and are described in more detail below (refer Figure 6.1):

1. Ipswich Rail (Ipswich to Central);
2. Ferny Grove Rail (Ferny Grove to Central);
3. Caboolture Rail (Caboolture to Central);
4. North West Transport Corridor Rail Link;
5. Everton Park to Albany Creek Rail Link;
6. Kelvin Grove to Everton Park Rail Link;
7. Indooroopilly to Dutton Park Rail Link;
8. Cross River Rail Link;
9. CBD Mass Transit;
10. Ferny Grove Rail Extension;
11. CBD Metro Rail;
12. Kenmore to CBD Rail Link;
13. Indooroopilly to Dutton Park Bus Link;
14. Kenmore to CBD Bus Corridor;
15. Darra to Toowong Bus Corridor;
16. Kedron to Bracken Ridge (Northern Busway);
17. Kelvin Grove to Everton Park Bus Corridor;
18. Kelvin Grove to Ashgrove Bus Corridor;
19. North West Transport Corridor Bus Link;
20. Everton Park to Kedron Bus Link;
21. TransApex Northern Link; and
22. Everton Park to Albany Creek Bus Corridor.



WESTERN BRISBANE TRANSPORT NETWORK INVESTIGATION

LEGEND

- 2026 Urban Footprint
- Waterbodies
- Existing Motorway and Highway
- Existing Rail
- Existing or Committed Busway
- Bus Option
- Metro Rail
- Rail Option

Figure 6.1

Long list of public transport improvement options

Queensland Government

connect west consortium

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0 2 4 Km 1:200,000 on A4

Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

1. Ipswich Rail (and 3. Caboolture Rail)

This option comprises progressively improving existing rail operations and assets on the 42 km long Ipswich rail line between Ipswich and the Brisbane CBD. It would allow metro-style rail operations in the longer term to provide reliable, high frequency rail services operating at even headways (potential for 2–3 minutes during peak periods). This option provides a high capacity radial link as well as a connection to the activity centres of Ipswich, Indooroopilly, Toowong and Brisbane CBD, and would be supported by an integrated network of feeder bus services. This option allows the operation of express as well as all-stop services and maintains the existing right-of-way rail facility with upgrades to existing rail stations, signalling and rolling stock. Upgrades would have implications and impact across the Greater Brisbane rail network. It would cater for peak and off-peak travel demand.

Project benefits:

- Majority of improvements within existing rail corridor;
- Highest capacity of all modes within corridor;
- High reliability ensured due to separate right-of-way;
- High frequency at even headways results in short waiting times and low transfer penalties;
- Travel time advantages compared to car and bus operating in mixed traffic (with potential to reduce traffic on Centenary Motorway/Milton Road corridor);
- Accommodates total future public transport demand of the low and high growth scenarios within the corridor resulting in low cost per passenger;
- Provides an anchor for transit oriented development and increased densification along the rail corridor;
- Potential for an Indooroopilly bus/rail hub;
- Potential for increased Park 'n' Ride; and
- Potential to induce mode share increase.

Project constraints:

- CBD rail capacity constraints;
- Limits use of rail for freight (particularly during peak hours);
- Station walk-in catchment limited to about 800 metres walk (bus feeder required to extend catchment);
- Competes with Kenmore to CBD Bus Corridor; and
- Upgrades would have implications and impact across the Greater Brisbane rail network.

Project feasibility:

- Full sectorisation of Ipswich and Caboolture rail lines using the western track pair through the CBD;
- Separation of Ipswich express trains from local trains at Darra (to ensure high travel time savings for express trains);
- New rolling stock stabling strategy;
- High capacity rolling stock (increased train length and internal capacity);
- Improved feeder bus services (Ipswich CBD, Ipswich region, Goodna and Darra rail stations); and
- Need to grade separate railway level crossings as service frequency increases.

2. Ferny Grove Rail

This option includes progressively improving existing rail operations and assets along the 14 km of rail between Ferny Grove and the Brisbane CBD. It would allow metro-style rail operations in the longer term to provide reliable, high frequency rail services operating at even headways (5–10 minutes during peak periods). This option provides a high capacity radial link from the activity centre of Mitchelton to the Brisbane CBD and would be supported by an integrated network of feeder bus services. It also provides opportunities for new centres at Ferny Grove and Enoggera/Alderley. This option maintains the existing right-of-way rail facility with upgrades to existing rail stations, signalling and rolling stock. Upgrades would have implications and impact across the Greater Brisbane rail network.

Project benefits:

- Majority of improvements within existing rail corridor;
- Highest capacity of all modes within corridor;
- High reliability ensured due to separate right-of-way (and priority at road intersections);
- High frequency at even headways results in short waiting times and low transfer penalties;
- Travel time advantages compared to car and bus operating in mixed traffic;
- Accommodates total future demand within corridor resulting in low cost per passenger;
- Potential for an Enoggera or Alderley bus/rail hub; and
- Anchor for transit oriented development and increased densification along the rail corridor.

Project constraints:

- CBD rail capacity constraints;
- Station walk-in catchment limited to about 800 metres walk (bus feeder service required to extend the catchment);
- Competes with Kelvin Grove to Everton Park Bus Corridor; and
- Upgrades would have implications and impact across the Greater Brisbane rail network.

Project feasibility:

- Full sectorisation of Ferny Grove rail line with the Gold Coast/Beenleigh/Cleveland group of lines using the eastern track pair through the CBD;
- New rolling stock stabling strategy;
- High capacity rolling stock (increased train length and internal capacity);
- Station and bus interchange upgrades; and
- Need to grade separate railway level crossings.

4. North West Transport Corridor Rail Link

This option would be a rail link between Enoggera and Strathpine utilising the North West Transport Corridor preserved corridor. The rail link would operate within the Gold Coast/Beenleigh/Cleveland group of lines using the eastern track pair through the Brisbane CBD and would capture demand in the outer north-western suburbs of Albany Creek, Cashmere and Strathpine. The line could operate metro-style operations at 10-minute to 15-minute services.

Project benefits:

- Could utilise all or part of the existing preserved transport corridor;
- Reduces the need for bus priority on Kelvin Grove Road;
- Connection to Caboolture line provides increased operations flexibility;
- Provides capacity for Caboolture rail line for freight rail;
- High reliability ensured due to separate right-of-way;
- Travel time advantages compared to car and bus operating in mixed traffic;
- Potential for an Enoggera or Alderley bus/rail hub;
- Anchor for transit oriented development and increased densification along the rail corridor; and
- Potential for Park 'n' Ride stations.

Project constraints:

- Not suitable for low density population/employment areas;
- Impacts headways on Ferny Grove line;
- Under current land use planning capacity would exceed future projected demand within the corridor resulting in high cost per passenger;
- Competes with North West Transport Corridor Bus Link;
- Competes with Kedron to Bracken Ridge (Northern Busway) corridor along Gympie Road; and
- Competes with Kelvin Grove to Everton Park Bus Corridor.

Project feasibility:

- Full sectorisation of Ferny Grove line with the Gold Coast/Beenleigh/Cleveland group of lines using the eastern track pair through the CBD;
- New rolling stock stabling strategy;
- High capacity rolling stock (increased train length and internal capacity);
- Grade separation at road intersections;
- Station and bus interchange upgrades; and
- If light rail, would need continuation along Enoggera/Kelvin Grove Road to CBD, otherwise would be an isolated link in the outer suburbs.

5. Everton Park to Albany Creek Rail Link

This option would be a rail spur line from the Ferny Grove line at Enoggera along South Pine Road and Old Northern Road. The option could also be run as an underground rail tunnel. It would provide a high quality public transport route linking trips from the north-western and northern suburbs of Everton Park, McDowall, Bridgeman Downs and Albany Creek to the Brisbane CBD.

Project benefits:

- Increased capacity from outer north-western suburbs to the CBD; and
- Reduced car travel demand on the Old Northern Road corridor and other north-south traffic routes.

Project constraints:

- Extremely high construction cost;
- Not suitable for low density population/employment areas;
- Capacity exceeds total future demand within corridor resulting in high cost per passenger;
- Competes with Everton Park to Albany Creek Bus Corridor;
- Competes with the North West Transport Corridor Rail Link; and
- Reduces capacity on the Ferny Grove rail line.

Project feasibility:

- Full utilisation of available capacity on Ferny Grove rail line and Old Northern Road bus corridor;
- High public transport mode share and increased population levels in north-west sector; and
- High demand for public transport trip ends from north-western sector to CBD.

6. Kelvin Grove to Everton Park Rail Link

This option provides a rail link between Enoggera via Kelvin Grove Road to the Brisbane CBD and could connect to the Everton Park to Albany Creek Rail Link and/or increase cross river transport capacity by providing an alternative rail link from the Brisbane CBD to Dutton Park. The option could operate on-street (Light Rail Transit) or as a separate right-of-way/tunnel (commuter/metro rail). If the option operates on-street on Kelvin Grove Road, it would serve a regional function as well as more local transport needs.

The option would function as a high quality transport route linking trips from the north-western and northern suburbs of Everton Park, McDowall, Bridgeman Downs and Albany Creek to the Brisbane CBD.

Project benefits:

- Increases inner city and CBD frame capacity and inner city distribution; and
- Provides a high quality public transport route linking the outer western suburbs of Gaythorne, Stafford, Everton Park to Enoggera/Alderley, urban fringe, CBD and Dutton Park.

Project constraints:

- Extremely high construction cost (particularly in separate right-of-way/tunnel);
- Not suitable for low density population/employment areas;
- Capacity would exceed total future demand within the corridor resulting in high cost per passenger;
- Competes with Kelvin Grove to Everton Park Bus Corridor;
- Competes with CBD Metro Rail; and
- Competes with Cross River Rail Link.

Project feasibility:

- Full utilisation of available capacity on Ferny Grove rail line, Kelvin Grove Road and other bus corridors;
- High public transport mode share and increased population levels in north-west sector; and
- High demand for public transport trip ends within 5 km radius of the CBD.

7. Indooroopilly to Dutton Park Rail Link

This option would run from Indooroopilly to Dutton Park intercepting key nodes of Indooroopilly, Ipswich rail line, University of Queensland and bus/rail facilities located at Dutton Park. The option could operate on-street (Light Rail Transit) or as a separate right-of-way/tunnel (commuter/metro rail). The option primarily focuses on providing east-west movements but integration with other modes allows radial public transport movements to be undertaken.

Project benefits:

- Relieves Ipswich rail line capacity constraints within the CBD;
- Increases utilisation of Cross River Rail Link (between Park Road and Bowen Hills);
- Reduces radial travel demand by providing a high quality east-west link (complemented by the Eastern Busway); and
- May reduce private vehicle demand for TransApex's East-West Link.

Project constraints:

- Very high construction cost;
- Capacity exceeds total future demand within the corridor resulting in high cost per passenger;
- Competes with Indooroopilly to Dutton Park Bus Link;
- Competes with CBD Metro Rail option; and
- Reduces capacity on Beenleigh and Gold Coast lines at Dutton Park.

Project feasibility:

- High demand for east-west travel;
- Increased densification of Indooroopilly and Dutton Park as activity centres; and
- Explore bus alternatives.

8. Cross River Rail Link

This option provides a new rail tunnel connecting the Cleveland, Beenleigh and Gold Coast rail lines at Park Road railway station to Caboolture, Shorncliffe, Doomben and Airport lines at Bowen Hills with potential stations at Parliament House and Riverside.

Project benefits:

- Increases cross river transport capacity (and CBD capacity) by providing an alternative rail link between Park Road and the CBD and connecting the commercial growth areas north and south of the CBD (and frame);
- Increases inner city capacity and inner city distribution and creates new stations on the eastern side of the CBD. Commitment allows investment into increased capacity across the Greater Brisbane rail network; and
- Opportunity for widespread urban renewal within walking distance of rail stations. Potential for future Park Road and Bowen Hills major bus/rail hubs.

Project constraints:

- Very high construction cost;
- Competes with CBD Metro Rail option;
- Competes with CBD Mass Transit option;
- Effective integration of transport network (rail, busways, TransApex road tunnels); and
- Creating quality urban living within high transport infrastructure development areas.

Project feasibility:

- Due to the very high construction cost all measures to maximise the utilisation of the existing network assets should be explored;
- High trip demand across the CBD and frame; and
- High trip demand into the CBD and frame from the outer suburbs, Gold Coast and Sunshine Coast.

9. CBD Mass Transit

This option comprises a high frequency light rail or bus rapid transit system that connects key destinations within the CBD and CBD frame such as hospitals, universities, busways and heavy rail stations, sporting venues and major commercial and residential developments including UQ, West End, South Brisbane, QUT, Fortitude Valley and Newstead. The option would perform an inner city distribution function as well as providing additional capacity on constrained heavy rail corridors. Support of the concept may influence 2026 network strategy.

Project benefits:

- Increases inner city capacity and inner city distribution and creates new stops and stations across the CBD and frame.

Project constraints:

- Potentially very high construction costs, if in separate right-of-way;
- Crossing conflicts with existing inner city rail and busway network;
- Does not open up new inner city and CBD frame public transport markets; and
- Competes with inner city bus and rail market.

Project feasibility:

- High trip demand across the CBD and frame between commercial and knowledge precincts; and
- All measures should be taken to utilise as much as possible existing rail, busway and road corridors.

10. Ferny Grove Rail Extension

This option includes extending the Ferny Grove line west of Ferny Grove station to create a new Park 'n' Ride station. This option would not preclude the future extension of the Ferny Grove line to Samford. The existing line and westward extensions would allow metro-style rail operations in the longer term to provide reliable, high frequency rail service operating at even headways (5–10 minutes during peak periods). This option makes use of part of the 'old' rail alignment to Samford and beyond.

Project benefits

- Provides a new Park 'n' Ride station and additional commuter parking/interchange facilities for Samford and surrounding areas;
- Facilitates improved bus interchange facilities at Ferny Grove;
- Reduced demand for parking/traffic would improve amenity at Ferny Grove station and surrounding areas; and
- Facilitates transit oriented development of Ferny Grove station and increased densification around the station and along the rail corridor.

Project constraints

- CBD rail capacity constraints; and
- Topographical/engineering and environmental constraints to line extension and parking facilities.

Project feasibility

- Projects identified as required by the Ferny Grove line improvement; and
- Good road access to new Park 'n' Ride station.

11. CBD Metro Rail

This option would be a link between South Brisbane at Park Road station and Everton Park in the inner north-west. It would be an extension of the Kelvin Grove to Everton Park Rail Link linking the south and north-west of the CBD frame with increased cross river capacity.

Project benefits:

- Increases inner city and CBD frame capacity and inner city distribution; and
- Provides a high quality public transport route linking the outer western suburbs of Gaythorne, Stafford, Everton Park to Enoggera/Alderley, urban fringe, CBD and Dutton Park.

Project constraints:

- Extremely high construction cost (particularly in separate right-of-way/tunnel);
- Not suitable for low density population/employment areas;
- Capacity exceeds total future demand within the corridor resulting in high cost per passenger.
- Competes with Kelvin Grove to Everton Park Bus Corridor;
- Competes with CBD Mass Transit; and
- Competes with Cross River Rail Link.

Project feasibility:

- Full utilisation of available capacity on southern group of lines, Ferny Grove rail line, Kelvin Grove Road and other bus corridors;
- High public transport mode share and increased population levels in north-west sector; and
- High demand for public transport trip ends within 5 km radius of the CBD.

12. Kenmore to CBD Rail Link

This option would operate as an on-street light rail or metro rail extension along Moggill Road and Coronation Drive linking Moggill Road/Western Freeway directly to the Brisbane CBD. The alignment would follow the Moggill Road/Coronation Drive corridor. The option links the inner western suburbs of Chapel Hill and Kenmore with the Brisbane CBD. The option could be extended beyond Kenmore along Moggill Road, if suitable land use and passenger demand warranted that option.

Project benefits:

- Improves the level of service of public transport along the Moggill Road and Coronation Drive corridor;
- Provides an opportunity to promote urban renewal through centres like Indooroopilly, Taringa and Toowong by removing general purpose traffic through diversion works and integrating public transport and cycle/walk modes with high density urban development; and
- Higher frequency at even headways results in short waiting times and low transfer penalties for passengers.

Project constraints:

- Low reliability if on-road facility;
- Moggill Road between Western Freeway and Coronation Drive is very constrained and will require significant infrastructure investment to accommodate light rail;
- Competes with the Kenmore to CBD Bus Corridor concept with Northern Link freeing up additional road space;
- Competes with Ipswich Rail which provides higher capacity at higher frequency and lower travel times;
- Extremely high construction cost, especially in separate right-of-way as metro rail including major property resumptions;
- Not suitable for low density population/employment areas;
- If metro rail, then connection at Indooroopilly station into Ipswich rail line would compromise capacity of existing rail; and
- If light rail, then terminus at Roma Street station which requires interchanging to bus or heavy rail.

Project feasibility:

- Full utilisation of available capacity on Ipswich rail line, Moggill Road/Coronation Drive bus corridor;
- If light rail within road corridor, major upgrades or realignments would be required at Indooroopilly, Taringa and Toowong to improve flow through constrained sections; and
- High demand for public transport trip ends within 5 km radius of the CBD.

13. Indooroopilly to Dutton Park Bus Link

This option extends the existing Eastern Busway at Dutton Park to the Western Freeway intercepting the key nodes of the University of Queensland and Indooroopilly. The option could function as a high quality separate right-of-way transport route or operate on-street linking trips from the outer western suburbs of Kenmore, Mt. Ommaney, Jindalee and neighbouring areas, and service high activity areas of Woolloongabba, Kangaroo Point and South Brisbane. This option provides a new east-west (orbital) link reducing the need to travel into the Brisbane CBD but also facilitates radial public transport movements into the CBD via the South East Busway.

The proposed route connects a number of regional and district centres south of the city with one another and creates interchanges with other regional public transport networks including the South East Busway, Beenleigh line, Ipswich line and potential Moggill Road/Coronation Drive bus corridor.

Project benefits:

- Increased capacity from outer western suburbs of Kenmore, Mt. Ommaney, Jindalee and neighbouring areas to the CBD (and high activity areas of Woolloongabba, Kangaroo Point and South Brisbane);
- Increased east-west capacity south of the city reducing the need to travel to the CBD (and subsequently demand on radial routes to the city);
- Reduced car travel demand on TransApex's Northern Link and East-West Link;
- High capacity corridor accommodating 12,000 to 15,000 passengers per hour (if busway);
- High reliability ensured due to separate right-of-way;
- High frequency at even headways results in short waiting times and low transfer penalties for passengers;
- Travel time advantages compared to car operating in mixed traffic and Cleveland rail line;
- Provides an anchor for transit oriented development at key activity centres and increased densification along the bus corridor;
- Potential for increased Park 'n' Ride; and
- Potential to induce mode share increase.

Project constraints:

- Requires the agreement of University of Queensland;
- Suitable alignment around the University of Queensland St. Lucia campus;
- Limited capacity on Eleanor Schonell Bridge/Eastern and South East Busway;
- Complexities associated with improving the Indooroopilly rail/bus interchange; and
- Competes for demand on the Ipswich and Cleveland rail lines.

Project feasibility:

- High east-west cross river demand; and
- Indooroopilly and Dutton Park rail/bus interchanges.

14. Kenmore to CBD Bus Corridor

This option could function as a high quality separate right-of-way transport route or operate on-street along the existing Coronation Drive linking Moggill Road/Western Freeway directly to the Brisbane CBD. The alignment will generally follow the Moggill Road/Coronation Drive corridor with significant treatments through constrained local areas. The option links the outer western suburbs of Kenmore, Mt. Ommaney, Jindalee and neighbouring areas to Indooroopilly, Toowong and the CBD. The option could be extended into Kenmore or into the Darra to Toowong Bus Corridor.

Project benefits:

- Significantly improves the level of service and reliability of the bus service along the Moggill Road corridor into and along Coronation Drive;
- Provides an opportunity to promote urban renewal through centres like Indooroopilly, Taringa and Toowong by removing general purpose traffic through diversion works and integrating public transport and cycle/walk modes with high density urban development;
- Increased capacity from outer western suburbs of Kenmore, Mt. Ommaney, Jindalee and neighbouring areas to the CBD;
- Reduced car travel demand on TransApex's Northern Link;
- High reliability ensured due to separate right-of-way;
- High frequency at even headways results in short waiting times and low transfer penalties for passengers;
- Travel time advantages compared to car operating in mixed traffic;
- Potential for increased Park 'n' Ride in Kenmore;
- Potential to induce mode share increase; and
- Opportunities to integrate services with the CityCat ferry service and Ipswich Rail and Indooroopilly to Dutton Park Bus Link.

Project constraints:

- Moggill Road between Centenary Motorway and Coronation Drive is very constrained and will require significant infrastructure investment to accommodate;
- Competes with the Northern Link bus corridor concept;
- Competes with the Ipswich rail line; and
- Ability of the CBD to absorb a significant increase in buses.

Project feasibility:

- Whilst not a prerequisite, the Northern Link would attract traffic from Moggill Road/Coronation Drive resulting in lower traffic volumes and the implementation of on-street bus priority measures would not adversely impact traffic conditions or car travel speeds; and
- Major upgrades or realignments would be required at Indooroopilly, Taringa and Toowong to improve flow through constrained sections.

15. Darra to Toowong Bus Corridor

This option could function as a high quality separate right-of-way busway or operate as a separate transit lane along Centenary Motorway from Ipswich Motorway to Toowong roundabout. The primary purpose of this option is to provide high speeds for express buses and commuters from Ipswich and Springfield and other south-western suburbs to the Brisbane CBD. This option is required to connect to Northern Link (with direct connections for buses to the Inner Northern Busway) or the Kenmore to CBD Bus Corridor on Moggill Road/Coronation Drive.

Project benefits:

- Option will significantly improve the level of service and reliability of the bus service and transit vehicles along the Centenary Motorway corridor;
- Increased public transport capacity from Ipswich, Springfield and other outer western suburbs to the CBD;
- High capacity corridor accommodating 12,000 to 15,000 passengers per hour (if busway);
- Reduced car travel demand on the Centenary Motorway corridor and TransApex's Northern Link;
- High reliability ensured due to separate right-of-way;
- High frequency at even headways would result in short waiting times and low transfer penalties for passengers;
- Travel time advantages compared to car operating in mixed traffic;
- Opportunity for new Park 'n' Ride facilities to be located alongside the bus corridor; and
- Potential to induce mode share increase.

Project constraints:

- The Centenary Motorway corridor is topographically constrained, and requires additional general purpose traffic lanes to accommodate forecast demand. This could limit the feasibility of additional transit/bus lanes;
- Option competes with Ipswich Rail; and
- Ability of the CBD to absorb a significant increase in the number of buses.

Project feasibility:

- Connections to Northern Link (with direct connections for buses to the Northern Busway or Kenmore to CBD Bus Corridor (Coronation Drive/Moggill Road bus corridor) to the CBD); and
- All measures to maximise the utilisation of the existing rail network assets should be explored prior to investing in a competing facility.

16. Kedron to Bracken Ridge (Northern Busway)

The Northern Busway is proposed under SEQIPP from Royal Children's Hospital to Bracken Ridge along Lutwyche and Gympie Roads. The Northern Busway corridor is committed to busway standards to Kedron. The option includes a dedicated busway within or parallel to the Gympie Road corridor.

Project benefits:

- Increased capacity from Kedron, Chermside and other outer north-western suburbs to the CBD to accommodate up to 12,000 to 15,000 passengers per hour;
- High reliability ensured due to separate right-of-way;
- High frequency at even headways results in short waiting times and low transfer penalties for passengers;
- Travel time advantages compared to car operating in mixed traffic on Gympie Road;
- Provides an anchor for transit oriented development at key activity centres and increased densification along the bus corridor;
- Potential for increased Park 'n' Ride at bus stations located on the facility periphery; and
- Potential to induce mode share increase and reduce car travel demand from the north-west sector.

Project constraints:

- Gympie Road is a very constrained corridor with high traffic demand and dense urban development along the length of the corridor;
- Competes at its northern end with Caboolture rail line;
- Competes with the North West Transport Corridor Bus Link and Rail Link; and
- Ability of the CBD to absorb a significant increase in buses.

Project feasibility:

- Whilst not a prerequisite, an alternative north-south route for motor vehicle traffic would reduce congestion on Gympie Road and allow a facility to be implemented within the existing corridor that would not adversely affect existing congestion levels and travel speeds.

17. Kelvin Grove to Everton Park Bus Corridor

This option could function as a high quality separate right-of-way transport route or operate on-street along the existing Kelvin Grove Road (at grade bus with indented bus bays) linking Enoggera and the outer north-western suburbs of Albany Creek and others directly to the Brisbane CBD. The option could be extended to the North West Transport Corridor.

Project benefits:

- Increased capacity from outer north-western suburbs of Albany Creek to Enoggera and the CBD;
- Reduced car travel demand on Kelvin Grove Road;
- High capacity corridor accommodating up to 15,000 passengers per hour (under separate right-of-way);
- Complements Ferny Grove rail line by providing additional radial capacity in the inner north-west sector;
- High reliability ensured due to bus priority at traffic signals and kerbside bus lanes along congested sections of the corridor or separate right-of-way;
- High frequency of service at even headways results in short waiting times for passengers; and
- Travel time advantages due to signal pre-emption/ separate right-of-way compared to car operating in mixed traffic.

Project constraints:

- Kelvin Grove Road between Everton Park and the CBD is topographically constrained and will require significant infrastructure investment to accommodate a busway;
- Competes with Ferny Grove rail line; and
- Ability of the CBD to absorb a significant increase in buses.

Project feasibility:

- Whilst not a prerequisite, upgrading Stafford Road would attract traffic from Kelvin Grove Road resulting in lower traffic volumes, allowing the implementation of on-street bus priority measures without adversely impacting traffic conditions or car travel speeds.

18. Kelvin Grove to Ashgrove Bus Corridor

This option runs from Ashgrove along the Musgrave Road corridor to the Inner Northern Busway and comprises on-street bus lanes and bus priority at signalised intersections. The option provides increased radial capacity to the Brisbane CBD from The Gap and surrounding inner western suburbs.

Project benefits:

- Increased capacity from the inner western suburbs of The Gap and Ashgrove to the CBD;
- Reduced car travel demand on Musgrave Road and Waterworks Road;
- High reliability ensured due to bus priority at traffic signals and kerbside bus lanes along congested sections of the corridor;
- High frequency of service at even headways results in short waiting times for passengers; and
- Travel time advantages due to signal pre-emption/ separate right-of-way compared to car operating in mixed traffic.

Project constraints:

- Musgrave Road is topographically constrained and limits widening the road to accommodate additional bus lanes; and
- Ability of the CBD to absorb a significant increase in buses.

Project feasibility:

- Increasing demand for public transport services from The Gap and surrounding areas.

19. North West Transport Corridor Bus Link

This option functions as a high quality separate right-of-way busway within the 1970's designated transport corridor between Stafford Road and Gympie Arterial Road. The public transport option could be implemented in isolation or in combination with road improvements. The bus option could connect to the Kelvin Grove to Everton Park corridor and provide a high quality bus facility from the outer north-west sector to the CBD. The proposed route connects a number of regional and district centres north of the city with one another and creates interchanges with other regional public transport networks including the Caboolture rail line (Strathpine), Everton Park to Kedron corridor (Stafford Road), and the Ferny Grove line.

Project benefits:

- Majority of improvements within a preserved transport corridor;
- A combined road/public transport solution would relieve traffic congestion on Gympie Road allowing greater flexibility to implement bus priority within the corridor for the Northern Busway;
- Increased radial capacity from outer north-western suburbs including Brendale, Albany Creek, Aspley and Chermside to the CBD;
- High reliability ensured due to separate right-of-way.
- High frequency at even headways results in short waiting times and low transfer penalties for passengers;
- Travel time advantages compared to car operating in mixed traffic;
- Provides an anchor for transit oriented development at key activity centres and increased densification along the corridor;
- Potential for increased Park 'n' Ride; and
- Potential to induce mode share increase.

Project constraints:

- Competes at its northern end with Caboolture rail line;
- Competes with the Northern Busway at the northern end; and
- Ability of the CBD to absorb a significant increase in buses.

Project feasibility:

- Demand for radial services to the city from the north-west sector.

20. Everton Park to Kedron Bus Link

This option provides improved cross town bus services and bus priority on Stafford Road from Mitchelton to the Australia TradeCoast intercepting the nodes of Kedron and Northgate. This option provides a new east-west link reducing the need to travel into the Brisbane CBD. It could function as a high quality separate right-of-way public transport route or operate on-street. The proposed route connects a number of district centres north of the city with one another and creates interchanges with other regional public transport networks including Ferny Grove line at Mitchelton, North West Transport Corridor and Caboolture.

Project benefits:

- Increased east-west capacity from the north-west sector to the Australia TradeCoast reducing the need to travel to the CBD (and subsequently demand on radial routes to the city);
- Reduced car travel demand on Stafford Road and Airport Link;
- High reliability ensured due to bus priority at traffic signals and along congested corridors;
- High frequency of service at even headways results in short waiting times for passengers; and
- Travel time advantages due to signal pre-emption compared to car operating in mixed traffic.

Project constraints:

- Suitable alignment east of North West Transport Corridor and west of Caboolture rail line; and
- Complexities associated with suitable access to Mitchelton and Kedron.

Project feasibility:

- High east-west demand from the north-west sector to the Australia TradeCoast.

21. TransApex Northern Link

This option runs between the Toowong roundabout and Inner City Bypass at Red Hill. The corridor forms an inner motorway ring system connecting the Western Freeway and Inner City Bypass and providing a continuous motorway network to the Gateway Motorway (dependant on Airport Link and East-West Arterial Road). Connections are proposed from Frederick Street, Toowong and Kelvin Grove Road, Red Hill. A possible connection into the Inner Northern Busway at the eastern portal could facilitate future express bus services into the Brisbane CBD, albeit in a tunnel.

Project benefits:

- High capacity connection directly to the Inner Northern Busway.

Project constraints:

- Caters primarily for long distance express routes; and
- Buses would have to use a general purpose traffic lane.

Project prerequisites:

- Construction of TransApex Northern Link and direct connection into the Inner Northern Busway.

22. Everton Park to Albany Creek Bus Corridor

This option could function as a high quality separate right-of-way transport route or operate on-street along the existing Old Northern Road (at grade bus with indented bus bays) linking the outer north-western suburbs of Albany Creek, Cashmere and Strathpine to Enoggera/ Alderley and the Brisbane CBD. This option would extend the proposed bus priority on Kelvin Grove toward the north-west.

Project benefits:

- Increased capacity from outer north-western suburb of Albany Creek to Enoggera and the CBD;
- Reduced car travel demand on Old Northern Road and Kelvin Grove Road;
- High reliability ensured due to bus priority at traffic signals and kerbside bus lanes along congested sections of the corridor or separate right-of-way;
- Travel time advantages due to signal pre-emption/ separate right-of-way compared to car operating in mixed traffic;
- Majority of improvements within an established, recently widened road corridor;
- Provides bus corridor to potential future urban growth area;
- Allows bus feeder services to North West Transport Corridor Rail Link and Enoggera/Alderley stations;
- Implementing bus priority within the corridor would relieve traffic congestion on southern end of Old Northern Road;
- High frequency at even headways results in short waiting times and low transfer penalties for passengers;
- Provides potential for increased densification along the bus corridor;
- Potential to induce mode share increase; and
- Potential long term connection to CBD Metro Rail.

Project constraints:

- Ability of the CBD to absorb a significant increase in buses;
- Engineering constraints at the southern end of Old Northern Road/South Pine Road; and
- Potential to compete with North West Transport Corridor.

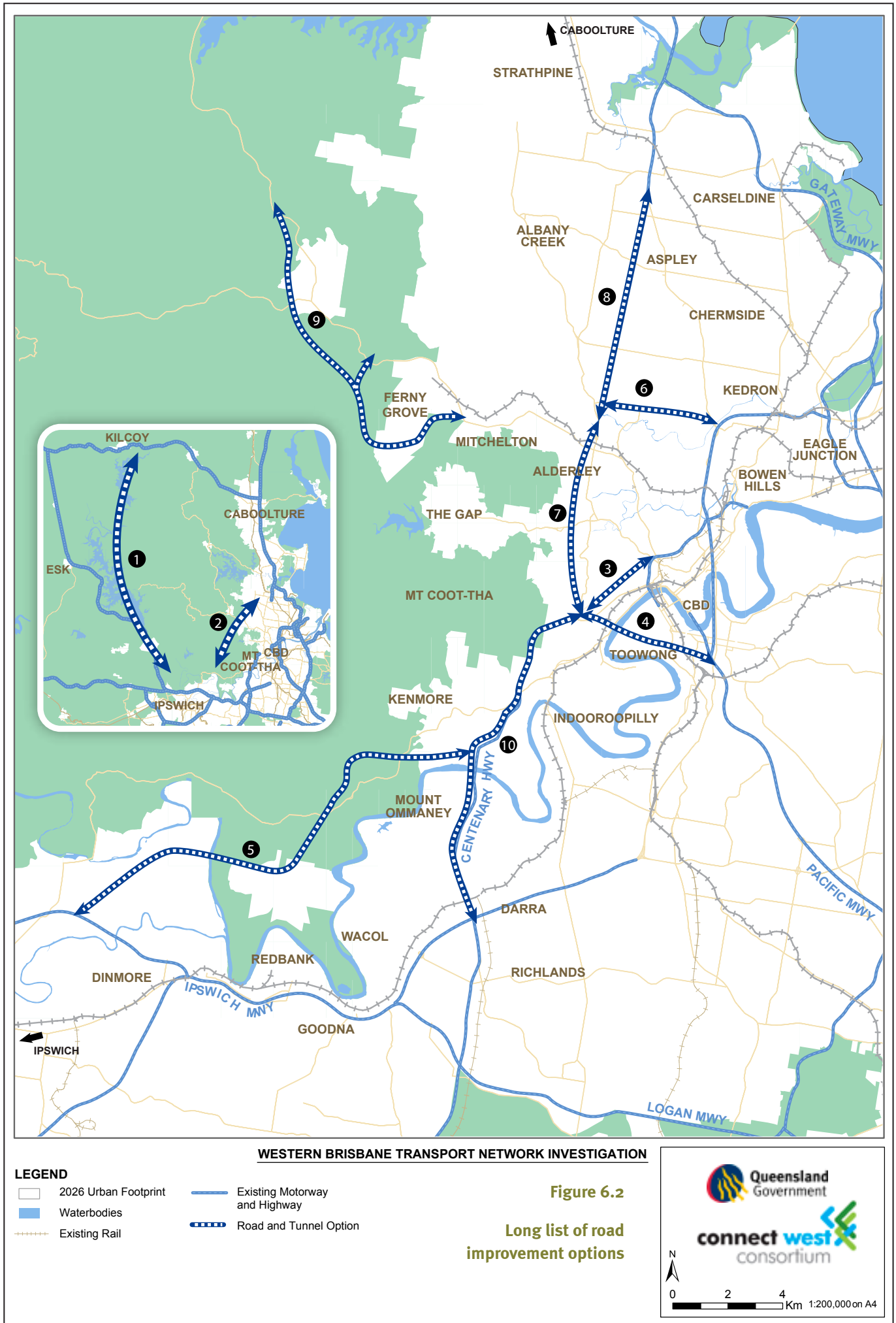
Project feasibility:

- Increased densification along the northern end of the corridor; and
- Whilst not a prerequisite, the construction of Kelvin Grove to Everton Park Bus Corridor would be an advantage for services to the CBD.

6.4 Road improvement options

The following road network improvement options were developed and are described in more detail below (refer Figure 6.2):

1. Brisbane Valley Bypass;
2. West of Mt. Coot-tha Bypass;
3. TransApex Northern Link;
4. TransApex East-West Link;
5. Moggill Pocket Sub-Arterial;
6. Everton Park to Kedron tunnel (Northern Crosslink Corridor);
7. Toowong to Everton Park tunnel (Inner Orbital Corridor);
8. North West Transport Corridor;
9. Samford Valley Sub-Arterial; and
10. Centenary Motorway Upgrade.



WESTERN BRISBANE TRANSPORT NETWORK INVESTIGATION

LEGEND

- 2026 Urban Footprint
- Waterbodies
- Existing Rail
- Existing Motorway and Highway
- Road and Tunnel Option

Figure 6.2

Long list of road improvement options

Queensland Government

connect west consortium

Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

1. Brisbane Valley Bypass

This option runs from the Warrego Highway to the D'Aguilar Highway through the Brisbane Valley west of the D'Aguilar Range.

This option would be a two lane, limited access highway through rural and regional landscape. Environmentally sensitive design principles would be applied to minimise environmental and social impacts.

This option will function primarily as a bypass facility around western Brisbane for long distance inter-regional travel. The corridor will be primarily used for private and commercial vehicle trips.

Project benefits:

- The option provides a highway link west of Brisbane for long distance through private and commercial trips;
- Reduces reliance in regional travel through Brisbane city; and
- Reduces congestion along Brisbane Valley Highway and Ipswich Motorway.

Project constraints:

- Environmentally significant regions within the Brisbane Valley possibly requiring significant mitigation treatments like tunnel and structure;
- Very low long distance north-south demand;
- Capacity of D'Aguilar Highway to receive additional traffic; and
- Length and affordability as single stage.

Project feasibility:

- Increase in north-south demand.

2. West of Mt. Coot-tha Bypass

This option runs from the Ipswich Motorway to the Bruce Highway west of Mt. Coot-tha.

This option would be a four lane, limited access highway through rural and regional landscape. Environmentally sensitive design principles would be applied to minimise the environmental and social impacts. It would be likely that sections up to or greater than 3 km would be required as tunnel through National Park and D'Aguilar Ranges.

This option would function primarily as a bypass facility around western Brisbane for long distance inter-regional travel. The corridor would be primarily used for private and commercial vehicle trips.

Project benefits:

- Provides a highway link west of Brisbane for long distance through private and commercial trips;
- Reduces the demand on the inner Brisbane transport system;
- Potential of providing relief to the Centenary Motorway; and
- Potential as an outer ring road.

Project constraints:

- Environmentally significant regions within the Brisbane Forest Park, etc. possibly requiring significant mitigation treatments like tunnel and structure;
- Moderate to low long distance north-south demand;
- Length and affordability as single stage; and
- Limited support for public transport.

Project feasibility:

- Significant increase in north-south demand.

3. TransApex's Northern Link

This option runs between the Toowong roundabout and Inner City Bypass at Red Hill.

The corridor is proposed by Brisbane City Council as a tolled four lane, urban motorway tunnel. Connections are proposed from Frederick Street, Toowong and Kelvin Grove Road, Red Hill. It would form an inner motorway ring system connecting the Centenary Motorway and Inner City Bypass, and providing a continuous motorway network to the Gateway Motorway (dependent on Airport Link and East-West Arterial Road). It provides a short term, secondary role for intra-regional north-south movements for private and freight vehicles.

A possible connection into the Inner Northern Busway at the eastern portal would facilitate future express bus services into the Brisbane CBD.

Project benefits:

- Provides relief to Milton Road and Coronation Drive;
- Potentially relieves congestion at the Toowong roundabout maximising the capacity of the Centenary Motorway;
- Assists with the opportunity to achieve bus priority along Moggill Road and Coronation Drive;
- Provides some advantages to freight transport by motorway connection to the Australia TradeCoast, albeit not for hazardous freight transport; and
- Provides redundancy in the network for incident management.

Project constraints:

- Requires driven tunnel from Centenary Motorway to Inner City Bypass;
- Social impacts at portals;
- Emission concentration at ventilation outlets;
- Capacity of Centenary Motorway and Inner City Bypass to 'feed' the motorway; and
- Effectiveness/affordability as a proposed tolled system.

Project feasibility:

- Associated upgrade to Centenary Motorway to support demand and increase viability;
- Sufficient demand along the corridor in conjunction with competing options; and
- Management of impact on the environment and community.

4. TransApex's East-West Link

This option runs between the Centenary Motorway and the Pacific Motorway at Dutton Park.

The corridor is proposed by Brisbane City Council as a tolled four lane, urban motorway tunnel. It functions as an orbital link forming an inner motorway ring system connecting the Centenary Motorway and Pacific Motorway avoiding the need for west to south vehicles to travel through the Brisbane CBD and frame, along the Riverside Expressway.

Project benefits:

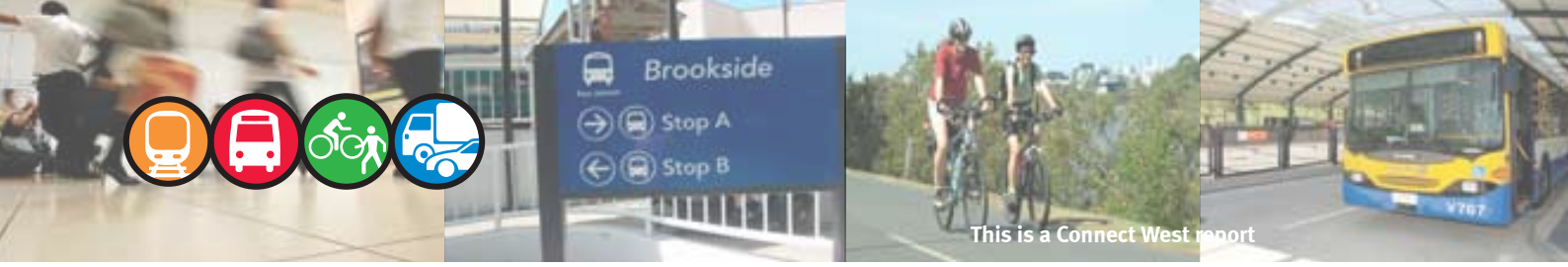
- Provides relief to Coronation Drive and Riverside Expressway shortcutting the travel from west to east bypassing the CBD;
- Assists with the opportunity to achieve bus priority along Moggill Road and Coronation Drive; and
- Provides redundancy in the network for incident management.

Project constraints:

- Requires driven tunnel from Centenary Motorway to Pacific Motorway;
- Social impacts at portals;
- Emission concentration at ventilation outlets;
- Capacity of Centenary Motorway and Pacific Motorway to 'feed' the motorway; and
- Effectiveness/affordability as a proposed tolled system.

Project feasibility:

- Associated upgrade to Centenary Motorway to support demand and increase viability;
- Sufficient demand along the corridor in isolation and in conjunction with competing options; and
- Management of impact on the environment and community.



5. Moggill Pocket Sub-Arterial

This option runs between the Warrego Highway at North Tivoli and Centenary Motorway at Fig Tree Pocket along the alignment of the State protected Moggill Pocket Preserved Transport Corridor.

The option would ultimately be a four lane, controlled arterial buffered with both sound barriers and extensive landscaping to adjacent land uses. Within the corridor, cycle facilities could be provided to link into the Centenary Bikeway.

This option would function as a controlled arterial bypassing the Ipswich Motorway and Centenary Motorway. It provides for trips from the Western Corridor to the western suburbs and as a bypass to Kenmore and the Centenary Motorway.

The Department of Main Roads is currently investigating a bypass of Kenmore utilising the section of this corridor between Moggill Road and Centenary Motorway. The results of this investigation could impact on the ultimate form and function of this section of the corridor.

Project benefits:

- Provides additional cross river capacity and relief to Ipswich Motorway and Centenary Motorway;
- Provides significant relief to Moggill Road through Kenmore and Chapel Hill;
- Creates opportunity for bus priority along Moggill Road to the Centenary Motorway linking to the Western Bus Corridor along Moggill Road and Coronation Drive; and
- Utilises existing preserved transport infrastructure.

Project constraints:

- Social impact on communities adjacent the corridor;
- Loss of greenspace within the corridor;
- Affordability of project with associated demand;
- Geometric constraints of connecting to Centenary Motorway;
- Capacity of Centenary Motorway to cater for the additional demand; and
- Encourages reliance on private car usage.

Project feasibility:

- Requires upgrade to Centenary Motorway and Western Freeway;
- Requires Toowong roundabout and beyond to be 'unblocked' to accept additional demand; and
- Social and environmental impacts need to be mitigated.

6. Everton Park to Kedron (Northern Crosslink Corridor)

This option runs between the proposed North West Transport Corridor and Gympie Road, generally underneath the alignment of Stafford Road as a tunnel.

Four lanes would be provided under Stafford Road to connect the proposed North West Transport Corridor with Airport Link to complete a tollway system potentially. The existing Stafford Road corridor would be upgraded to provide for four median controlled lanes with bus priority.

This option would function as an orbital link within the middle ring system connecting the western suburbs to Airport Link and the Australia TradeCoast. It provides for inter-regional movements for private and freight vehicles. It would cater for both peak and off-peak demand. Stafford Road would be maintained as an arterial with bus priority for public transport connections from Everton Park to the east (including Australia TradeCoast).

Project benefits:

- Provides additional capacity to the Stafford Road corridor which will be placed under significant additional demand by Airport Link and the possible future North West Transport Corridor and Inner Orbital;
- Provides a high quality orbital link allowing movement of people and freight across and around inner Brisbane to the north;
- Maximises the potential of Airport Link and possible future Inner Orbital and North West Transport Corridor by connecting the high order road network;
- Allows for priority along Stafford Road to connect to the Northern Busway corridor; and
- Allows urban regeneration along Stafford Road.

Project constraints:

- Requires tunnel from Everton Park to Airport Link;
- Possible social impacts at portals;
- Emission concentration at ventilation outlets; and
- Effectiveness/affordability as a potential tolled system.

Project feasibility:

- Assumes the delivery of Airport Link;
- Supported in combination with North West Transport Corridor and/or Inner Orbital;
- Sufficient demand along the corridor in conjunction with competing options; and
- Management of impact on the environment and community.

7. Toowong to Everton Park (Inner Orbital Corridor)

This option runs between the northern end of the Centenary Motorway at Toowong, connecting to the proposed North West Transport Corridor at Everton Park.

The corridor will be an urban motorway in tunnel. Tunnel portals would be buffered from adjacent land uses through urban solutions like sound barriers and high quality landscaping to mitigate potential noise and visual impact.

It functions as a strategic transport link between the Western Corridor (Ipswich) and the northern suburbs with opportunities to ultimately link to the Australia TradeCoast via the proposed Northern Crosslink Corridor. It provides for intra-regional north-south movements for private and freight transport trips.

Project benefits:

- Completes the north-south motorway standard link west of Brisbane in conjunction with the proposed North West Transport Corridor;
- Relieves Metroad 5 and inner radial links currently servicing the orbital or north-south demand;
- Provides a high speed orbital network and connectivity within western Brisbane to separate freight transport from the suburban network;
- Creates redundancy to the network in case of incidents on complementary corridors allowing redistribution of congestion;
- Allows for efficient bus access along Metroad 5; and
- Allows urban regeneration in areas such as Toowong, Bardon, Ashgrove and Everton Park.

Project constraints:

- Requires tunnel from Centenary Motorway to Everton Park;
- Possibility of social impacts at portals;
- Emission concentration at ventilation outlets;
- Effectiveness/affordability as a potential tolled system; and
- Capacity of Centenary Motorway to cater for the additional demand and 'feed' the motorway.

Project feasibility:

- Assumes the delivery of North West Transport Corridor;
- Supportive of North West Transport Corridor in combination with Northern Crosslink Corridor;
- Sufficient demand along the corridor in conjunction with competing options; and
- Management of impact on the environment and community.

8. North West Transport Corridor

This option runs between Stafford Road and Gympie Arterial Road along a designated transport corridor preserved since the 1970's.

The corridor would be a four lane urban motorway buffered with both sound barriers and extensive landscaping to adjacent land uses. Separated bike and pedestrian paths would be provided to cater for nonmotorised transport demand. The cross-section of the corridor would allow for future provision of public transport infrastructure as either bus or rail.

Functions as a strategic regional transport link between the Bruce Highway and Stafford Road with opportunities to link to the Australia TradeCoast via the proposed Northern Crosslink Corridor. It provides for intra-regional north-south movements for private, freight and future public transport trips together with a principal cycle and walking route.

Project benefits:

- Relieves Gympie Road enabling a potential for the proposed Northern Busway along Gympie Road within the existing corridor, compatible with adjacent land use and at a cheaper cost;
- Provides relief to the local transport network like Old Northern Road and Webster Road providing structure to the north-western transport network, and assisting the efficiency of freight transport, particularly pick up and delivery movements;
- Provides redundancy to the transport network in case of incidents, allowing a redistribution of traffic;
- In conjunction with the proposed Northern Crosslink Corridor, it could complete the link from the Bruce Highway to Airport Link (if constructed) as an additional link to the Australia TradeCoast from the north;
- Potentially defers the upgrade to Gateway Motorway North;
- Potentially allows for being part of a tollway system joining to Airport Link; and
- Utilises existing preserved transport infrastructure.

Project Constraints:

- Environmentally sensitive zones along the preserved corridor which may require tunnelling;
- Social impacts along corridor due to constrained corridor reservation;
- Effectiveness/affordability as a potential tolled system; and
- Capacity of Gympie Arterial Road and potential radial linkages to cater for the additional demand and 'feed' the motorway.

Project feasibility:

- Assumes the delivery of Airport Link, Northern Crosslink Corridor and/or Inner Orbital; and
- Managing impact on the environment and community.

9. Samford Valley Sub-Arterial

This option has been considered because it is an existing preserved corridor between Ferny Grove and Yugar. Rail and busway are not considered because of insufficient public transport demand in this area. It may relieve congestion along Samford Road by providing a two lane road along this corridor. However, the investigation studies show that growth in the area is limited due to land constraints.

If this preserved corridor was not considered in the final strategy, this would not mean that any changes will be made to preserving the corridor as this is a Department of Main Roads corridor.

10. Centenary Motorway Upgrade

SEQIPP has identified the upgrade of the Centenary Motorway between the Ipswich Motorway and Toowong roundabout. This is to provide for HOV lanes in addition to the existing two general purpose lanes in each direction.

With the potential for the delivery of Northern Link, East-West Link and Inner Orbital in addition to the existing Milton Road and Frederick Street, the capacity of the Centenary Motorway to 'feed' some or all of these projects is stretched. The Centenary Motorway plays a critical role as the primary access route west of Brisbane. It plays an essential role in the development of a Western Orbital.

This option proposes an upgrade to achieve eight lane capacity on the Centenary Motorway including the planned HOV lanes between the Ipswich Motorway and Toowong roundabout. This is intended to support the role of the Centenary Motorway as a key element in the middle ring system and a Western Orbital.

Project benefits:

- Significant increase in capacity along the Motorway to 'feed' other potential options such as Northern Link, East-West Link and Inner Orbital;
- Supports demand from the western corridor;
- Facilitates the delivery of the Moggill Pocket Sub-Arterial Road;
- Provides for HOV priority to service the Centenary suburbs;
- Improves safety and reliability of the Motorway;
- Defers the need for the West of Mt. Coot-tha Bypass; and
- Potential to be part of a tollway system joining to Inner Orbital and North West Transport Corridor forming the Western Orbital.

Project constraints:

- Geometric constraints along the corridor to provide for eight lanes;
- Space constraints within the corridor impacting possibly on adjacent third party lands;
- Social impacts along corridor due to constrained corridor reservation;
- Feasibility as a potential tolled system considering existing infrastructure;
- Lack of a supporting arterial road network south of the Brisbane River; and
- Existing configuration and location of interchanges.

Project feasibility:

- Assumes the delivery of one or more of the potential linking options;
- Assumes the demand for the Western Corridor is sustained; and
- Managing impact on the environment and community.

6.5 Active transport improvement options

The following active transport improvement options were developed and are described in more detail below (refer Figure 6.3):

1. Toowong to Everton Park Veloway;
2. Indooroopilly to Dutton Park Veloway;
3. Everton Park to Kedron Veloway;
4. Darra to Indooroopilly Veloway;
5. Kelvin Grove to Everton Park Veloway;
6. Everton Park to Albany Creek Veloway;
7. Kenmore to Bicentennial Veloway;
8. Kedron to Chermside Veloway;
9. North West Transport Corridor;
10. Kedron to Herston Veloway;
11. Cross City Veloway (Albert St Garden Axis Veloway);
12. River City Veloway (Uni River Link);
13. Hamilton Road Veloway;
14. Ashgrove to The Gap Veloway;
15. Kelvin Grove to Ashgrove Veloway;
16. QEII Park, South Bank to North Quay River Link;
17. West End to St. Lucia River Link;
18. Fig Tree Pocket to Sherwood River Link;
19. Kenmore to Jindalee River Link; and
20. Bellbowrie to Riverhills River Link.

1. Toowong to Everton Park Veloway

This high quality cycle path provides a major direct north-south spine between Toowong and Everton Park.

The benefits include:

- Providing high quality cycle infrastructure eliminating the vehicle and cyclist conflicts which currently exist along this route; and
- Creating cycling opportunities in an area where cycling use is low due to highly trafficked roads constraining the ability to cycle safely.

2. Indooroopilly to Dutton Park Veloway

This high quality cycle path would start at Indooroopilly Activity Centre and pass through or around the University of Queensland linking with the Eleanor Schonell Bridge to Dutton Park.

The benefits include:

- Linking Indooroopilly Principal Activity Centre with University of Queensland, Dutton Park and the CBD via the Goodwill Bridge;
- Links Indooroopilly, University of Queensland and Princess Alexandra Hospital;
- Links Education with the CBD and vice versa; and
- Creates a CBD/University/Principal Activity Centre circular route.

3. Everton Park to Kedron Veloway

This high quality cycle path would be located along Stafford Road between Everton Park and Kedron creating direct east-west connectivity.

The benefits include:

- Duplication of Kedron Brook bikeway but a more direct route for users using existing infrastructure; and
- Route would provide visibility/safety benefits especially at night as overlooked by traffic/adjacent development.

4. Darra to Indooroopilly Veloway

This high quality cycle path provides a spine route from Darra and the south-western suburbs to Indooroopilly and Toowong and beyond to the Brisbane CBD.

The benefits include:

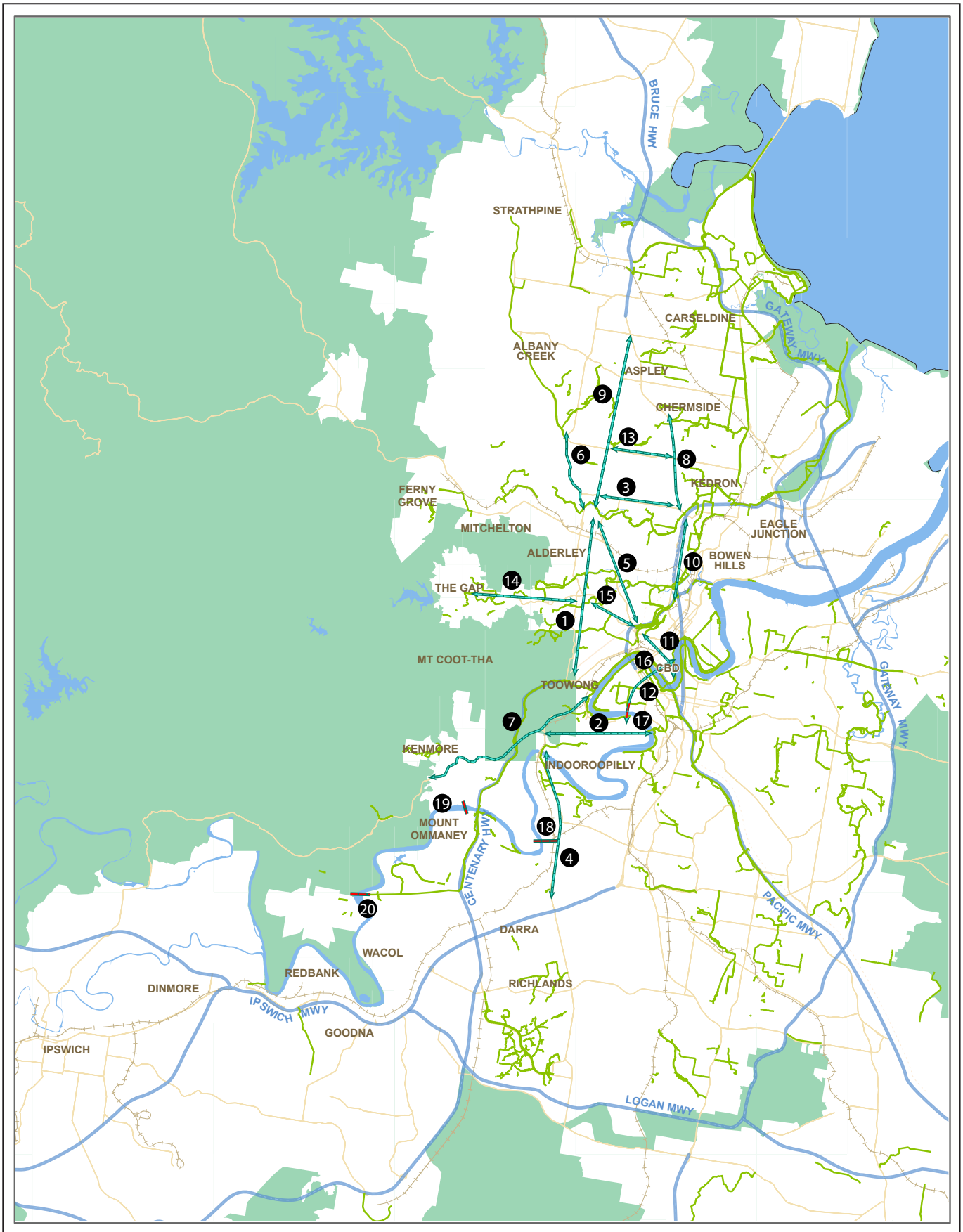
- Connecting residential areas with railway stations;
- Creates a direct cycle route from south-western suburbs to major activity centres; and
- Providing a link from outer suburbs and University of Queensland and beyond to the CBD.

5. Kelvin Grove to Everton Park Veloway

The cycle path links Kelvin Grove to Everton Park creating a direct connection between the inner suburbs to the outer north-western suburbs.

The benefits include:

- Provides a dedicated link for cyclists within an easy distance of the CBD;
- Direct commuter route for inner northern suburbs, e.g. Alderley;
- Links inner suburbs to Kelvin Grove Urban Village and the CBD;
- Links to Kedron Brook bikeway; and
- Provides direct connectivity with Victoria Park bikeway and the Royal Brisbane Hospital.



WESTERN BRISBANE TRANSPORT NETWORK INVESTIGATION

LEGEND

- 2026 Urban Footprint
- Waterbodies
- Motorway and Highway
- Existing Rail
- Existing Cycle Routes
- Cycle Infrastructure
- Pedestrian/Cycle River Link

Figure 6.3

Active transport improvement options

Queensland Government

connect west consortium

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Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

6. Everton Park to Albany Creek Veloway

This high quality cycle path provides a link between outer north-western suburbs and the existing Kedron Brook bikeway and new routes to the Brisbane CBD.

The benefits include:

- Links Old Northern Road on-road bikeway with Enoggera and thereafter into the CBD; and
- Provides a link between outer suburbs and the existing Kedron Brook bikeway/Everton Park to Kedron bikeway.

7. Kenmore to Bicentennial Veloway

This high quality cycle path provides a link between Kenmore and outer western suburbs to the Bicentennial Bikeway and through to the Brisbane CBD.

The benefits include:

- Connecting two principal activity/shopping/ employment centres;
- Connects the western suburbs with Indooroopilly and the Bicentennial Bikeway through to the CBD;
- Creates a direct commuter route from west of Indooroopilly and through to the CBD;
- Links western suburbs with the Centenary Motorway cycleway; and
- Links western suburbs with University of Queensland and beyond to the Eleanor Schonell Bridge.

8. Kedron to Chermside Veloway

This high quality cycle path starts at Kedron and ends at the Chermside Activity Centre.

The benefits include:

- Part of a direct 'signature' commuter route from the northern suburbs through to the CBD;
- Direct route following the 'desire line' (busway or arterial road corridor);
- Highly visible, high activity levels with employment along corridor;
- Access from education (schools) to principal shopping and CBD;
- Direct access to Chermside bus interchange;
- Connects to Kedron Brook bikeway which links to Australia TradeCoast and western suburbs; and
- Connects to Victoria Park/Royal Brisbane Hospital bikeway which links to Roma Street Parklands and CBD.

9. North West Transport Corridor

This high quality cycle path starts at Everton Park and ends in Aspley.

The benefits include:

- Preserved Transport Corridor designed to accommodate the needs of pedestrians and cyclists;
- Creation of a first class, fast and direct cycle commuter route;
- Part of a direct 'signature' commuter route from the northern suburbs through to the CBD; and
- Connecting with Kedron Brook bikeway and Everton Park to Kedron Veloway which links to Australia TradeCoast and western suburbs.

10. Kedron to Herston Veloway

This high quality cycle path provides a direct spine route from the northern suburbs to the Royal Brisbane Hospital and through to the CBD.

The benefits include:

- Linking northern suburbs with the CBD;
- Creating a major north-south cycle route;
- Links with Everton Park to Kedron, Kelvin Grove to Everton Park and Cross City Veloways;
- Connecting the Royal Brisbane Hospital with the proposed Bowen Hills transit oriented development;
- Connecting cycle infrastructure with major activity and employment centres;
- Providing access to major transport interchanges; and
- Links northern suburbs, Australia TradeCoast and Bowen Hills with the Victoria Park bikeway through to Roma Street and the CBD.

11. Cross City Veloway (Albert St Garden Axis Veloway)

The Cross City cycle path is the first of two signature projects providing innovative, high quality and safe cycling facilities for commuters, shoppers and tourists alike. The route would provide a major connection from Victoria Park bikeway to the Goodwill Bridge via the Roma Street Parklands, King George Square, Albert Street and the Botanical Gardens.

The signature project would contain a number of streetscape measures including: pedestrian and cyclist priority, vehicle trafficked streets converted to cycle only carriageways, closing some roads to create cul-de-sacs thereby creating a reduced car orientated city centre, carriageway narrowing and the creation of a wide city centre dedicated cycleway.

The benefits include:

- Signature CBD route axis along Albert Street providing connections throughout the CBD;
- Provides safe and direct cycle routes through the CBD as currently very limited safe direct cycle routes exist through the main CBD areas;
- Signature commuter route to increase the journey to work mode share by active transport modes;
- Cycle connections to Normanby Busway Station;
- Cycle connections to Roma Street Station and the Brisbane Transit Centre;
- Direct cycle connection to King George Square cycle centre;
- Direct access to CBD;
- Connections to the Queen Street Bus Station;
- Creates connectivity and continuity between the Royal Brisbane Hospital, CBD and South Bank employment precincts;
- Creates connectivity between educational centres and the CBD;
- Connects leisure and tourism destinations including South Bank, Botanical Gardens, Roma Street Parklands and Victoria Park; and
- Connects education, employment, shopping, public transport, health and recreation precincts.

12. River City Veloway (Uni River Link)

The River City cycle path is the second of two signature projects providing innovative, high quality and safe cycling facilities for residents, students, commuters, shoppers and tourists alike. The route would provide a major connection from Creek Street in the CBD though to the University of Queensland in St. Lucia, via a new cycle bridge attached to the existing Victoria Bridge, West End, Highgate Hill and a new bridge from Orleigh Park to St. Lucia.

The signature project would contain a number of streetscape measures including: pedestrian and cyclist priority, the creation of pedestrian and cycle boulevards, carriageway narrowing, the creation of an eight metre wide dedicated cycleway and two new pedestrian and cycle only bridges.

The benefits include:

- Signature cross city cycle route connecting St. Lucia and West End with the CBD and beyond to New Farm;
- A direct, through CBD, link between West End and the floating walkway to New Farm;
- More direct route than the 'recreational' based riverside cycleway;
- Connects tourism, leisure, employment and shopping;
- Links the University of Queensland, West End and South Bank with Roma Street, Transit Centre, Roma Street Parklands, Victoria Park and Royal Brisbane Hospital;
- Connecting South Bank and West End with northern bikeways;
- Passes through Boundary Street, a popular shopping/eating area;
- Safer at night than the Riverside Drive bikeway which is isolated;
- Local access facility and key commuter route; and
- Improved and increased access to the University of Queensland.

13. Hamilton Road Veloway

This high quality cycle path links Chermside and Chermside West via Hamilton Road creating east-west connectivity.

The benefits include:

- Creates a high quality east-west link in the north-western suburbs;
- Creates a local link to Chermside bus interchange; and
- Provides local access to Chermside major activity centre.

14. Ashgrove to The Gap Veloway

This high quality cycle path links the outer western suburbs with the new cycle network and the Brisbane CBD.

The benefits include:

- Linking outer western suburbs with the CBD;
- Creates an east-west link; and
- Links with Toowong to Everton Park and Kelvin Grove to Ashgrove Veloway options.

15. Kelvin Grove to Ashgrove Veloway

This high quality cycle path provides an east-west connection and links the western suburbs with the Brisbane CBD.

The benefits include:

- Provide a dedicated link for commuters within a realistic cycle distance of the CBD;
- Direct commuter route from inner western suburbs e.g. Ashgrove; and
- Links outer western suburbs to Kelvin Grove Urban Village and the CBD.

16. QEII Park, South Bank to North Quay River Link

This green link provides connectivity from West End and South Bank to the CBD and beyond.

17. West End to St Lucia River Link

This green link provides connectivity from Orleigh Park to Guyatt Park between the University of Queensland, to the Brisbane CBD and beyond via West End and South Bank.

18. Fig Tree Pocket to Sherwood River Link

This green link provides an east-west connection from Consort Street to Mandalay Park, increases access and connectivity to the Darra to Toowong Veloway and provides Fig Tree Pocket with access to railway stations.

19. Kenmore to Jindalee River Link

This green link provides an east-west connection from Gem Road to Jindalee Park, increases access to Kenmore to the Bicentennial Bikeway and provides increased access to the Centenary Bikeway.

20. Bellbowrie to Riverhills River Link

This green link provides an east-west connection from Sumners Road to Lions Park, increases access to Kenmore to the Bicentennial Bikeway and provides increased access to the Centenary Bikeway.

7.0 Community input

7.1 Introduction

Community participation has been fundamental to developing the network strategy. Understanding community issues, concerns, needs and desires has helped to develop a network strategy and to broaden the direction of the investigation. Key feedback to the investigation was recorded over three consultation phases, as indicated in Table 7.1.

In mid 2007 the community provided comment on the study's draft Terms of Reference (see Chapter 2). Over 400 public submissions and comments were received and the Terms of Reference were updated to reflect the community themes:

- The need to address public transport infrastructure improvements;
- That social and environmental considerations should be taken into account;
- That there should be reference to freight;
- Integration with other projects should be included; and
- That community consultation was a priority.

Transport issues that have been taken into consideration were identified through contact with over 3,000 people at staffed displays, almost 4000 recorded public submissions and comments and active participation by two Community Liaison Groups.

Table 7.1 Consultation phases of the Western Brisbane Transport Network Investigation

Date	Activity	Community response
Phase 1		
February 2006 to May 2007	Developed strategy and plan	
Phase 2		
June to December 2007	Launched project and revised its draft Terms of Reference	Around 1,400 database responses; 400 comments on draft Terms of Reference; website unique visitors around 16,200 (82,000 pages visited during this period)
Phase 3		
January to March 2008	Validated the Assessment Framework	Around 950 database responses; 700 attendees at public displays; 890 kiosk hits (29/01/08–08/03/08); website unique visitors around 2,450 (51,000 pages visited during this period)
Phase 4		
April to June 2008	Explained possible transport improvement options	Around 1,500 database responses; around 3,000 attendees at public displays; website unique visitors around 5,806 (157,000 pages visited during this period)
Phase 5		
July 2008	Closed out study and report writing	

Issues that have set the direction of the network strategy were:

- Improvement of the existing transport network as well as new infrastructure;
- Increased and improved public transport, with better access, connectivity, frequency and reliability;
- Rail as the favoured mode of transport – because it is seen to produce less emissions, be more comfortable and reliable and to have a greater carrying capacity;
- Government policy and initiatives that encourage greater use of public transport;
- Solving congestion and improving the transport network, while protecting the semi-rural and village lifestyles in areas outside, or on the perimeter, of the urban footprint; and
- Planning for a changing future that takes into consideration growth, changing working conditions, climate change and declining oil supplies.

7.2 Key findings

Four key areas of concern were consistently identified by the community. These were:

- Improving public transport in western Brisbane;
- Current traffic congestion;
- Uncertainty about the future; and
- The need to 'do it now'.

The latter two concerns focused on the need for progressive and integrated planning by all levels of government to address climate change, peak oil concerns, ongoing uncertainty about property impacts, the impact of development on the environment and the need for immediate action to address Brisbane's transport congestion. The community is concerned that long term planning studies are delaying the delivery of infrastructure and service changes needed to deal with the current problem.

Several common themes in community feedback emerged over the three key public consultation phases. These included:

- Improved public transport, especially rail;
- Provision for active transport alternatives;
- Congestion on existing road infrastructure;
- Freight on the network;
- Impacts of transport on local environment and amenity; and
- Social and safety.

Public transport

Public transport was rated the most important consideration for planning future transport infrastructure. It was the most frequently raised issue during all phases, through most channels of feedback and was an integral amendment to the Terms of Reference.

Support for improved public transport services was an ongoing theme across all channels of feedback. Key concerns relating to bus improvements were:

- The need to improve reliability due to being caught in local traffic congestion;
- Access to services;
- Overcrowding on services;
- Connections; and
- Safety.

Feedback indicated that whilst people would like to use public transport they were deterred from using buses because of lack of reliability and increased travel times. The lack of direct routes for bus services means that the journey time is often longer than a similar trip by car, which is often compounded by buses being caught in road traffic congestion. Some people also indicated that they gave up on bus travel as buses would not turn up on time or would pass them by because they were full.

Key concerns relating to rail improvements were:

- Access to rail stations and connectivity;
- Station upgrades;
- Increasing Park 'n' Ride;
- Overcrowding on services;
- Safety; and
- Desire for rail services in the western suburbs.

Active transport

Another priority emerging from the community was the need to improve active transport infrastructure.

Focus group feedback and survey results identified that the community thought that there is insufficient active transport infrastructure, particularly in terms of the connectivity and quality of cycleways.

Concerns were also raised about the safety of using active transport in terms of:

- Quality of paths;
- Proximity to roads and vehicle traffic; and
- Perception of personal safety.

People also commented that if pedestrian and cycling access to, and amenities at public transport nodes were improved then they would choose these options.

Roads

Congestion consistently rated high as an impact on lifestyle and daily travel experience. The increased length of time taken to commute, rat running on local roads, the need to improve roads, and the consequential impacts on residential amenity and the environment were all cause for concern.

There was an increase in feedback regarding congestion, with a particular reference to how it affected bus travel as well as use of private vehicles.

A focus of community feedback was the lack of roads linking as well as bypassing the city. Another concern was the lack of alternative routes in the transport network when accidents and traffic problems occur (especially during peak periods). Many community comments identified the need for a large motorway or road on the western side of Brisbane.

Freight

In 2007 the Terms of Reference were amended based on community feedback to place a greater emphasis on freight movements on the network. However, when surveyed in 2008, freight movement had the lowest priority amongst the respondents and rated as the least important planning consideration. Generally, feedback from the community also rated freight relatively low.

Local environment and amenity

In surveys one and two respondents placed a strong value on the preservation of local environment and amenity. In general, these concerns were more likely to be raised in a local area context and in connection with a specific option. Lifestyle and local amenity remained a strong issue for those on the fringe of the urban footprint.

There was, however, a general overall concern about how transport network upgrades could impact the future development of the area, especially those areas with high environmental values. In general people preferred the enhancement of existing public transport to developments that could affect natural bushland areas, for example bypasses and preserved corridor options.

Reducing carbon emissions was a low priority in the responses to Surveys One and Two, however, there was support for the 'leafy green' of Brisbane to be maintained.

Social impacts

Cultural and indigenous heritage was rarely raised as an issue on the database. For example, indigenous heritage was raised twice in phase two and not raised at all during phases three and four. Most cultural heritage feedback was received during the comment period on the draft Terms of Reference.

There was a significant increase in concern over property impacts when the options were released. This includes comments about:

- Impact on property values;
- Possibility of resumption;
- Need for more information on corridor alignments to assess impacts; and
- Timing on decisions on options.

Safety

Throughout the investigation safety was rated as an important factor that influenced how people travelled. It is specifically mentioned in reference to making choices to use public and active transport options.

7.3 Community feedback on options

On 3 April 2008 Deputy Premier Paul Lucas and Minister for Transport, Trade, Employment and Industrial Relations John Mickel released 15 options to the community – seven public transport options, four surface road corridor options and four tunnel corridor options (see Figure 7.1).

At the release of these possible options the Queensland Government announced that:

- They had ruled out the Brisbane Valley Bypass and the West of Mt. Coot-tha Bypass options as early results showed neither of the western bypass options were viable because of low traffic volumes;
- The Indooroopilly to Dutton Park Bus Link was withdrawn from the study's scope given a full busway link from the city to the university would be complete by 2010;
- Public consultation would conclude on 31 May 2008; and
- These are long-term options and will be subject to further analysis of traffic volumes, engineering and environmental considerations, costings and public consultation (if they become funded projects under an approved strategy).

Feedback gathered on these individual options, and in some instances the possible combinations of options, informed and influenced the development of the final strategy.

During April and May 2008, Survey Two was released to capture feedback on the possible transport options.

Respondents to the survey were located in 41 different postcodes. The majority of feedback was concentrated within western Brisbane, with the neighbouring postcodes of 4069 and 4070 accounting for 214 of all 423 feedback forms. This is approximately 51 percent of responses. It should also be noted that residents of Kenmore submitted 59 feedback forms, accounting for 14 percent of overall responses. Of those who responded to the survey, the options that received the most support were:

- Toowong to Everton Park road tunnel;
- Moggill Pocket Sub-Arterial corridor; and
- Kenmore to CBD bus corridor.

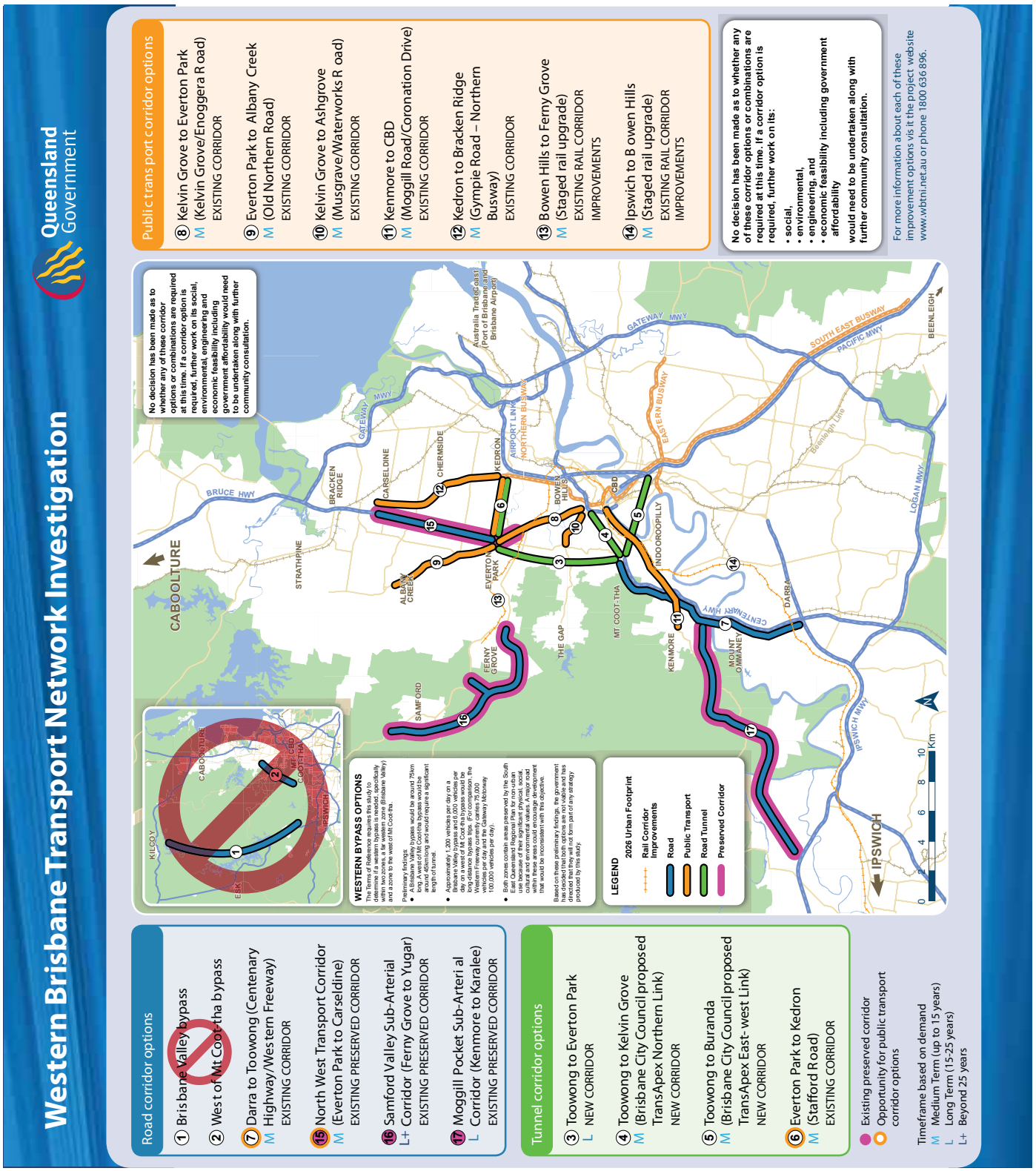


Figure 7.1 Consultation map of 15 transport options

7.4 Options feedback

The community was asked to comment on individual options and possible combinations of options. This information was presented to the community via display panels, seven information sheets, website updates and advertising.

During this phase of community consultation almost 3,000 people visited the ten public displays and around 500 contact forms were completed. There were approximately 180 calls to the 1800 number, 380 emails received and 9,500 visits to the website. More than 370 online surveys and 50 printed feedback forms were completed.

Survey Two was released and captured feedback from 423 respondents on the possible transport options.

Option One (Brisbane Valley Bypass) and Option Two (West of Mt. Coota-tha Bypass)

In 2007 community comments suggested that the draft Terms of Reference were too focused on a western bypass. There were a significant number of comments on a bypass west of Mt. Coot-tha, especially in regard to future residential land use and environmental issues.

During these early stages of the study there was intense interest from residents in Samford, The Gap, Bellbowrie and Moggill in relation to impact on environment and local amenity and general interest from supporters of a bypass.

In April and May 2008, the decision to exclude the bypass options from the study renewed this debate. When asked to comment on the range of possible transport options in April and May there was mixed feedback to the government decisions to rule out the two bypass options. Comments centered around:

- Information on why the bypass options were removed;
- Support for preserving the natural environment;
- Support for preserving semi-rural lifestyle areas;
- The need to take trucks and heavy vehicles out of the inner city suburbs;
- The need for a link from north to south that avoids the CBD; and
- Alternative routes to already congested major arterial roads and motorways.

Option Three (Toowong to Everton Park Tunnel)

Overall there was very strong support for the Toowong to Everton Park corridor (Option Three). In terms of direct positive feedback this was the most popular option. Opposition and enquiry comment was focused on issues relating to road infrastructure costs and impacts.

Enquiries generally related to property and lifestyle impacts, e.g.

- Alignment;
- Tunnel entry and exit points;
- Location or inclusion of any ventilation station outlets;
- Tunnel depth; and
- Environmental impacts including vibration, noise and air quality.

Option Four (Toowong to Kelvin Grove, BCC proposed TransApex Northern Link Tunnel)

Feedback received by the investigation team regarding Brisbane City Council's proposed TransApex Northern Link Tunnel was limited. Responses to this option were generally balanced.

Enquiries were about:

- Property values;
- Public transport being preferred;
- Tunnel entry and exit points; and
- Tunnel alignment.

Option Five (Toowong to Buranda, BCC proposed TransApex East-West Link Tunnel)

The Toowong to Buranda option (Option Five) received very limited responses.

These enquiries and comments included:

- Concerns about direct property impacts;
- Concerns about Options Three, Four and Five meeting at Toowong; and
- Alignment.

Option Six (Everton Park to Kedron, Stafford Road Tunnel)

Everton Park to Kedron (Option Six) also received limited public comment.

Enquiries and comments included:

- Entry and exit points;
- Alignment;
- Property impacts – especially values; and
- Public transport preferred – better use of road space and investment.

Option Seven (Darra to Toowong, Centenary Highway/Western Freeway)

Darra to Toowong (Option Seven) received a high number of comments and enquiries. Although some localised property and social impact issues were raised, these enquiries generally included comments regarding other proposed road links from this option, mainly Toowong to Everton Park (Option Three) and Everton Park to Carseldine (Option Fifteen). This shows the wider awareness and understanding of the connectivity of the proposed options.

Options Eight to Ten (see Public transport options)

Option Eleven (Kenmore to CBD)

Fairly minimal comments were received regarding Kenmore to CBD (Option Eleven), with the feedback being generally positive. The majority of respondents provided positive responses to this option, with the remaining comments being either indirect or passing comment. As such, no negative comments were received for this option.

Respondents from suburbs surrounding Kenmore generally indicated that this option was a positive step and a preferred option over the Moggill Pocket Sub-Arterial (Option 17).

Comments and enquiries generally related to:

- Public transport support;
- Fig Tree Pocket river crossing; and
- Property values and resumptions.

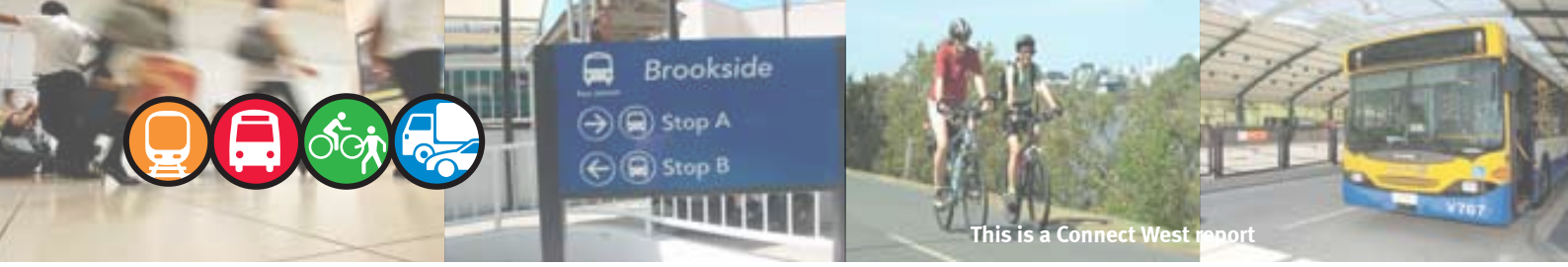
Options Twelve to Fourteen (see Public transport options)

Option Fifteen (North West Transport Corridor; Everton Park to Carseldine)

Option 15 received a very high number of enquiries with opinion relatively divided. Whilst enquiries included a number of local issues, including property impacts and route alignment, this option was also raised by respondents in conjunction with the Toowong to Everton Park (Option Three) and Darra to Toowong (Option Seven) options.

Key issues and enquires included:

- Possible uses of the corridor – such as the motorway, bus and rail;
- Exact location of corridor and possible road alignment;
- Loss of greenspace and wildlife areas; and
- Concerns about social impacts and property values.



Option Sixteen (Samford Valley Sub-Arterial Corridor, Ferny Grove to Yugar)

The Samford Valley Sub-Arterial Corridor (Option 16) also received limited public comment. Public opinion received for this option was balanced.

Enquiries received generally related to:

- Concerns about social impacts and property values; and
- Possible uses of the corridor.

Option Seventeen (Moggill Pocket Sub-Arterial Corridor)

Initial survey responses were supportive of the Moggill Pocket Sub-Arterial (Option 17). However, during late April and May a significant number of concerned responses were received by the investigation team.

This may be in part as a result of coordinated entries from a number of local lobby groups that formed when the Kenmore Bypass was announced.

These groups viewed the Kenmore Bypass project as stage one of Option Seventeen and promoted the idea that traffic from the Warrego Highway would be funnelled through the suburb.

Issues and enquiries raised included:

- Exact location of the preserved corridor and possible road alignment;
- Requests for a bridge at Bellbowrie to Riverhills to carry private and public transport;
- Expressed opposition to loss of greenspace; and
- Concerns about property values.

Public transport options

The public transport options included:

Option Eight – Kelvin Grove to Everton Park (PT option);

Option Nine – Everton Park to Albany Creek (Old Northern Road, PT option);

Option Ten – Kelvin Grove to Ashgrove (PT option);

Option Twelve – Kedron to Bracken Ridge (Gympie Road-Northern Busway, PT option);

Option Thirteen – Bowen Hills to Ferny Grove (staged rail upgrade);

Option Fourteen – Ipswich to Bowen Hills (staged rail upgrade).

In general the community were supportive of these Public Transport Options. Much of the comment received was directed towards overarching rail and public transport solutions rather than towards specific proposed options. These improvements were viewed as necessary to improving the whole network. Public transport was repeatedly mentioned as the solution to the congestion problem.

General public transport issues included: accessibility, affordability, reliability, frequency and of most concern, safety.

Safety improvements suggestions included:

- Provision of lighting at stations, bus stops and car parks;
- Increased security on buses and trains (both camera and person);
- Safe footpaths, signage and supervision for children walking to bus stops and train stations; and
- Increased Park ‘n’ Ride facilities.

7.5 Technical response

Feedback captured through communication tools and at community events was recorded in a database and shared with the investigation's technical team to inform the investigation process. All feedback was considered.

Table 7.2 summarises the key issues and responses around:

- Rail and light rail;
- Active transport (walking and cycling);
- Freight;
- Western bypass;
- Preserved transport corridors;
- Design details; and
- Peak oil.

Table 7.2 Key issues and responses

Key Issue	Response
Rail – new infrastructure	
	A key principle of the study is to make better use of existing infrastructure before investing in new corridors. The rail improvement options would enable significant improvements to rail services across the whole Brisbane rail network and Western Brisbane Transport Network Investigation is investigating a 'Turn-up-and-go' strategy with no need for timetables in peak periods.
Rail – frequent enquiries about extending rail to:	
• Kenmore • Bellbowrie • Moggill • Samford	Population projections to 2026 indicate that there will not be sufficient population density in the Kenmore/Bellbowrie/Moggill and Samford areas to support regular and frequent rail services. Buses in bus or transit lanes are better able to provide high frequency services to low density residential areas.
Light Rail	
	A key principle of the study is to make better use of existing infrastructure before investing in new corridors and transport systems requiring new infrastructure, such as light rail.
Light Rail – frequent enquiries about introducing light rail to:	
• Bellbowrie • Moggill	While light rail has been considered, population projections to 2026 indicate there will not be sufficient population density in the Bellbowrie and Moggill areas to support regular and frequent services. Buses are better able to provide high frequency services to low density residential areas. While each option may improve transport in its local area, it is the way that options are combined that helps to meet long-term demand.
Underground Rail	
	A key principle of the study is to make better use of existing infrastructure before investing in new corridors and transport systems requiring new infrastructure, such as an underground rail system.
Active Transport – new infrastructure	
	There are numerous pedestrian and cycle options being considered to support the use of active transport and public transport at key centres and to link residential areas to education, employment, shopping and recreational facilities. These possible options include off road walking and cycling links and river crossings for recreational and commuter-based trips. With all options, there would be opportunities to develop on and off road walk and cycle infrastructure.
Active Transport – frequent enquiries about a bridge from Bellbowrie to Riverhills to include:	
• Public transport • Road transport	A possible pedestrian and cycle river crossing from Bellbowrie to Riverhills is being considered to provide a direct link between Bellbowrie, the Western Freeway cycleway and the rail network at Darra/Oxley. No route has been determined and any proposed option could only proceed if the government's environmental impact management requirements are met. A road link is not being considered for this river crossing because of its impact on local suburban roads.

Table 7.2 Key issues and responses cont'd

Key Issue	Response
Ferry – frequent enquiries about extending ferry services to:	
• Fig Tree Pocket • Jindalee • Moggill	As a strategic network study, Western Brisbane Transport Network Investigation is investigating the infrastructure requirements of the transport network. Operational issues such as the extension of river cat services up the river to Fig Tree Pocket/ Jindalee are outside the scope of this study. There are environmental and operational constraints to extending the ferry/CityCat services to Moggill such as erosion. If these could be overcome, the time taken for the trip would be excessive and would limit the benefits it could provide to the wider transport network.
Freight – frequent enquiries about moving freight from road to rail	
	In terms of freight, over 90 per cent is transported by roads in urban areas and a large proportion of all freight trips in any given area are local movements or local deliveries. Moving this type of freight off local roads is difficult because the vehicles actually travel to local destinations thus, there is no opportunity in western Brisbane to shift freight from the road to rail, now or in the future.
Freight – frequent enquiries about freight on local roads	
	In terms of freight, over 90 per cent is transported by roads in urban areas and a large proportion of all freight trips in any given area are local movements or local deliveries. Moving this type of freight off local roads is difficult because the vehicles actually travel to local destinations thus, there is no opportunity in western Brisbane to shift freight from the road to rail, now or in the future.
Freight – frequent enquiries about freight on local roads	
	The Gateway and Logan Motorways form the Priority No. 1 Freight Route through Brisbane for long-haul vehicles (i.e. Auslink Freight Route), and the Ipswich Motorway and Centenary Motorway/Western Freeway will still be the Priority No. 2 Freight Route through western Brisbane. The road tunnel options provide opportunities to reduce freight traffic on local streets.
Western Bypass	
	The western bypass options have been ruled out by the government primarily because of low projected traffic volumes. No specific routes had been investigated however whatever the route the Brisbane Valley bypass (refer Option 1) could have followed, it would have been around 75 kilometres long, and the west of Mount Coot-tha bypass (refer Option 2) would have been around 40–50km long and would require significant lengths of tunnel for topographic and environmental reasons. In addition, the western bypass options would provide little relief to congestion in western Brisbane and would be incompatible with the Regional Plan as they would encourage urban sprawl beyond the 2026 urban footprint.

Table 7.2 Key issues and responses cont'd

Key Issue	Response
Preserved Transport Corridors	
	The Terms of Reference state that the investigation will consider the role existing preserved transport corridors may have in the future network. There are three preserved corridors being considered; the North West Transport Corridor, Samford Valley Sub-Arterial Corridor and Moggill Pocket Sub-Arterial Corridor. Any proposed use of these undeveloped preserved transport corridors could only proceed if the government's environmental impact management requirements are met. Significant measures would need to be taken to protect environmental values and urban amenity.
Design Details – frequent enquiries about:	
• Ventilation system • Property impacts • Locations of tunnel entries/exits • Construction impacts • Noise mitigation measures	No decision has been made as to whether any of these corridor options or combinations are required at this time. If a corridor option is required, further work on its social, environmental, engineering, and economic feasibility including government affordability and funding sources would need to be undertaken along with further community consultation. Design details would be determined in future planning phases before design and construction could commence. It is not possible to determine impacts on individual properties until this work is done. It is important to note that there are State and Commonwealth legislative requirements that would need to be met to ensure that noise and vibration from construction and operation activities of any corridor option are within appropriate limits.
Transport Modelling and Sensitivity Testing – frequent enquiries about key assumptions	
	The transport model (as with any predictive tool) has been developed using existing data which is based on current behaviours, and it is appropriate that assumptions for the future base case be based on those same behaviours. Future changes in areas such as technology, social behaviours and economic activity would result in changes to travel behaviour and demand. Sensitivity testing will involve varying the assumptions within the model to account for possible future changes in conditions such as user behaviour, vehicle technology and fuel prices. The model outputs will be compared to gauge the shifts in demand and required response.
Transport Modelling and Sensitivity Testing – Peak Oil	
	A key assumption of the base case is that fuel prices will remain high but will not eliminate the passenger car or change user behaviour. Sensitivity testing will test the impact of variations in this key assumption to account for possible future changes in fuel pricing (by up to 500 per cent). The results of sensitivity testing will inform the development and assessment of strategies and ensure that the outcome will be appropriate for a range of possible future conditions.

Table 7.2 Key issues and responses cont'd

Key Issue	Response
Outside Study Area – frequent enquiries about:	
• Rail to Redcliffe • Gateway Motorway	Western Brisbane Transport Network Investigation is a strategic study focussed on the investigation of regionally significant transport links and travel patterns across western Brisbane, which is defined as the area extending north of Ipswich Motorway / Warrego Highway, south of Pine River and west of the CBD to the D'Aguilar Range. The study area extends further north to Caboolture, south to Ipswich and west to Brisbane Valley, as travel demand in western Brisbane is also affected by potential connections and growth outside of western Brisbane. The investigation of transport issues in Redcliffe are outside the scope of this study. This investigation is not considering the upgrade of the Gateway Motorway as it is not located within the study area. For information about the Gateway Motorway, please contact Department of Main Roads - Metropolitan District.
Outside Study Area – frequent enquiries about transport issues in Brisbane Valley	
	The Brisbane Valley area is important in the south-east Queensland context as it is the location of one of the western bypass options and has been included in the study area for that reason. The government has since ruled this option out because of low traffic volumes.
Outside of Scope – frequent enquiries about local issues:	
• Local bus routes • Local walking/cycling links • Local access issues • Gap Creek Road	As a strategic network study, Western Brisbane Transport Network Investigation is investigating the infrastructure requirements of the transport network. Local issues are outside the scope of this study and should be forwarded to Brisbane City Council or Department of Main Roads - Metropolitan District. This investigation is not considering the upgrade of Gap Creek Road as it is a local road and not a strategic link. For information about Gap Creek Road, please contact Brisbane City Council.
Outside of Scope – frequent enquiries about operational issues:	
• Ticketing • Timetabling • Signal timing	As a strategic network study, Western Brisbane Transport Network Investigation is investigating the infrastructure requirements of the transport network. Operational issues are outside the scope of this study, and should be forwarded to Brisbane City Council, Department of Main Roads - Metropolitan District or TransLink.

8.0 Public transport investigations

8.1 Introduction

This chapter presents the analysis of the public transport options described in Chapter 7. The strategic assessment of public transport options was performed as a multi-step process:

- Utilising TransLink's 'Low' and 'High' public transport growth scenarios in the SEQSTM;
- Comparison of the SEQSTM demands with demands derived from extrapolation of TransLink's 'Low' and 'High' public transport growth scenarios on current patronage;
- Identifying options that would provide the capacity for TransLink's 'Low' and 'High' public transport growth scenarios, respectively;
- Sensitivity testing of future demand under increased vehicle operating costs;
- Confirming future public transport demand with BSTM V6; and
- Review of operational changes in light of the forecast demand.

A fundamental principle underpinning the options evaluation described in this chapter, and the triple bottom line assessment of options discussed in Chapter 9, was the principle of maximising the use of existing infrastructure before considering the need for any new infrastructure. In regards to rail, this required a strategic review of rail operations to determine the capacity of the system under the existing operating paradigm. It also required consideration of road corridors as multi-modal transport corridors to maximize the throughput of people, which includes prioritisation of road space for bus services, where appropriate.

Given the uncertainty around peak oil and transport costs, it was considered necessary to assess the options in view of increasing the capacity on key public transport routes.

The following sections therefore describe:

- Rail network review of current operations and discussion of opportunities;
- Identification of strategic bus corridors;
- Identification of strategic bus and rail interchanges; and
- Qualitative and quantitative public transport options assessment.

8.2 Rail network

A fundamental principle of the development of a transport network strategy is to assess the scope for maximising the use of existing transport assets and services before consideration of new infrastructure. For public transport, this necessitated a review of current rail operations on the western network and the assessment of spare capacity, if any, to maximise the use of existing infrastructure to accommodate future public transport demand by rail.

Introduction of committed works

As a starting point it was assumed that by 2015, the following committed works as outlined in SEQIPP would be implemented:

- Third track from Salisbury to Kuraby;
- Track duplication from Helensvale to Robina;
- Track duplication from Mitchelton to Keperra to Ferny Grove;
- Third track from Corinda to Darra;
- Third track from Darra to Redbank;
- Track duplication between Caboolture and Landsborough; and
- New extensions from Darra to Springfield and Robina to Elanora.

By 2026, it was assumed that the following committed works would be implemented:

- Additional tracks from Coomera to Helensvale, Kuraby to Kingston, and Salisbury to Park Road;
- Third track from Lawnton to Petrie;
- Rail extension from Elanora to Coolangatta;
- Track duplication between Landsborough and Nambour;
- New track extension from Beerwah to Maroochydore; and
- New cross city rail tunnel.

8.2.1 Passenger rail operations review

A strategic review of current passenger rail operations showed that the configuration of the peak period timetabled services is significantly different to off-peak operations. At peak times, most trains on each rail line are scheduled to various connecting lines after travelling through the Brisbane CBD, with some trains running directly into Mayne Yard for stabling. Express services operate on all lines except the Doomben line and additional short starting services (i.e. trains that do not originate from the end of the line) are provided from areas closer to the CBD. Peak time services could be characterised by the following:

- Very inconsistent headways;
- Inconsistent service patterns;
- Inconsistent stopping patterns;
- Utilisation of both the 'Main' and 'Suburban' lines through the CBD from some corridors;
- Uncoordinated train numbers between lines using shared CBD tracks; and
- Variable running times between trains operating on the same station stopping pattern.

As an example, passenger trains on the Ipswich line between Ipswich and Central arriving between 7am and 9am show a total of twelve different service operating types. A mixture of service types run from each of the key origins with three different services running from Rosewood, four from Ipswich and two from Redbank. Some services run via all stations, others express on differing sections of the line to the CBD, thus making it difficult for passengers to easily identify where their train stops. Similarly, the operation of express and stopping services from Ferny Grove station results in very uneven headways at stations along the line.

The scheduling of such complex and inconsistent services has consequences for rail passengers:

- Variable travel times – trains departing from the same station have variable travel times resulting in some services being more attractive to passengers than others, leading to overcrowding of the popular services.
- Inconsistent headways – peak period headways at most stations on the Ipswich and Ferny Grove lines, vary from between 3 and 23 minutes to between 5 and 29 minutes, respectively. Whilst it would be impossible to offer completely even headways at all stations, the longest headways occur in the middle of the peak period, probably at a time when a large proportion of passengers would ideally want to travel.

Existing passenger service configuration and capacity

As described above, the existing timetabled passenger service is complex with a number of different service types operating from all main lines at irregular intervals. Figure 8.1 shows a simplified diagram of the existing services that operate in the peak direction during the peak period from all corridors (arriving at Central station between 7am and 9am). This diagram does not show the connections between services from north to south and vice versa, instead trips are only represented as far as Central station.

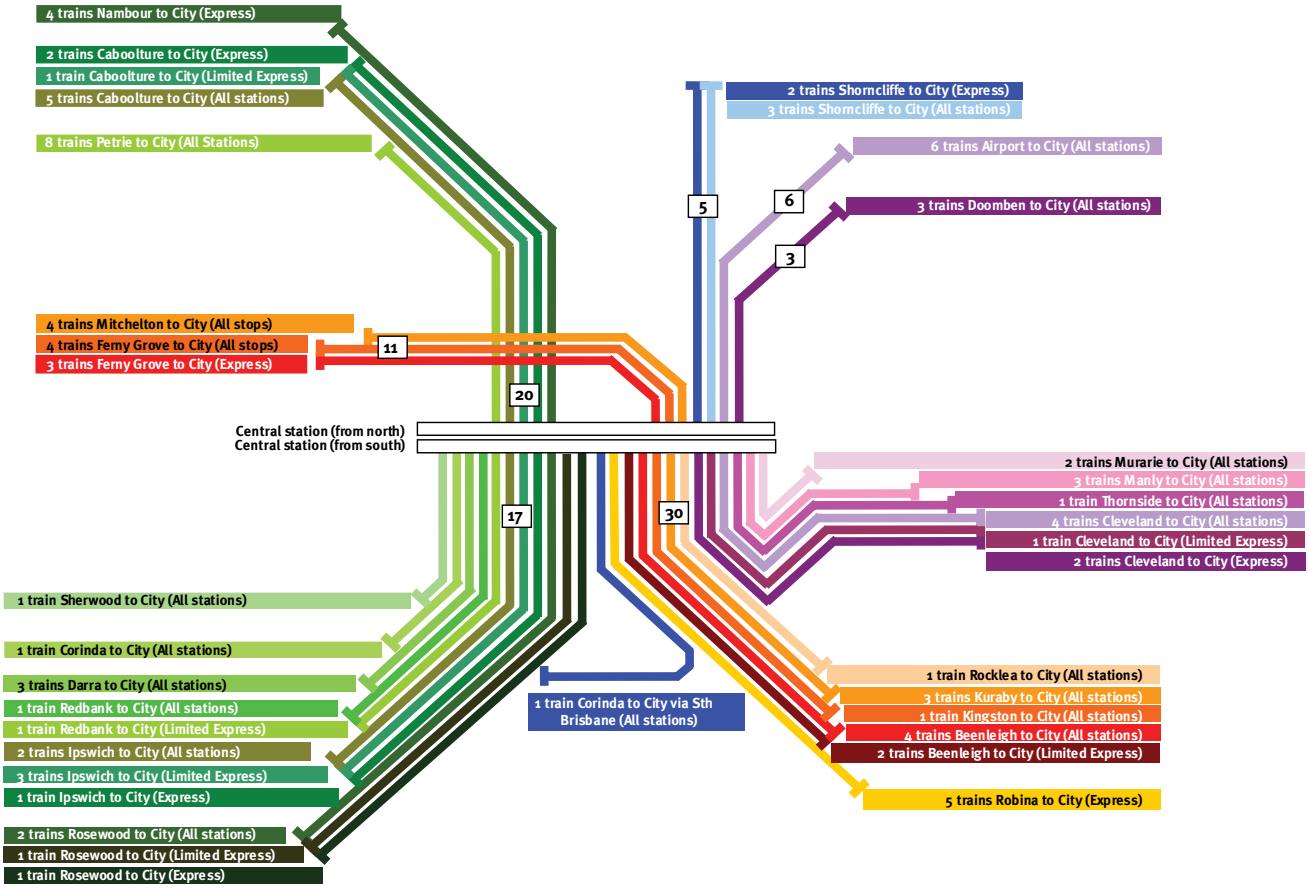


Figure 8.1 Existing services on each corridor into the CBD during AM peak period (7am-9am)

The overall capacity of the existing network and service patterns for access to the Brisbane CBD in the two hour peak period is about 73,000 passengers. The Ipswich line has capacity for approximately 14,000 passengers over the two hour period, with the Ferny Grove and Caboolture lines able to carry about 9,000 passengers and 13,000 passengers, respectively (Figure 8.2).

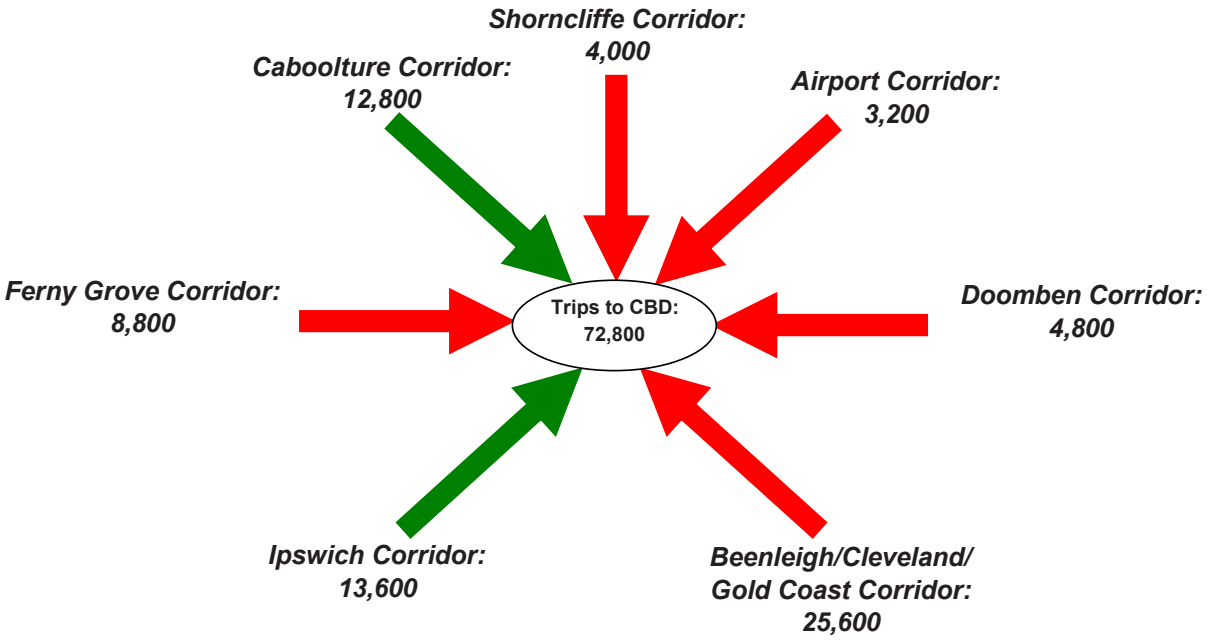


Figure 8.2 Peak two hour capacity of existing timetable

8.2.2 Possible rail opportunities

The strategic rail operations review revealed that there are opportunities to release more capacity from the existing rail infrastructure network if changes were made to operating practices, train schedules and some modifications to policy guidelines. Based on the high population growth projections for SEQ, it is likely that long term network demand would require major new infrastructure to be built. However, as long lead times are associated with the delivery of major rail infrastructure assets, the short and medium term strategies should seek to maximise the utilisation of the existing network, and find opportunities to provide extra train services to meet the rapidly rising demand.

A potential incremental strategy to facilitate the operation of a higher capacity service to accommodate the short to medium term growth in demand is outlined below.

The identified rail opportunities take advantage of the committed SEQIPP network upgrades but have the potential to not require any significant additional track infrastructure. Instead, operational changes and a major recast of the timetable would enable more capacity to be released. It should be noted that it was assumed that freight trains would continue to have a curfew at peak times as occurs in Brisbane, Sydney and Melbourne.

Specifically, this chapter will describe the following rail opportunities:

- Greater sectorisation of the network;
- Timetable simplification;
- Altered stabling arrangements;
- Rolling stock requirements;
- Options for longer trains; and
- Signalling upgrades.

For the rail system to operate effectively in the western Brisbane area, the whole SEQ passenger rail system needs to be considered. As this is a strategic investigation, detailed service planning for the rest of the network would need to be carried out.

Sectorisation

Sectorisation can be defined simply as breaking up railway operations into smaller self-contained units or 'clearways'. Sectorising the railway improves both the reliability of the system and capacity. Running the network as two independent 'clearway' lines allows the system to better contain the effect of delays into a smaller area, minimizing the impact on services on other clearways. Currently, the CityTrain network is partially sectorised, i.e. it is sectorised during the off-peak but not during the peak. To gain benefits of higher reliability and headway increases, the rail network would need to be fully sectorised during the peak and off-peak periods. The sectorised lines would also remove many bottlenecks at junctions by reducing at grade movements between parallel lines. This would also release spare capacity as the reduction in the number of lines that would need to be scheduled together, as well as the removal of conflicts, could free up extra paths in each line's timetable.

Two track pairs run parallel with each other between Roma Street and Bowen Hills, and offer two routes in each direction for trains to use through the Brisbane CBD. At present, trains from certain lines are often restricted to one or the other central area line pair during the peak. However, the existing timetable does not consistently dedicate trains from certain corridors through specific central area tracks. Additionally, trains from each southern corridor regularly form trains to each northern corridor and vice versa. The full sectorisation of train services through the Brisbane CBD would complement the development of simpler timetables.

Based on the available demand data and knowledge of the track work leading into the CBD, it is proposed that the network could be permanently sectorised as follows:

- Western CBD Lines (also known as 'Main' lines): Ipswich and Caboolture lines; and
- Eastern CBD Lines (also known as 'Suburban' lines): Gold Coast, Beenleigh, Cleveland, Doomben, Airport, Shorncliffe and Ferny Grove lines.

Figure 8.3 shows the grouping of the proposed sectorised lines: the 'Western lines' are shown in green and the 'Eastern lines' in red. In this arrangement, a number of connections would be unused at most times of the day, for example the lines connecting the Beenleigh/Gold Coast/Cleveland lines to the western CBD line just south of Roma Street would not be used. This would remove conflicts between that group of trains and the Ipswich line trains allowing greater capacity and increased reliability.

This proposed sectorisation would minimise conflicts between passenger trains on each sector allowing independent timetables to operate and avoiding the risk of incidents on one line affecting the entire network. In general the sectorised network matches the demand balance in the north and south, for example the total number of trains from the Caboolture and Ipswich lines is similar.

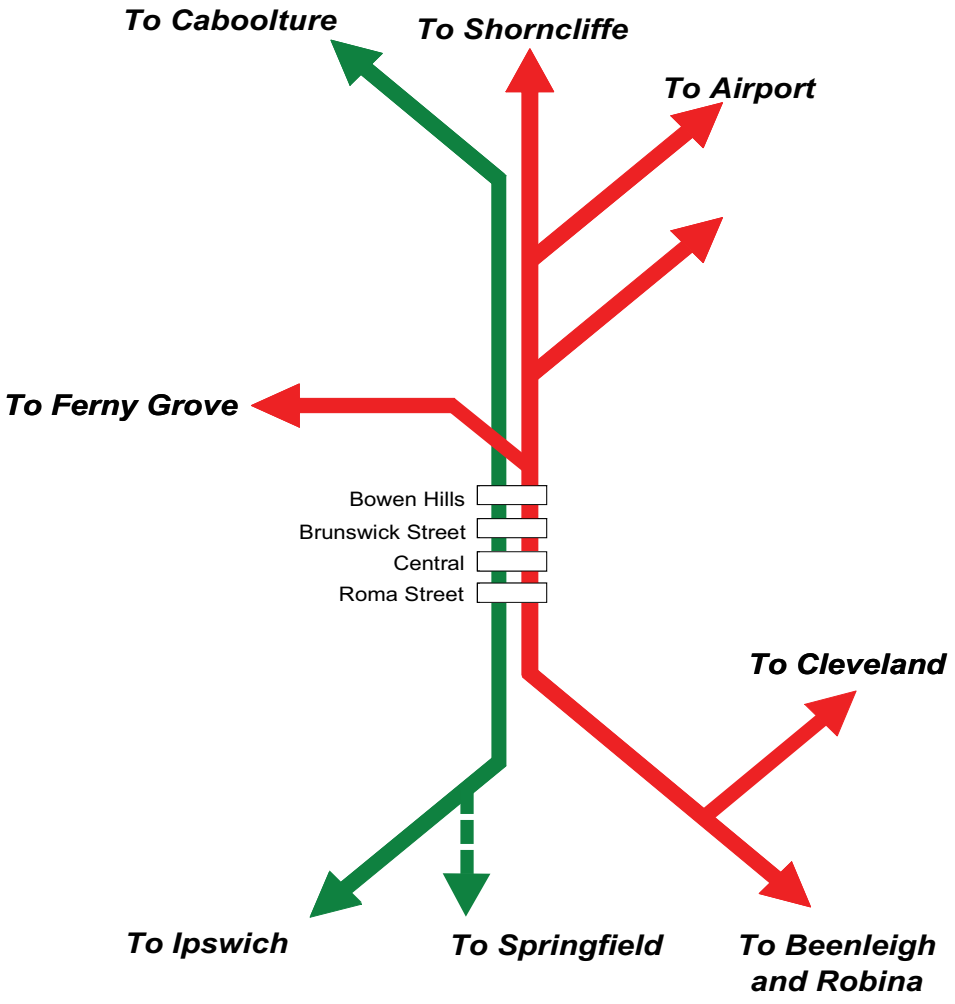


Figure 8.3 Proposed sectorised rail network

Segregation of Ipswich and Beenleigh/ Gold Coast/Cleveland lines

A key element of the rail sectorisation is the full segregation of south-west trains from south-east trains and the scheduling of trains from each corridor to be positioned onto dedicated tracks in advance of Roma Street. The existing track work allows all trains from South Brisbane and Milton to use any track through the Brisbane CBD via a series of at grade junctions.

The proposed segregation of the suburban line and main line removes all conflict points between the two lines, as shown in Figure 8.4. As all trains from South Brisbane are forced to merge into one track on approach to the Merivale Bridge, no additional capacity can be provided for the Beenleigh/Gold Coast/Cleveland lines by running via both track pairs through the CBD. Consequently, the sectorised network runs all trains from that group of lines via the eastern side tracks through the CBD. By containing all south-eastern trains on one CBD track pair, the full capacity of the other track pair is then available for Ipswich line trains. The remaining two conflict points on the Ipswich line can then be managed by timetabling trains from each line to present at the junction at even headways from one another.

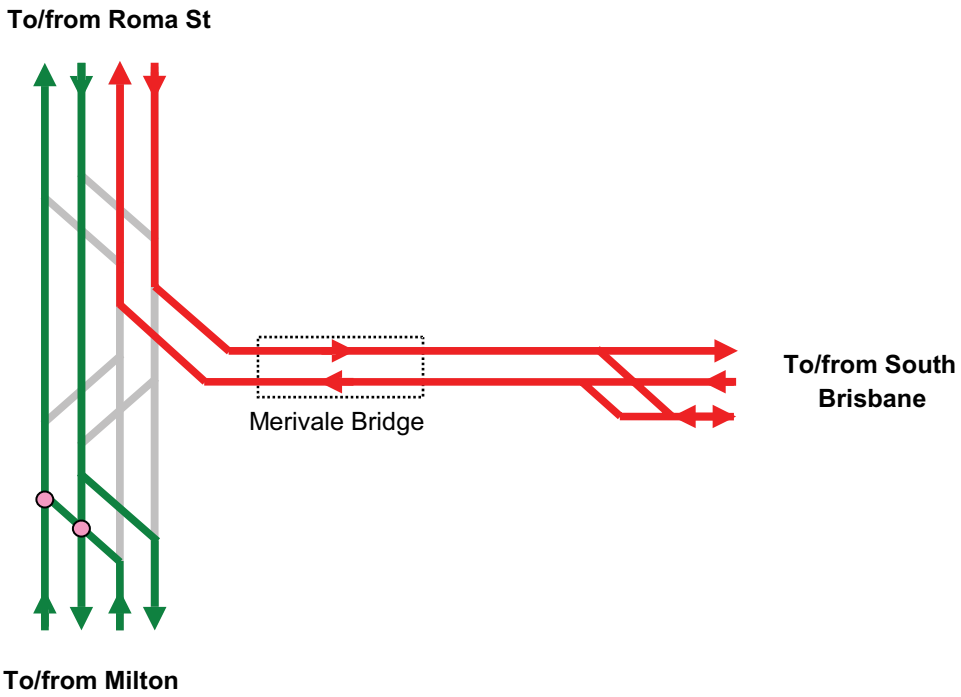


Figure 8.4 Proposed revised operation through junctions south of Roma Street (all conflict points between different lines are removed)

Connection of Ferny Grove line to 'Eastern lines'

The proposed sectorised network maintains the connection of the Ferny Grove line to the Beenleigh line as operated in the current off-peak. There are two main reasons for this:

- Existing track layout; and
- Demand balance.

The Ferny Grove line joins the combined line through the Brisbane CBD just north of Bowen Hills station. The line crosses the Enoggera Creek immediately before curving south over the edge of the rail yard. The bridge over the creek extends into a flyover that crosses the western track pair and the northbound track of the eastern track pair before it descends to grade. As a result, the two tracks to/from Ferny Grove are positioned between the northbound and southbound tracks of the eastern track pair as shown in Figure 8.5.

Figure 8.5 Track layout north of Bowen Hills

As a result, the Ferny Grove tracks merge with the eastern track pair in both directions just south of the flyover as shown in Figure 8.6.

To enable trains from Ferny Grove to travel to Ipswich and vice versa, trains would need to cross over from the eastern track pair to the western track pair using the points just outside Bowen Hills or Brunswick Street. That move would reduce overall capacity and increase unreliability for all services. To maintain a fully sectorised operation, the flyover would need to be re-engineered to join the western track pair.

The proposed sectorised configuration outlined above results in all trains from Ipswich travelling through to the Caboolture line and vice versa via the western track pair. Trains from Gold Coast/Beenleigh and Cleveland travel to Ferny Grove, Doomben, Shorncliffe and the Airport. In this scenario trains arriving on the Ferny Grove line must share the CBD capacity with trains arriving from Shorncliffe, Doomben and the Airport.

Conversely, in the event that the flyover was re-engineered to connect the Ferny Grove line with the western track pair (and the Ipswich line), trains would need to share capacity with those arriving from the Caboolture line.

The demand on the Caboolture line is significantly higher than the total demand from Shorncliffe, Doomben and the Airport. Therefore, by leaving the Ferny Grove line connected to the Beenleigh/Gold Coast/Cleveland group, a higher number of trains would be able to serve the line. This also avoids a costly re-engineering of the Ferny Grove flyover.

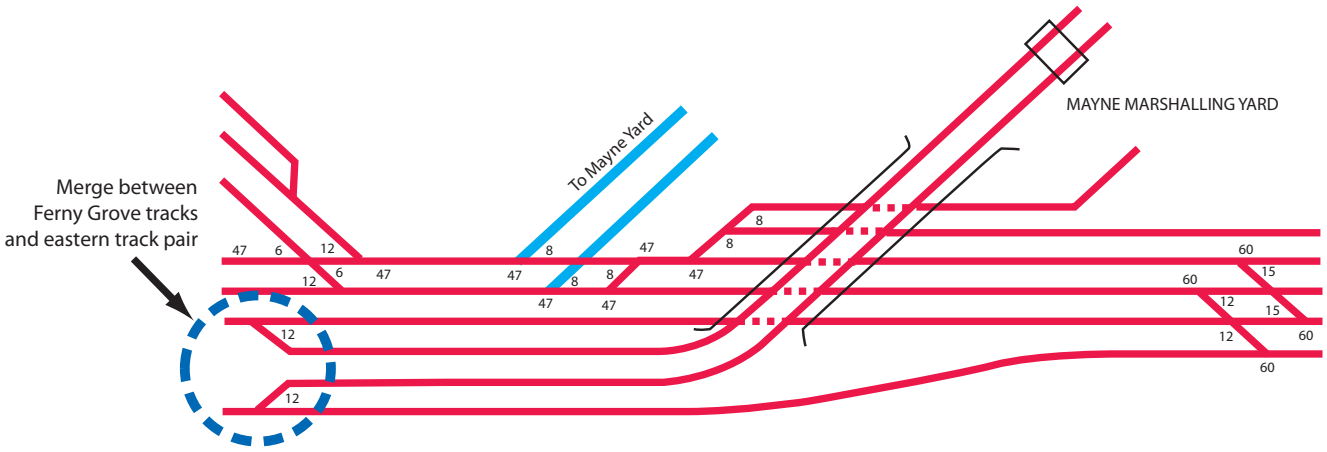


Figure 8.6 Track layout at the connection of the Ferny Grove line

Connection of Shorncliffe line to 'Eastern lines'

At present trains from the Shorncliffe line travel via both the 'main' and suburban' lines in the Brisbane CBD. At off-peak times most Shorncliffe trains travel to Corinda via Milton. However, in the proposed restructure of the network, all Shorncliffe trains would travel via the 'suburban' line and connect through to the Cleveland line. This has been proposed to allow a greater frequency of trains to operate to and from the Caboolture line and to reduce the overall number of conflicts in the CBD.

Impact of sectorisation

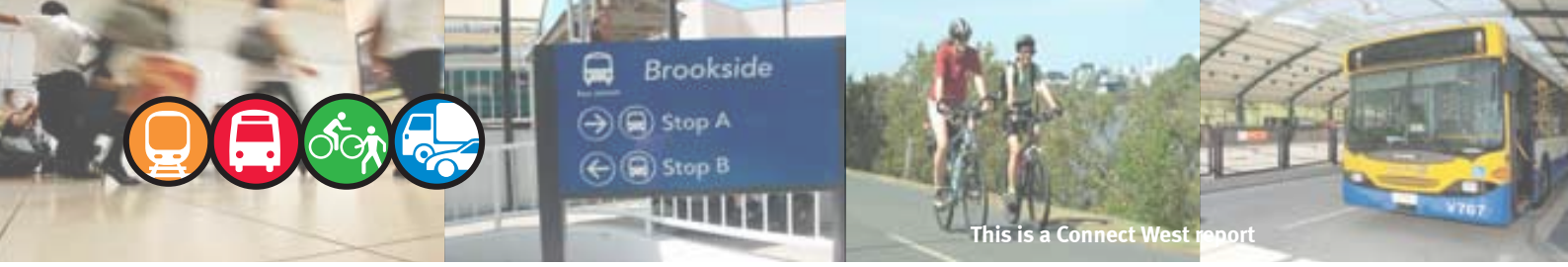
Sectorisation would enable higher capacity to be achieved on the existing network and improve reliability. Passengers would more easily be able to identify trains, the marketing of the service would be easier and staff should be able to more easily manage disruption.

However, some passengers may be required to make additional interchanges to reach their final destinations. Additionally, access to Mayne Yard would be more limited from some lines.

Table 8.1 highlights the advantages and disadvantages associated with sectorisation.

Table 8.1 Advantages and disadvantages of sectorisation

Advantages	Disadvantages
Improves capacity by allowing simpler timetable to be implemented Some passengers won't have to interchange	Some additional interchanges would be required for some passengers who no longer receive a direct service to their destination (e.g. passengers travelling from the Ipswich line to Shorncliffe)
Simplifies operations for train controllers enabling them to easily identify each service type by its origin/ destination	Reduces opportunity for CBD stabling for some lines
Improves reliability by reducing at grade conflicts and reducing the risk of delays on one section impacting on other sections	Additional stairs or escalators may be required at Central and Bowen Hills to improve flow and reduce congestion at the existing platform access
Simplifies service for passengers by running all services from the same CBD platforms	
Allows easier coordination of services on same group	



Timetable simplification

As discussed above, the existing timetable does not maximise the available capacity of the network. The sectorisation of the network discussed above and the introduction of the committed works would provide an opportunity to develop an entirely new, 'greenfield' timetable for the network. The development of a new timetable would:

- Streamline and simplify the number of and variability of existing peak service patterns;
- Ensure the service provision matches the demand profile as appropriately as possible given the infrastructure constraints; and
- Enable a higher level of reliability to be achieved.

Service patterns

A possible new service pattern for each line was developed to demonstrate the value of redesigning the timetable, and highlights the potential capacity increases that could be achieved. These service patterns are indicative only and would require further review and optimisation when detailed demand data becomes available and signalling and track infrastructure is assessed on a corridor by corridor basis in more detail.

The design of the service patterns reflects the desire to reduce the overall number of routings and provide a service that repeats regularly.

The service design reflects commonly agreed best practices that have been applied throughout the world, in particular in the UK and France where new timetables have been developed in recent times. In particular, on lines where express trains are required, patterns have been developed that offer some outer suburban uniform express services overlaid with inner suburban 'zonal' services that sweep up passengers at all remaining stations. On lines where more than one service type operates, it is important that services run at frequencies that are multiples of one another to allow the pattern to repeat and for trains to be continuously coordinated with one another. Each service type would stop at the same combination of stations at all times as this allows the pattern to operate consistently and avoids customer confusion. Additionally, passengers would be able to identify the service by its description rather than have to consult a timetable to check which stations each train stops at (e.g. passengers boarding a 'Springfield' service would know that it stops at all intermediate stations).

In developing new service pattern options, a number of assumptions were made about the operating conditions and capacity available on the existing network. These assumptions would need to be reviewed in detail when more data is available.

The key assumptions to note are as follows:

- Signalling headway capacity of 3 minutes: It was assumed that the existing signalling system can process trains at 3-minute intervals. The current timetable does schedule trains at 3-minute intervals at some times in inner city areas, however a detailed assessment of the capability of the signalling system was not undertaken. The service patterns were designed to run trains at even headways of 3 minutes through the CBD area and on inner sections of the Ipswich, Caboolture and Beenleigh/Cleveland/Gold Coast lines.
- Additional running times: It was assumed that running times could be increased in some sections where necessary to allow the even presentation of trains into shared inner sections. For example, some stopping services may have to 'hold' at a station immediately before the merge with express trains. Overall travel time should still be lower due to the provision of consistent service patterns and shorter intervals.
- Layovers would be removed at Central station for all Ipswich and Caboolture line services: The sectorisation of the network would result in all Ipswich and Caboolture line trains having access to only one platform at Central station. Consequently trains would not be able to layover at that station due to the high frequency of services through the station. It may however be possible to provide some layover at Roma Street if required, though it is recommended that all recovery is moved to suburban locations and critical junctions. Trains on other lines would still be able to layover at Central station for approximately 2 minutes. The latter two assumptions would require more detailed assessment which is outside the scope of this investigation. The removal of layovers at Central station would not only provide the opportunity to operate more trains but also significantly improve travel times for passengers travelling through the city and mitigate the additional interchange time that may be required by some passengers travelling through the CBD in the sectorised network.
- No additional time provided for crew changes at Bowen Hills: It was assumed that if crew changes are to remain at Bowen Hills station they would need to take place during the allocated dwell time. From observation and timetable review it was concluded that no additional time for crew changes is provided in the existing timetable.
- Some contra-peak express services would need to run via all stations: The provision of three track sections on the Ipswich, Caboolture and Beenleigh lines allows express trains to overtake stopping services in the peak direction. However, in the contra-peak direction all trains would have to share a single track in those sections. This reduces the opportunity for express running where services are running at 3-minute intervals. Express running is still achievable in outer areas where the overall frequency is lower and on four track sections if properly configured.

Figure 8.7 shows the proposed new service patterns. This service maximises the available capacity through the CBD by running 20 trains per hour in each direction on each track pair. A total of 20 trains per hour arrive from the Caboolture, Ipswich and Beenleigh/Cleveland/Gold Coast corridors with 12 trains per hour able to operate from Ferny Grove leaving 8 trains per hour total to serve the Shorncliffe, Airport and Doomben lines.

A total of 11 different services could operate over the entire network. For comparison, the existing timetable is composed of 11 different services on just the Ipswich line. It should be noted that the service frequencies represent the ultimate service that could be delivered within the constraints of the existing signalling system and with the assumption that committed works, some supplementary works and new rolling stock is purchased. However, these service patterns could operate at lower frequencies in the interim until the full suite of new infrastructure is delivered. For example, the first step could be to operate the Ipswich/Caboolture sector with the same service pattern but at 12 trains per hour total frequency. This would provide 6 trains per hour on the Ipswich express service and 3 trains per hour from Springfield and Redbank stopping all stations.

Note: Extension of rail lines to Caloundra and Coolangatta are included in SEQIPP.

Figure 8.7 Proposed services on each corridor into the CBD during AM peak period (7am-9am) with 3 minute headways

Stopping patterns

To enable the above service patterns to operate and distribute demand as evenly as possible over the peak period, stopping patterns would also need to be simplified. Express services are proposed to be dedicated to the long distance services to Caboolture (and beyond), Ipswich/Rosewood, Elanora and Cleveland. All other services would be designed to pick up passengers from inner suburban stations not served by the express trains.

Focusing on the western Brisbane area specifically, the following sections describe the stopping patterns on the Ipswich and Ferny Grove lines:

Ipswich line

The new service pattern on the Ipswich line would offer a 'layered' stopping pattern with all Ipswich and Rosewood trains stopping at all stations to Goodna and then running express to Roma Street, stopping only at Darra and Indooroopilly. The 'zonal' services would run from Springfield and Redbank stations calling at all stations to Roma Street. Figure 8.8 outlines these proposed stopping patterns as well as travel times and headways from each station. As shown, a 6-minute service would operate from each station except for all stations west of Ipswich (24-minute service), Wacol and Gailes stations (12 minutes, as they are served by Redbank starter trains) and on the Springfield line (12 minutes).

In the current timetable, some inner suburban stations are served by occasional express services. Whilst the proposed service pattern removes the opportunity to catch express trains from some stations, this can be justified as follows:

- The actual travel time difference is marginal (for example in the current timetable an express train from Corinda to Central takes 20 minutes whilst a stopping service takes 21 minutes);
- The simplification of the timetable in this way allows a higher frequency and even headways to operate from all stations; and
- The provision of a consistent stopping pattern avoids passengers targeting specific trains and encourages a 'turn-up-and-go' philosophy which eventually leads to more peak spreading and better balanced loadings.

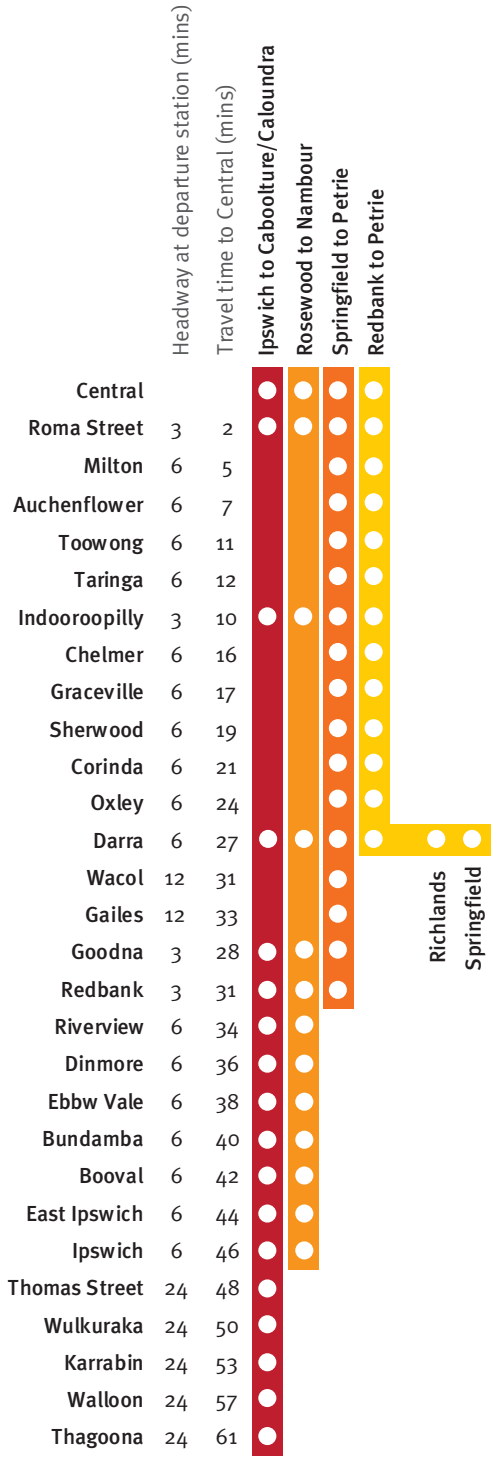


Figure 8.8 Proposed Ipswich line stopping pattern and estimated travel times and headways from each station (during peak)

The provision of a consistent express stopping pattern from Ipswich to the Brisbane CBD would reduce average in-vehicle travel times by around 5 minutes. However, there may be further opportunities to improve this by up to 10 minutes with track upgrades and signalling improvements on the express track between Redbank and Roma Street.

As a result of the proposed changes, the average headways between trains would be improved at each station under the proposed option compared to the existing timetable. Moreover, the inconsistency of headways in the current timetable would be removed at all stations except those with a very high service frequency. The high frequency and regular intervals would avoid passengers having to consult timetables.

Irrespective of the improvement in service headways, the total number of services delivered is no less than currently offered. The proposed Ipswich line service offers a greater number of services than the current timetable from each station in both the peak hour and the overall two hour peak period.

Ferny Grove line

Services on the Ferny Grove line would also be simplified from the existing timetable with a focus on providing significant increases in capacity. However, due to the need to share train paths with services from Shorncliffe, Doomben and Airport, and the desire to maximise frequency, services to Ferny Grove would not be able to run at absolutely regular intervals. Instead, trains arriving at stations between Mitchelton and the CBD would arrive at alternating intervals of 3 and 6 minutes. Stations between Ferny Grove and Mitchelton would be served by trains at 6-minute or 9-minute intervals.

Figure 8.9 shows the proposed service pattern. A total of 12 trains per hour would operate on the line with a third of the trains starting from Mitchelton. All trains would stop at all stations as the expressing of services absorbs additional train paths and offers little travel time advantage.

This stopping pattern would improve service frequency and headway consistency at all stations on the Ferny Grove line. At all stations headways are significantly reduced and the variability from the average headways falls from an average +/- 6 minutes at Enoggera in the current timetable to a standard +/- 1½ minutes at all stations in the proposed timetable.

As with the Ipswich line, compared to the current timetable, service frequencies would be higher at all stations in the proposed timetable compared to the current timetable in both the peak hour and the overall peak two hour period.

The operation of 12 trains per hour to the Ferny Grove line also offers the opportunity to develop a new corridor along the North West Transport Corridor. The Mitchelton services could, potentially, be diverted at Alderley to run north to Strathpine where they would terminate and offer interchange with the Caboolture line. This option would still provide an average 7½-minute service between Alderley and Ferny Grove and a 15-minute service on the preserved corridor.

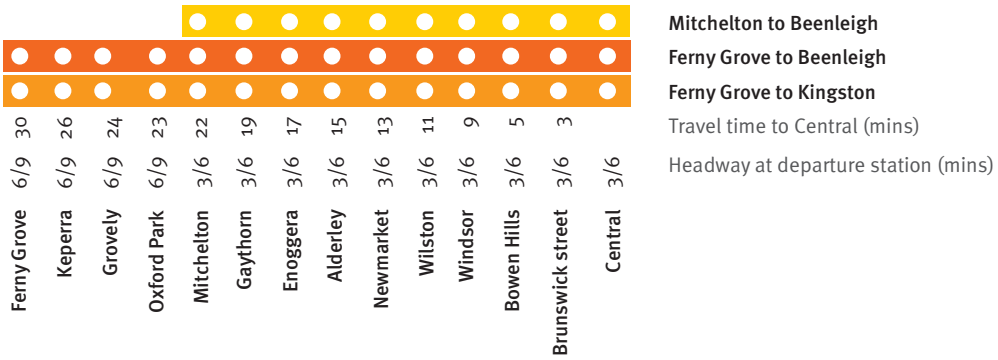


Figure 8.9 Proposed Ferny Grove line stopping pattern and estimated travel times and headways from each station (during peak)

Impact on Airport and Doomben lines and Australia TradeCoast

As mentioned previously, the proposed sectorisation considered the operational and engineering restrictions of the track work and sought to maximize capacity where it was most needed. However, whilst the resulting service pattern was developed to provide as much capacity as possible to the Ipswich, Ferny Grove, Caboolture, Beenleigh/Gold Coast and Cleveland lines, relatively few paths were provided for the Airport and Doomben lines. Under the proposal, the Airport and Doomben lines receive only 4 trains per hour between them, whilst that service level provides sufficient capacity it fails to provide an attractive level of service to those destinations and may conflict with the outcomes of the current Australia TradeCoast Transport Study.

The high demand for train paths to Ferny Grove and the need to provide at least 4 trains per hour to Shorncliffe limits the potential for providing additional paths to the Doomben and Airport lines. Even with a proposed signalling upgrade, both the Airport and Doomben lines would still only be served by 4 trains per hour each. It is therefore suggested that the feasibility of merging the two lines is explored, but this is outside the scope of this investigation.

Operating two hour peak

It is advisable that the proposed service patterns operate for at least two hours continuously in the AM and PM peaks. The operation of a long peak service would provide the following benefits:

- Improved capacity over two hours;
- Encouragement of peak spreading;
- Improved travel opportunities for workers who ideally want to reach work earlier or later than peak hour;
- Improved fleet utilisation;
- Simpler customer message; and
- Improved contra-peak service.

At present, demand statistics show that patronage in the peak hour accounts for about 67 per cent of the total two hour peak period demand. However, evidence elsewhere suggests that a significant proportion of that is driven by the relatively low peak shoulder service in operation thus forcing many passengers to travel on a peak hour train.

To avoid exacerbating this scenario in future it is recommended that the peak level of service is extended to operate for at least two hours. This would also reduce the level of capital investment needed in the long term to accommodate a sharp peak.

The ability to run a 'peak hour' service for two hours is relatively cost effective and easy to achieve compared to delivering infrastructure to meet a very 'peaked' service over an hour or less. Moreover, the total rolling stock requirement is lower and train usage more efficient in the longer peak model as the same trains can be reused for more than one peak trip.

Contra-peak service provision

It is advisable that an improved service is also provided in the contra-peak direction for the following reasons:

- Improve waiting times for contra-peak passengers;
- Encourage greater public transport usage in contra-peak;
- Improve access and travel times to activity centres in suburban areas;
- Make better use of rolling stock and position trains to make additional peak direction trips;
- Avoid CBD area stabling in peak hour; and
- Simplify marketing messages by offering similar service patterns in contra-peak.

However, whilst equal service frequencies could be offered in the contra-peak, in some places it would not be possible to completely replicate the peak service pattern in the contra-peak direction due to track limitations.

On the Ipswich line, the four track section only runs as far as Corinda, although three tracks would be available from Corinda to Redbank following the SEQIPP upgrades, two of these would be used in the peak direction. As a result, based on the existing infrastructure program all Redbank, Springfield, Ipswich and Rosewood trains would need to share the same track. Consequently, in the contra-peak direction, Ipswich and Rosewood express services would only be able to run express as far as Corinda, thereafter trains would stop at all stations. This would add about 6 minutes to the travel time.

Similar restrictions would increase in-vehicle time on the Gold Coast and Caboolture lines. However, service and stopping patterns would be equivalent in both directions on the Ferny Grove line.

The extra travel time for contra-peak passengers could be eliminated by upgrading all 3 track sections to 4 tracks and providing two dedicated tracks in each direction, one for stopping services, one for express. However, detailed analysis of the relative benefits and disadvantages would be required to establish the merit of those schemes.

Altered stabling arrangements

As discussed earlier, the existing timetable schedules some trains to enter Mayne Yard during the peak period. These moves conflict with other passenger services and reduce capacity and reliability. It is recommended that in order to successfully operate services on the sectorised network for two hours, no stabling moves are scheduled into Mayne Yard between 7 am and 9 am in the morning peak and between 4 pm and 6 pm in the evening peak. This would increase rolling stock utilisation and improve the capacity and reliability of the network but increase staff costs.

Additional infrastructure requirements

As discussed previously, the development of the new timetable was based on the provision of committed infrastructure upgrades. However, it is envisaged that the following additional upgrades by 2026 would also improve the reliability and/or efficiency of the service:

- Additional stabling in the vicinity of Nambour and Beerwah/Caboolture;
- Additional stabling in the vicinity of Ipswich;
- Additional stabling at Robina or Elanora;
- New daytime stabling at Moolabin, Redbank or Clapham;
- New platform at Beenleigh;
- New bay road or turn-back at Kingston;
- New bay road and platform at Manly;
- New platform at Mitchelton;
- Operational change to track running between Roma street and Corinda (up-up-down-down running instead of up-down-up-down);
- Improved track speeds between Redbank and Roma Street; and
- New crew changeover facilities in suburban locations.

Rolling stock requirements

The introduction of the proposed timetable with 20 trains per hour during peak periods would also require significant increases in rolling stock. Without the development of a full timetable only a preliminary estimate of extra trains could be made. It was predicted that the operation of the proposed timetable would require a total of 145 six car trains at peak times across the network as shown in Table 8.2. Therefore, 290 three car sets would be required in service. At present, a total of 137 three car sets are available with an additional 40 three car sets committed in SEQIPP. As shown in Table 8.3, the new timetable would require an additional 113 three car sets to be purchased incrementally to 2026.

The additional rolling stock would also drive the need for new stabling and maintenance facilities. Suitable train stabling facilities would need to be provided on northern and southern sections of both sectors of the network. Ideally, rolling stock would be segregated on each sector, however an expanded Moolabin Yard would probably need to be available for stabling trains from both sectors. Existing maintenance arrangements would need to be rearranged to allow a longer peak operation and the later return of inter-peak stabling trains.

Additional staff would be needed to reduce the time required for some train maintenance activities and to cater for the higher fleet size. Some facilities may need to operate 24 hours a day. It is recommended that separate maintenance facilities are provided for each sector with Mayne Yard converted to serving only the Eastern sector trains and a new facility constructed for Western sector trains in a northern or western suburban area close to a terminating point. For example, the provision of a new maintenance facility at Redbank, if space is available, would maximise operational efficiency and flexibility.

Station facilities

The proposed increase in train services would require major upgrades at some key stations to accommodate the higher associated throughput and increased interchanging between trains. In particular, it was estimated that Central and Bowen Hills stations would require new lifts and escalators to be provided on each platform and new station concourses. Further analysis is required to establish the full requirement at all stations on the network.

Table 8.2 Peak period rolling stock requirement for 20 trains per hour trunk service level across SEQ

Service type	Six car sets
Ipswich & Caboolture Express services	51
Springfield, Redbank & Petrie Stopping services	29
Main Line Sector Total	**80**
Gold Coast & Doomben/Airport services	17
Beenleigh, Cleveland, Shorncliffe & Ferny Grove services	48
Suburban Line Sector Total	**65**
Total Requirement	**145**

Table 8.3 Rolling stock requirements: current and future

	Three car sets
Current Timetable: Peak service requirement	137
Extra trains committed in SEQIPP	40
Proposed Timetable: Peak service equipment	290
New trains required	**113**

Capacity provided

The changes outlined above would offer a significant increase in capacity on the Brisbane passenger rail network. Figure 8.10 highlights the resulting overall capacity provided from each corridor in the two hour peak period. This represents a 76 per cent increase in capacity in the two hour peak compared to the existing service. Capacity on the Ipswich and Ferny Grove lines would more than double compared to the existing service.

Options for longer trains

The previous section showed that significant additional capacity could be provided with the reorganisation of operations and implementation of some committed new infrastructure. However, whilst these changes would address capacity requirements in the short and medium term, in the longer term further capacity enhancements would need to be found. The existing track layout and signalling capacity constrains the achievable throughput of trains on each sector, limiting the Ipswich line to 20 trains per hour and the Ferny Grove line to 12 trains per hour. Whilst outside the western Brisbane area, it should also be noted that the Beenleigh/Cleveland/Gold Coast group of lines are limited to 20 trains per hour as they must share a twin track section over the Merivale Bridge into Roma Street. Due to the long timescales associated with the construction of new alignments, or the upgrade of the signalling system, it was assumed that major new infrastructure solutions would not be available until the longer term.

The accepted need to purchase new trains provides an opportunity to design new trains for a higher load standard. By using the first of these trains exclusively on lines where capacity would become utilised quickly, the need for additional track and signalling expenditure could be further delayed.

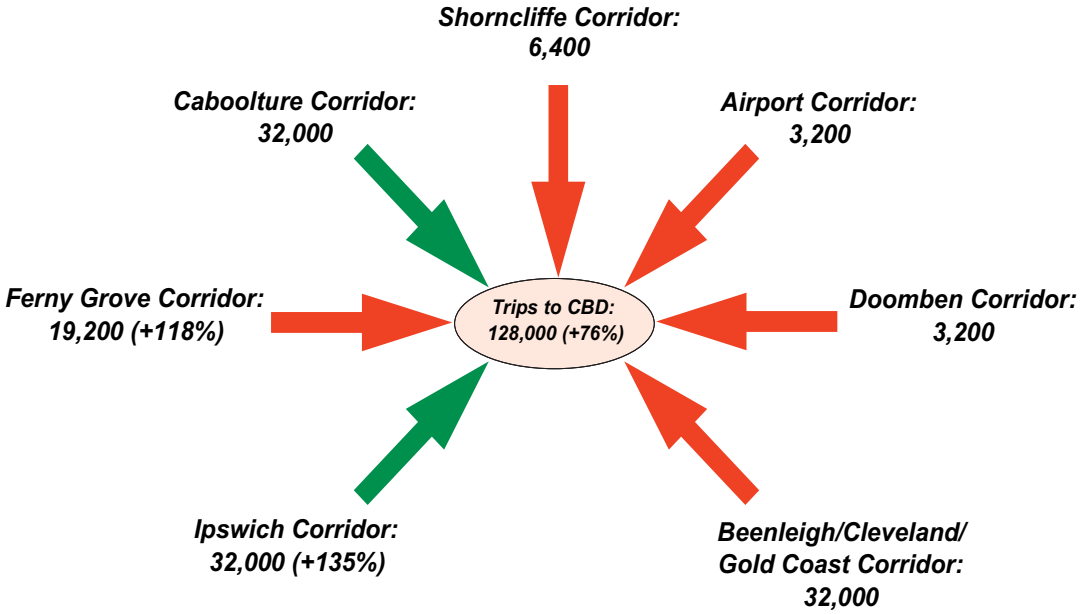


Figure 8.10 Two hour peak capacity from each corridor into the CBD with 20 trains per hour

Existing train fleet capacity constraints

At present, it was considered that six car trains on the CityTrain network have a maximum capacity of 800 passengers. A number of different train types are in service with differing internal configurations, however, for the purposes of this study 800 passengers was assumed as the maximum capacity.

Options for new trains

The specification of new trains for the replacement of existing units and the provision of new services would need to consider the existing engineering constraints on the rail network. As a result only a limited number of options are realistic to allow the new trains to continue running alongside existing fleets and to avoid major disruptive infrastructure works. However, the sectorisation of the network does provide some opportunity to upgrade certain sections of the network to operate different rolling stock types. Two options are available for consideration:

- modified six car sets, and/or
- introduction of new seven car sets.

Modified six car trains

A number of opportunities exist to provide additional capacity by specifying new trains with a modified design and slightly increased length compared to existing trains. The current train fleet was designed to offer a high number of seats at the expense of standing capacity. Additionally, the existing fleet does not fully utilise the available space on platforms for a six car envelope. The following alternatives for design of the new trains could provide additional capacity:

- Providing longer saloon areas by removing centre cabs;
- Maximizing platform face length by designing trains to extend the full length of the platforms and placing front and rear ends beyond the platform boundary/in tunnel;
- If required, at stations with short platforms enable the final set of doors to remain closed;
- Providing additional doors to enable quicker boarding and alighting and provide more vestibule area for standing; and
- Redesigning the internal layout of trains to provide more standing room.

The above mentioned improvements have all been successfully implemented around the world.

Introduction of seven car trains

Queensland Rail has previously considered the option of introducing longer trains on the network and feasibility studies identified that the operation of seven car trains was achievable without significant infrastructure modifications on the network. Costs increased significantly when the feasibility of eight and nine car trains was examined.

Further investigation would be required to determine the full extent of signalling, track realignment and platform works required to accommodate seven car sets and enable a more comprehensive analysis of the advantages and disadvantages of upgrading the network for seven car operation.

Capacity provision

It was estimated that a 'modified design' six car set should be able to deliver an increase in capacity of at least 5 per cent. A further upgrade to seven car operation with the modified design would increase the capacity achieved by sectorisation by 21 per cent. The delivery into service of the new trains over a number of years and the need to continue operating existing trains at the same time until replacement would mean that a step change in capacity on all lines at once would not be achievable. However, it was proposed that the larger and/or longer trains would be deployed, initially, on those lines in most need of additional capacity in the short and medium term. In particular, it is suggested that the new trains could be deployed on the Gold Coast, Beenleigh and Cleveland group of lines as a first step. If the seven car option were to be selected, this phasing would also assist with the staging of infrastructure works.

Figure 8.11 shows the potential increases in capacity on each line with a 5 per cent or 21 per cent increase in capacity of all trains on the network.

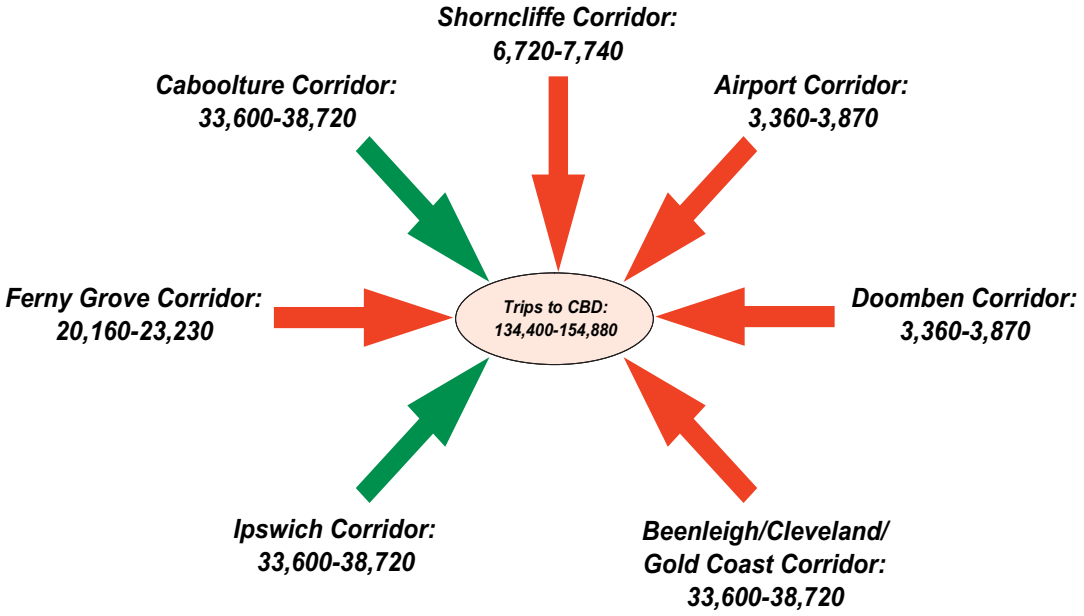


Figure 8.11 Two hour peak capacity on each corridor into the CBD with increased rolling stock capacity of between 5 and 21 per cent

Signalling upgrade

The service developed by means of sectorisation and timetable revision was constrained through the CBD and on trunk sections of some corridors by the capacity of the existing signalling system. This section discusses the possibility of improving signalling headways and the resultant service provision on each passenger rail line.

Signalling constraints

In the current timetable passenger trains are generally scheduled to run no less than 3 minutes apart. Whilst the signalling system has not been analysed in detail for this strategic study, it was assumed that the maximum operating capacity was 3-minute headways, driven primarily by the reoccupation time of the signalling and partly by the dwell time performance at the busiest stations. This capacity is comparatively lower than what is achieved overseas and it is suggested that an upgraded signalling system and enhanced dwell time management techniques could easily achieve 2½-minute headways on trunk sections. Further improvements could be achieved with an upgrade to a Moving Block/'Automatic Train Operation' (ATO) system which would also enable faster and consistent running times as well as the reliability benefits provided by the associated Automatic Train Regulation (ATR) system.

International examples

A number of metro systems around the world operate ATO/Moving Block style signalling systems including London Underground, Paris Metro, Paris RER and Hong Kong Metro. Many still employ drivers on board the trains but their role is limited to opening and closing doors, offering customer information and the ability to drive the train in the rare event of ATO signalling failure. Most systems adopted ATO signalling for the following reasons:

- Higher achievable capacity (most run at least 2-minute headways, Paris and Hong Kong run some lines at 90-second headways);
- Improved safety (ATO systems are considered safer than traditional manually driven lines);
- Faster running times (acceleration rates can be improved due to the higher safety);
- Improved operational efficiency;
- Higher reliability due to consistent running times (with all trains running at the same speed on each section, the inconsistency between trains is removed);
- Automatic Train Regulation (ATR) is an associated system which manages intervals between trains automatically by constantly reviewing the position of each train relative to one another to maximize throughput;
- Cheaper long term solution than continuous renewal of existing signalling infrastructure; and
- Cost savings, safety and reliability improvements associated with the removal of line-side infrastructure in non-tunnel sections.

Even without the provision of ATO systems, many metro and suburban lines operate up to 30 trains per hour with manually driven systems. Three manually driven lines on the London Underground and eight lines on the Paris Metro operate at least 24 trains per hour (with some offering 30 trains per hour). The high capacity on these lines has been achieved by reducing block lengths (adding additional signals) and employing staff to manage dwell times by improving the boarding and alighting rates at CBD stations.

Benefits of signalling upgrade

It is realistic to assume that an upgrade to at least 2½-minute headways is achievable on the CityTrain network either through small scale enhancements to the current signalling system with improved dwell time management or, preferably through a complete upgrade to a Moving Block system.

In addition to the capacity benefits, an upgrade to Moving Block would also deliver significant benefits in terms of safety, operational efficiency and cost. It should be remembered that the existing signalling system would need to be renewed anyway, incrementally, over the next 10 to 20 years (it is estimated that all signalling assets on the network would need to be replaced within 20 years). The potential cost associated with upgrading to ATO signalling would need to be offset against the renewal program for the existing system and the ongoing maintenance costs thereafter.

If the network was upgraded to an ATO/Moving Block system, new infrastructure would be required in the form of onboard train equipment installed on every passenger and freight vehicle that uses the Brisbane network as well as a number of Wayside controllers installed at regular intervals and connected together through a master operating control centre. However, existing trackside equipment would no longer be required, avoiding the need for new cabling and signalling equipment.

The Moving Block system would provide a much higher level of train protection by authorising the movement of all trains based on the exact position of all other trains and the track layout rather than the existing system which only releases a fixed block after the previous train has vacated it plus an overlap. This would also enable bidirectional travel in all locations as required and eliminate the risk and impact of signals being passed at danger.

Capacity improvements with upgraded signalling

A 2½-minute signalling headway would enable 24 trains per hour to operate in both directions on both the main and suburban routes through the CBD – a very conservative estimate when it is considered most Moving Block systems run at least 30 trains per hour. Figure 8.12 outlines the possible service pattern that would operate with 2 ½-minute headways.

This would allow an additional 16 trains to operate over and above those achieved by sectorisation and timetable revision. The Ipswich line would run an additional four trains per hour, two trains on the express services to/from Ipswich (making a total of 12) and one train each to/from Redbank and Springfield.

Headways at almost all stations would reduce to 5 minutes (the Springfield extension, Gailes and Wacol stations would have 10-minute services and the Rosewood branch 20-minute services). It is considered that additional services would not be required on the Ferny Grove line, so that additional trains could be provided to the Airport and Doomben lines to cater for demand to the Australia TradeCoast.

Note: Extension of rail lines to Caloundra and Coolangatta are included in SEQIPP.

Figure 8.12 Proposed services on each corridor into the CBD during AM peak period (7am–9am) with 2½-minute headways

If a signalling system capable of delivering 24 trains per hour is introduced along with new seven car trains across the network the overall capacity of the peak two hour service could be increased by 155 per cent above current levels. As can be seen in Figure 8.13, capacity in the Ipswich line would increase by a total of 240 per cent with a 164 per cent increase on the Ferny Grove line.

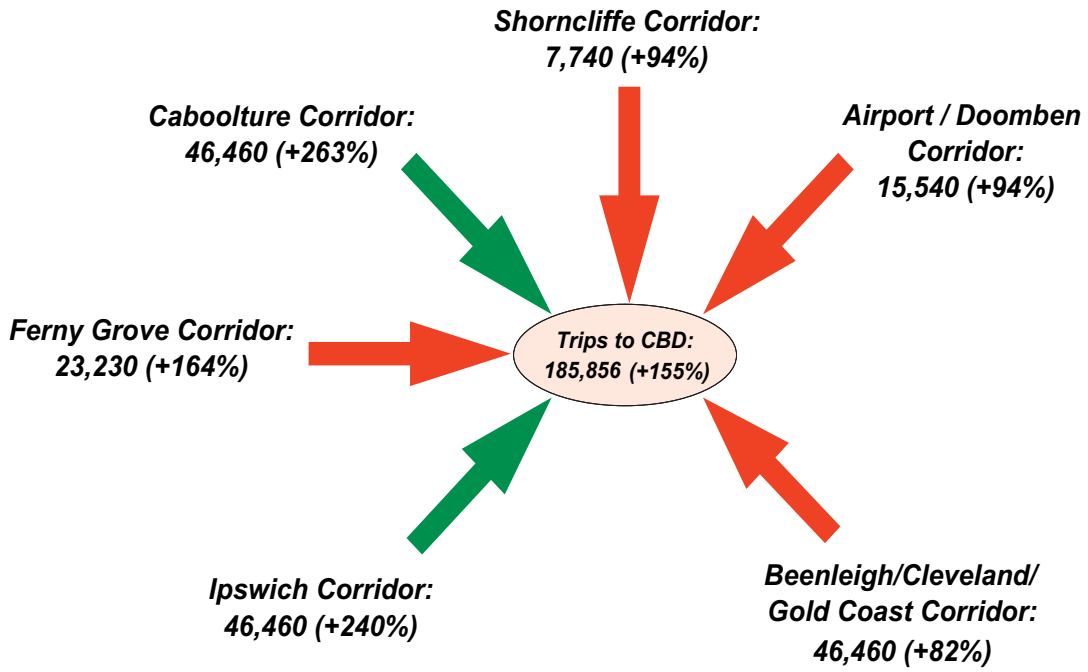
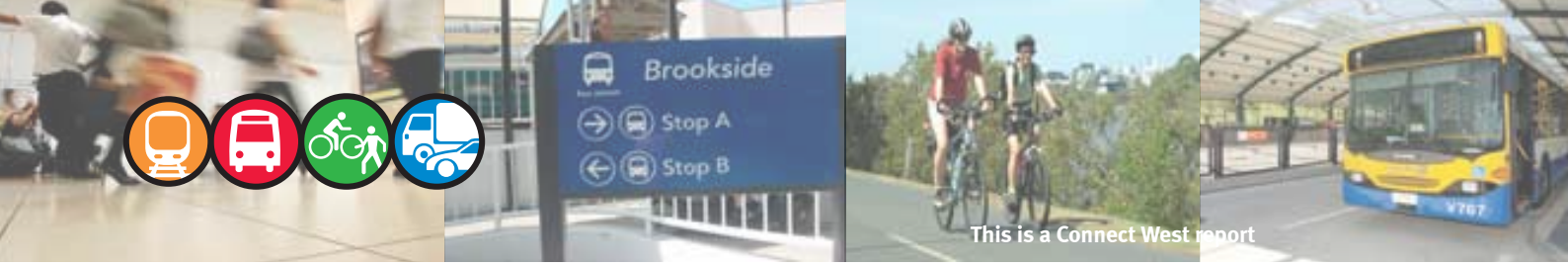


Figure 8.13 Peak two hour capacity of each corridor into the CBD with 24 trains per hour signalling and 21 per cent larger trains

Table 8.4 shows the total estimated train requirement in the event that the 24 trains per hour service was operated. In total 182 seven car trains would be required to operate that service.

Table 8.4 Peak period seven car train requirement under 24 trains per hour trunk service level across SEQ

Service Type	Seven car sets
Gold Coast – Airport/Doomben	36
Beenleigh – Ferny Grove	27
Cleveland – Shorncliffe	13
Manly – Mitchelton	10
Rosewood – Nambour	20
Ipswich – Caloundra	16
Ipswich – Caboolture	25
Springfield/Redbank – Petrie	35
Total	**182**



Capacity improvements with Moving Block signalling

With a Moving Block system 2-minute headways could be achieved if appropriate dwell time management takes place at CBD stations. This would offer a total of 30 trains per hour on each line through the CBD, an increase of 40 trains through the CBD – equivalent to a new line. Figure 8.14 outlines the possible service pattern that would operate with 2-minute headways. The Ipswich line could offer a total of 30 trains per hour, half originating from Ipswich, with a quarter each from Springfield and Redbank. The Ferny Grove could operate 15 trains per hour.

Note: Extension of rail lines to Caloundra and Coolangatta are included in SEQIPP.

Figure 8.14 Proposed services on each corridor into the CBD during AM peak period (7am–9am) with 2-minute headways

A Moving Block signalling system capable of delivering 30 trains per hour and seven car trains would enable 232,000 passengers to be carried into the CBD in the two hour peak period, this represents an increase of 219 per cent over the existing service. As can be seen in Figure 8.15, capacity in the Ipswich line would increase by a total of 327 per cent with a 230 per cent increase on the Ferny Grove line.

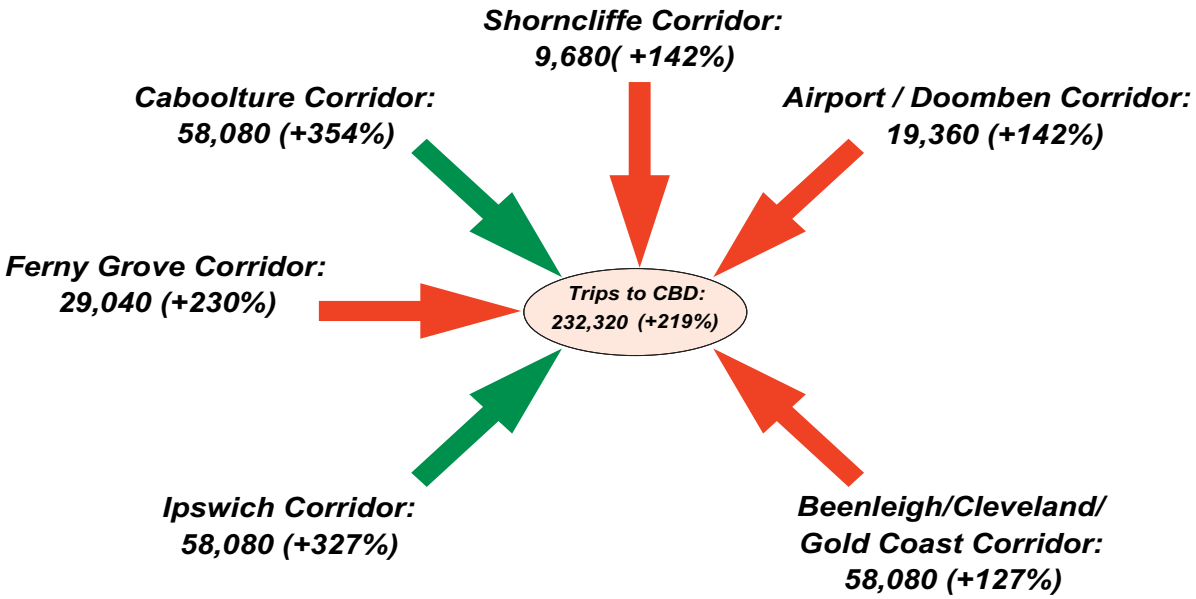


Figure 8.15 Peak two hour capacity of each corridor into the CBD with 30 trains per hour signalling and 21 per cent larger trains

Additional possibilities

An upgrade to Moving Block signalling would require a new signalling system to be installed across the CityTrain network. To avoid significant disruption, the new system would need to be overlaid with the existing system for a transition period. Following the full commissioning of the Moving Block system, comprehensive testing and the conversion of all rolling stock to be capable of operating with the new system, the existing signalling system could gradually be withdrawn.

It is very difficult to estimate the likely cost of installing a new Moving Block system including all the in-train equipment and the line side transponders. A strategic level estimate was undertaken which suggested it would cost in the region of $1.5 billion to convert the existing Brisbane rail network (note that this is a very high level estimate and should not be used for any detailed evaluation). It should be remembered that despite an initial high installation cost the ongoing operating costs associated with a Moving Block system are significantly lower than for existing signalling systems.

The implementation of a 30 trains per hour trunk service would also require significantly more rolling stock in service at peak times.

Table 8.5 shows the total estimated train requirement in the event that the 30 trains per hour service was operated and a break down by service grouping. In total 205 six or seven car trains would be required to operate that service, or 410 three car sets. This would represent an increase of 233 three car sets over what is currently available and committed in SEQIPP.

Table 8.5 Peak period train requirement under 30 trains per hour trunk service level

Service type	Six/seven car sets
Ipswich and Caboolture Express services	73
Springfield, Redbank and Petrie Stopping services	39
Main Line Sector Total	**112**
Gold Coast and Doomben/Airport services	40
Beenleigh, Cleveland, Shorncliffe and Ferny Grove services	53
Suburban Line Sector Total	**93**
Total Requirement	**205**

New cross river rail alignment

The extrapolation of TransLink's 'Low' and 'High' public transport growth scenarios for the Brisbane rail network suggested that the possible capacity improvements outlined in the previous sections would be sufficient on all passenger rail lines in the short to medium term. This was confirmed with the BSTM modelling to 2026, which is discussed later in Chapter 15. Thus, an increase in rolling stock capacity, service changes and small scale upgrades to signalling to allow 24 trains per hour through the CBD would be required. However, it is noted that capacity on the Ipswich line and the group of lines running through South Brisbane could be close to or exceeding capacity around 2026 even with those upgrades.

Table 8.6 shows a summary of the rail capacity improvements if sectorisation, timetabling, stabling, longer trains and signalling upgrades were implemented. Passenger levels for 24 or 30 trains per hour capacity would require substantial upgrades to Central station and Bowen Hills station. The latter could be implemented as part of the Bowen Hills TOD redevelopment.

Additional infrastructure may then be required, once the above capacity improvements have been exhausted, to provide new capacity to support continued passenger growth on those lines. An upgrade to Moving Block signalling offering 30 trains per hour would need to be investigated as well as the following two alternatives:

- Potential and cost associated with extending trains to eight car or nine car; or
- Potential and cost associated with constructing a new cross city rail alignment from Park Road to Bowen Hills.

Given the long lead time for rail infrastructure, it would be prudent to start planning for a new cross city rail tunnel. Such planning would also inform the location and footprint of potential future rail stations on the eastern side of the Brisbane CBD as the increased passenger throughput would need to be accommodated.

Table 8.6 Summary of potential two hour peak period inbound rail capacity improvements

	Existing (2005)	20 tph with six car sets (1)	% increase over existing	20tph with seven car sets	% increase over existing	24 tph with seven car sets (2)	% increase over existing	30 tph with seven car sets (3)	% increase over existing
Ipswich Rail	13,600	32,000	135%	38,720	185%	46,460	242%	58,080	327%
Ferny Grove Rail	8,800	19,200	118%	23,230	164%	23,230	164%	29,040	230%
Caboolture Rail	12,800	32,000	150%	38,720	203%	46,460	263%	58,080	354%
Other Rail	37,600	44,800	19%	54,200	44%	69,640	85%	87,120	132%
Total	**72,800**	**128,000**	**76%**	**154,870**	**113%**	**185,790**	**155%**	**232,320**	**219%**

Notes:

1. Assumes full sectorisation and new timetables.
2. Assumes full sectorisation, new timetables and ATO signalling.
3. Assumes full sectorisation, new timetables and Moving Block signalling.

Whilst investigating the relative costs associated with upgrading the existing signalling system and the ongoing maintenance costs it may be found that an earlier upgrade to a Moving Block (30 trains per hour capacity) system is more cost effective in the long term irrespective of the immediate capacity requirements. Similarly, the detailed investigations into the feasibility of operating seven car trains may show economies of scale in converting the network into accommodating eight or nine car sets at the same time. However, it may be found that it is easier and/or more cost effective to construct a new cross river alignment in the longer term and provide the additional capacity required through the provision of a new rail track in each direction through the CBD. This option is currently being investigated by The Department of Transport and Main Roads in a concurrent study and should be seen as a possible longer term solution as it offers network connectivity benefits as well as improving capacity for all lines. However, further works would need to determine the timing of such a project and how the network should be reconfigured to fully exploit the benefits of the new alignment. Furthermore, detailed economic evaluation would be required to identify what other upgrades could take place before such a scheme is introduced.

Grade separations

Providing high frequency passenger train services at even headways in the commuter peak period is a key initiative to increasing the capacity of the existing rail system. The grade separation program considers the impact of trains operating at minimum 2-minute headways on the standard of existing open level crossings (OLCs) across western Brisbane. The grade separation program acknowledges that with the increased crossing closure times as a result of reduced train headways, and the effect of the region's expected population growth and related traffic congestion growth, existing OLCs would reach a point where grade separation and/or alternate crossing points would be required in the not too distant future.

There are currently 17 OLCs across the western Brisbane rail network on the Ferny Grove, Ipswich and Caboolture lines.

Table 8.6 classifies the 17 western Brisbane OLCs into major and minor road crossing. Major crossings are those where the rail line traverses arterial and sub-arterial roads, with inherently higher traffic volumes.

Minor crossings are those where rail negotiates local access roads with inherently lower traffic volumes. Some minor road crossings (Arbor Street in Ferny Grove and Prospect Road in Gaythorne) have been classified as major because they provide a main access to nearby high trip generators such as schools and shopping centres, thereby increasing their importance for grade separation.

A strategic priority list of OLCs for grade separation has been developed to determine a strategic grade separation program. As a high level assessment, grade separation was considered warranted if a threshold value calculated from the daily traffic volumes and weekly train services is exceeded. The lowest value of this road-rail volume product has been used as a guide and in conjunction with a multi-criteria analysis (MCA).

The high level MCA was developed for each of the existing OLCs in western Brisbane. Equal numerical weightings for each of the following criterion were applied to the crossings:

- 2026 AM peak period peak direction traffic demand;
- 2026 AM peak period bi-direction traffic demand;
- Volume to capacity ratio (based on an average traffic boom gate down time of 49 seconds for a passenger train); and
- Traffic arrival queue per boom gate down time (based on 2026 traffic demand through the crossing).

All traffic volumes and capacities were sourced from the 2026 Base Case.

The outputs of the MCA were compared against the outputs of the grade separation analysis and a qualitative review of each OLC undertaken to justify a warrant to grade separate.

If both high level assessments guided the need to grade separate, then this was listed under Priority 1 list. If there was a slight discrepancy between the outputs, these crossings were listed under Priority 2 list.

It is noted that some traffic volumes on local roads (Prospect Road and Blackwood Street) were not available from the SEQSTM as it is a strategic transport model. Consequently, these crossings could not be included in the analysis. In this instance, a qualitative review of the omitted OLCs were undertaken based on whether the crossings are on major or minor road crossings and the inherent safety implications based on the hierarchy of the road. These OLCs are listed under Priority 3 list.

The method derived above is considered sufficiently relevant to illustrate a reasonable order of priority for a strategic grade separation program.

From Table 8.7 it can be reasonably assumed that at least 13 of the 17 OLCs would require grade separation if trains operate at minimum 2-minute headways on the Ipswich and Caboolture lines and minimum 4-minute headways on the Ferny Grove line. For a conservative estimate, it was assumed that 16 of the 17 OLCs would require grade separation. Blackwood Street could be closed due to its proximity to the Glen Holm Street and Osborne Road crossing.

Table 8.7 Priority list for grade separation

	Priority listing	MCA outcomes	Grade separate	Major/minor road crossing
	Priority 1 list			
1	Dawson Parade – west of Groverly station	21	Y	Major
2	Telegraph Road – between Carseldine and Bald Hill stations	16	Y	Major
3	Arbor Street – east of Ferny Grove station	16	Y	Major
4	Newman Road – east of Geebung station	15	Y	Major
5	Wilston Road – adjacent Newmarket station	15	Y	Minor
6	Beams Road – south of Carseldine station	13	Y	Major
7	South Pine Road – south of Strathpine station	13	Y	Major
8	Northgate Road – between Northgate and Virginia stations	12	Y	Major
9	Samford Road – between Keperra and Ferny Grove stations	11	Y	Major
10	Wacol Station Road – north of Wacol station	9	Y	Major
11	Osborne road – east of Mitchelton station	8	Y	Major
12	Sherwood Road – south of Sherwood station	8	Y	Major
13	Shand Street – west of Alderley station	6	Y	Major
	Priority 2 list			
14	Glen Holm Street – between Oxford Park and Mitchelton stations	10	N	Minor
15	Ellison Road – west of Sunshine station	6	N	Major
	Priority 3 list			
16	Prospect Road – between Gaythorne and Mitchelton stations	-	-	Major
17	Blackwood Street – west of Mitchelton station	-	-	Minor

A strategic average cost of $90 million per OLC was estimated for grade separation, with a total investment of $1.5 billion for the 16 OLCs across western Brisbane. For the development of cost estimates, two grade separation options were considered, i.e. overpass and underpass. Whether a road should form an overpass or underpass of a railway depends primarily on the vertical and horizontal alignments of the railway and the road, and the topography at the crossing location, as well as other factors such as abutting land use. A third option, to tunnel rail under road was not considered due to requirement for flat grades for rail and the high probability that this would be economically unviable.

The above analysis provides a broad assessment of grade separated crossings and is sufficiently relevant to illustrate a reasonable order of cost for this strategic assessment. However, if metro-style rail was implemented, a detailed implementation strategy for the grade separation program would be required. The following further works would then be necessary:

- Undertake accurate measurement of train and vehicle traffic volumes and vehicle queue length and delay data for each crossing and an analysis of the frequency and type of vehicle accidents at each of the OLCs;
- Undertake an economic evaluation through a Benefit Cost Analysis (BCA). BCA provides an effective way of gauging whether an option or project would generate a net increase in economic welfare. To assess the overall merits of the various OLC elimination proposals, a BCA should be undertaken on various options to quantify as many costs and benefits as is necessary to establish whether an option or project is worth consideration;
- Based on engineering feasibility, some locations would generate a number of possible design solutions, and these alternatives should be assessed in more detail should any project be proposed for inclusion into a capital works budget; and
- In general, OLCs in urban areas are undesirable because of safety concerns associated with delays to road users and impacts on train operations. Queensland Rail maintains an incident database that could be used to analyse safety issues at the OLCs and this information would be useful at a detailed level of assessment.

8.3 Strategic bus corridors

In addition to the strategic rail operations review, an analysis of existing bus operations and patronage was undertaken. The analysis identified a number of major, strategically important bus corridors in western Brisbane which are impacted by significant traffic congestion. The major bus corridors are:

- Centenary Motorway/Milton Road;
- Moggill Road/Coronation Drive;
- Waterworks Road/Musgrave Road;
- Enoggera Road/Kelvin Grove Road;
- Old Northern Road/South Pine Road (southern section); and
- Gympie Road/Lutywche Road.

Consideration was given to the range of bus priority measures and the capacity they could provide under the various proposed bus priority options under 'Low' and 'High' public transport growth scenarios.

Table 8.8 provides a list of strategic bus corridors and proposed warrants.

Table 8.8 Proposed bus priority warrants for western Brisbane

	Existing		2026 'Low' PT scenario		2026 'High' PT scenario	
Bus corridor	No. of buses per hour	Bus priority	Estimated no. of buses per hour	Bus priority	Estimated no. of buses per hour	Bus priority
Centenary Motorway/Milton Road	15	No	25	No	50	Yes
Moggill Road/Coronation Drive	55	No	75	Yes	129	Yes
Waterworks Road/Musgrave Road	25	No	37	Yes	64	Yes
Enoggera Road/Kelvin Grove Road	28	No	38	Yes	66	Yes
Old Northern Road/South Pine Road	13	No	22	No	43	Yes
Gympie Road/Lutwyche Road	45	Yes	55	Yes	94	Yes

8.4 Bus operations opportunities

Potential bus operations opportunities have been developed at a strategic level to support a public transport network in western Brisbane. The main objective of the bus operations review was to provide direct services to the CBD in corridors not served by rail, and to support the higher capacity rail corridors via bus feeder services. Bus travel times would be improved by giving priority to buses on major corridors where appropriate, by reprioritising road space afforded by traffic relief on the existing network from implementing a number of road projects in existing corridors. The key benefit of such bus operations would be the improvements in reliability and the protection of strategically important bus corridors from increases in surface traffic and congestion.

A strategic review of current bus operations in western Brisbane showed that the majority of bus routes along the major bus corridors operate in mixed traffic. Currently, all daily services are supplemented by additional services in peak periods to accommodate higher AM peak inbound demand and the PM peak outbound demand. To reduce peak period bus travel times, more than one additional bus service is often provided and the services work in tandem with one another to provide a bus service at every other stop. This operational strategy results in additional bus trips on the road network on major corridors in the peak periods when private vehicle traffic is also at its peak.

Implementing bus priority measures in the heavily trafficked corridors would improve the reliability and travel times of buses operating in mixed traffic. However as the city develops, and existing and future regional centres and other major activities centres develop (such as Ipswich, Strathpine, Australia TradeCoast, South Brisbane) travel patterns would become increasingly more complex and more dispersed. This travel demand would be best served by the introduction of new cross city services that provide direct and frequent services between these centres without the need to travel to the CBD. The strategic bus operations principles to support bus infrastructure initiatives is described in the following section.

Radial bus option – preferred bus operations strategy

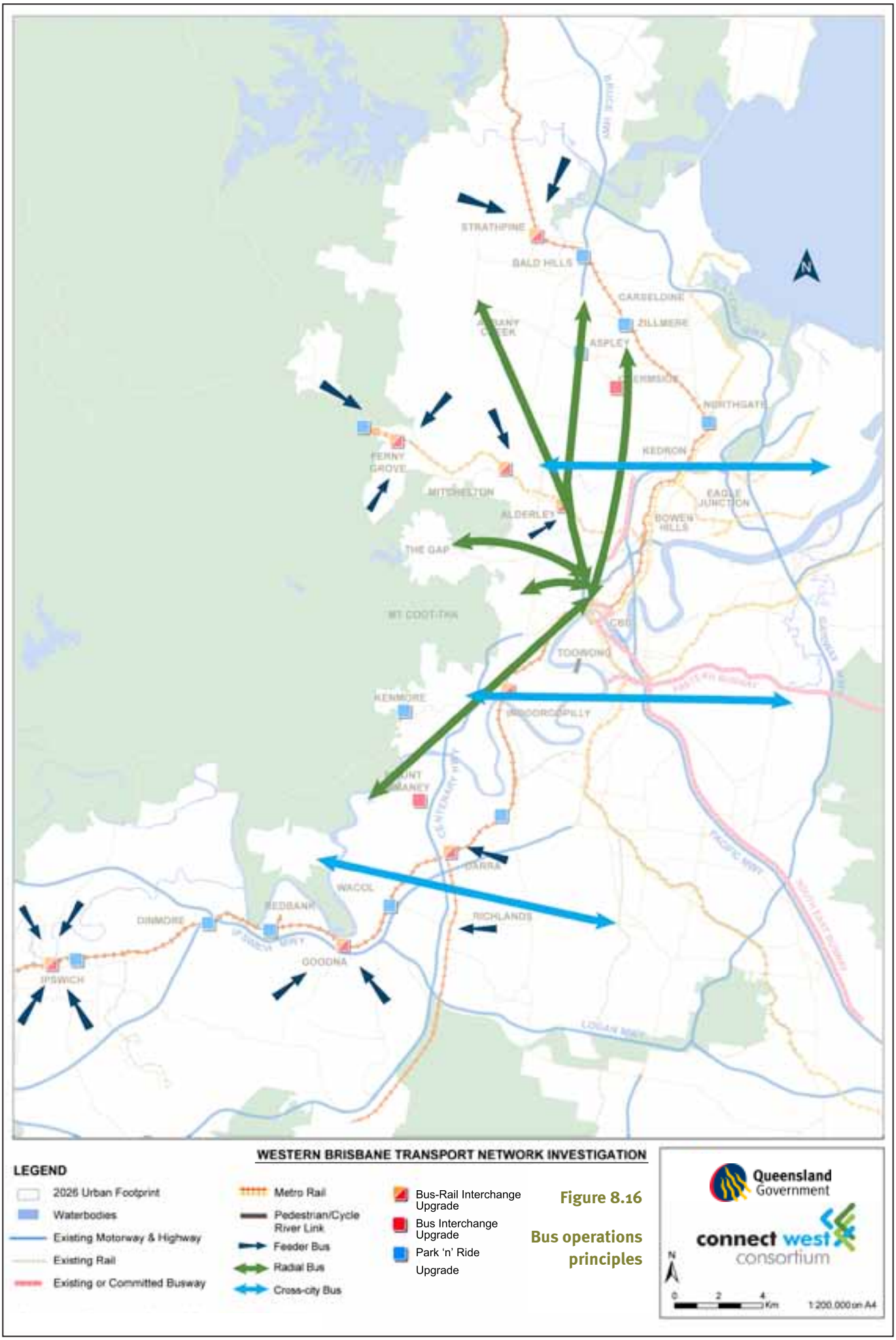
The bus operations principles support radial services to the CBD. They also fill the gaps in the public transport network that are not supported by the rail network. The bus operations principles accommodate the 2026 'Low' and 'High' mode share objectives by providing bus priority in existing transport corridors within reprioritised road space from implementation of the roads scheme.

The bus operations principles propose marginal route changes at the individual service level, the introduction of new bus routes, extensions to existing services and removal of other services. The bus operations are based on the following principles:

- Bus routes which compete with the rail network have been removed to support the principle of rail investment as the 'back bone' of the transit network. Improvements are recommended to the rail network to accommodate increased demand in lieu of buses that were eliminated;
- Any coverage lost by any routes removed from the transport network would be replaced by extensions to existing local bus services or the provision of local or feeder services. Existing local services or feeder routes designed for residential area collection and/or employment area distribution were enhanced through connection to bus interchanges or rail stations;
- Express (Rocket) services running parallel to proposed bus priority facilities would be relocated to that facility to minimise bus travel times and increase reliability to ensure buses remain competitive to cars. Local all stop services would continue to operate on parallel corridors to support localised travel demand; and
- Additional routes are proposed to take advantage of the new priority bus corridors, specifically the introduction of new cross city links (Stafford Road, Indooroopilly to Dutton Park and Progress Road) that provide direct and frequent services between these centres without the need to travel to the CBD.

The preferred bus operations principles were cognisant of the TransLink Network Plan (4 year and 10 year plans).

The bus operations principles were utilised in the development of a preferred transport strategy for western Brisbane, and are shown conceptually in Figure 8.16.



Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

8.5 Interchange opportunities

8.5.1 Bus and rail interchanges

The ability to easily interchange between modes and services creates opportunities for increased journey combinations and destinations, maximises use of the network and expands overall network coverage. This can only be successfully achieved when interchange facilities are in close proximity to one another, services are timed to connect to one another or are operated at sufficient headways to allow a 'turn-up-and-go' philosophy, fares are integrated and travel information is presented in a consistent and up to date manner.

Physical integration includes providing convenient, safe and comfortable interfaces (bus stops, stations, interchange and transfer facilities) and managing how passengers move between the links in their trip. The use of a single integrated fare and the coordination of transfers minimises the inconvenience associated with the interchange. Similarly, the provision of simple route and trip planning information will ensure that passengers can make informed decisions about public transport travel.

It is however not possible to cater for every trip from each origin to every destination with direct services. Hence, bus feeder services that support a few high capacity and high quality corridors provide a more cost effective way of providing public transport coverage across the region. The interchange is the conduit for the transfer of passengers.

The design of an interchange should balance the competing needs of passengers who use the system, the operators who provide the service, and the surrounding community impacted by the establishment or expansion of an interchange.

For the passengers, the interchange should:

- Provide a safe and secure place;
- Be a legible and easily recognisable as an interchange;
- Cater for all types of passenger including the mobility impaired;
- Provide the shortest possible walk between buses and other modes;
- Have an at grade surface;
- Provide a comfortable environment with adequate weather protection;
- Offer the shortest possible wait;
- Provide integrated ticketing machines;
- Include a clear, concise and understandable information system including bus frequency and hours of operation and routes; and
- Provide facilities such as bicycle storage and lockers, refreshments and toilets.

For transport operators, the interchange should provide:

- Adequate space to accommodate demands;
- An area free from conflict between modes;
- An area capable of meeting future demands;
- A facility which will allow flexible operations and maximise efficiency;
- An opportunity to display relevant information related to services;
- Services for drivers including toilets and rest facilities; and
- Lower order maintenance facilities.

The interchange should integrate with the neighbouring environment and keep noise and disturbances to surrounding communities at a minimum.

The recommended interchange strategy for western Brisbane should reflect the overall rail and bus operation strategy. This includes refurbishment and modernisation of major stations and associated rail and bus interchanges including:

- Chermside bus interchange;
- Ferny Grove station/bus interchange;
- Mitchelton station/bus interchange;
- Enoggera station/bus interchange;
- Alderley station/bus interchange;
- Indooroopilly bus interchange;
- Mt. Ommaney bus interchange;
- Darra station/bus interchange;
- Goodna station/bus interchange; and
- Ipswich station/bus interchange.

Rail station and bus interchange improvements would target improving the functionality of each interchange, increasing capacity, and modernising and beautifying the interchange to create a statement of identity for the public transport system. Modes should be separated (including pedestrians) to minimise conflict and improve safety but should be located in close proximity to one another with the most efficient access modes being given the highest priority locations within the interchange to minimise overall passenger transfer times.

Interchanges are also places where people wait for their passenger transport services, so safety, security, lines of sight, lighting, convenience facilities and comfort are important. Each rail station and bus interchange upgrade would need to integrate with their surrounding area, including town centres and shopping centres, and provide safe pedestrian and cycle access routes to the stations with adequate shelter and secure cycle storage facilities. Adequate way finding, timetables and maps, and real-time information should be provided throughout the interchange.

8.5.2 Park ‘n’ Ride stations

The purpose of the Park ‘n’ Ride strategy is to provide dedicated parking facilities for public transport users at key stations on the rail and busway network. Park ‘n’ Ride stations are suitable for residential and fringe areas that do not have sufficient land use densities to support local bus feeder services. Park ‘n’ Ride facilities effectively increase the catchment of the public transport system and provide travellers with flexibility for the home based component of their trip (e.g. to drop off or pick up school children, or recreational or shopping activities). Strategic use of Park ‘n’ Ride facilities also allows access to the travel market that otherwise would prefer to travel the whole journey by car.

TransLink’s existing policy on Park ‘n’ Ride aims to:

- Provide dedicated parking capacity on the high frequency and priority public transport network to facilitate car based access;
- Encourage travellers to use public transport for most part of their journey;
- Support high frequency public transport by increasing the range of access options; and
- Provide car based access in areas where urban densities are not sufficient to support a reasonable level of service.

TransLink considers private car use as a low priority access method because it is the least environmentally friendly mode, requires significant land and can create local traffic problems.

TransLink requires that a Park ‘n’ Ride station is located further than 10 km from the Brisbane CBD and 3 km from a regional business district, has direct access to an arterial road and the area is not well serviced by feeder bus services.

These guidelines correspond with the network planning principles as discussed in Chapter 5.2.

The following Park ‘n’ Ride stations (Figure 8.17) are recommended for expansion/upgrade in western Brisbane based on their strategic location to attract public transport users from a lower density catchment area and the distance from the Brisbane CBD:

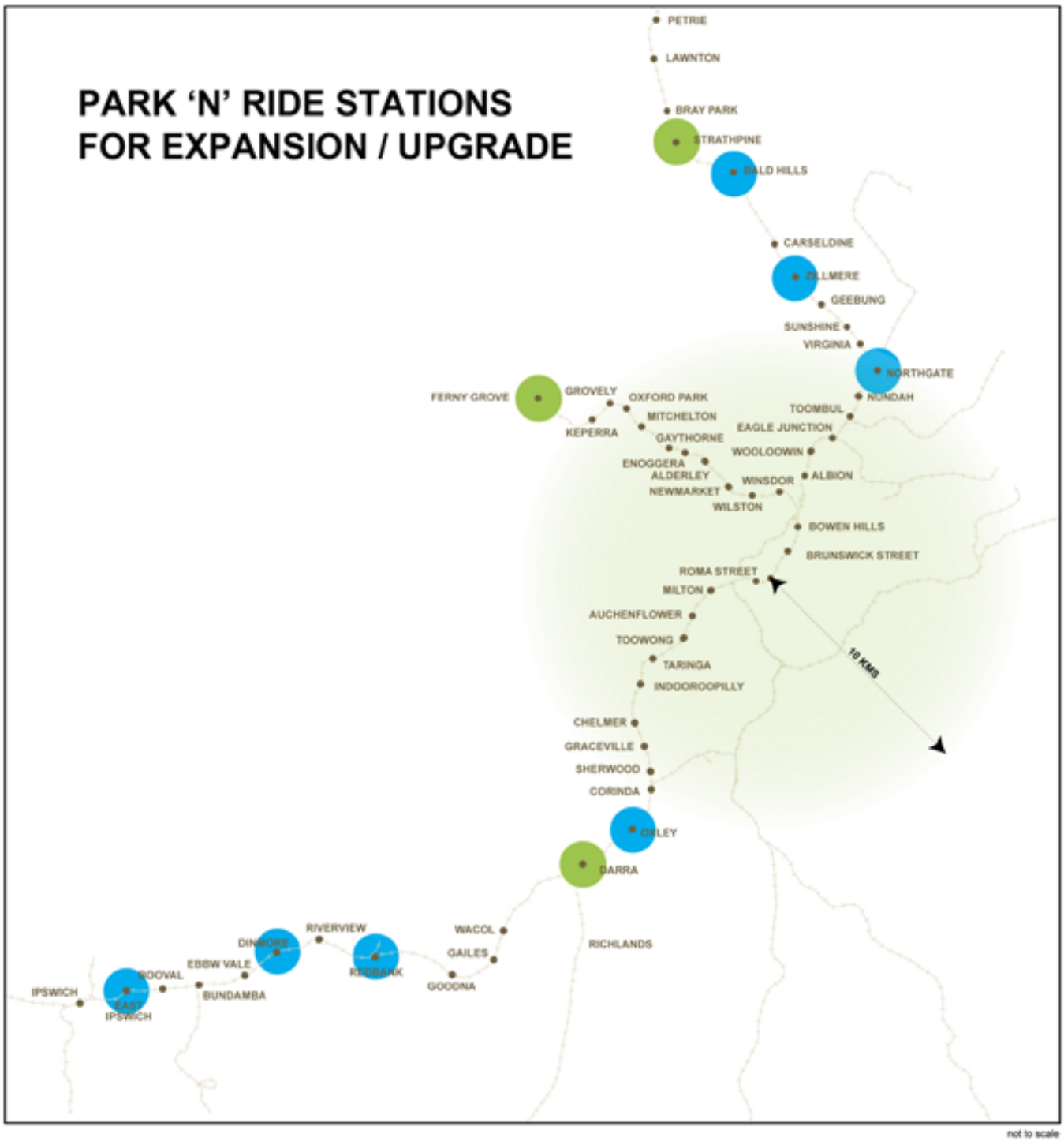
- Ferny Grove station (as a land bank for future use as a TOD and bus/rail hub);
- Strathpine station (as a land bank for future use as a TOD and bus/rail hub);
- Bald Hills station;
- Zillmere station;
- Northgate station;
- Oxley station;
- Wacol station;
- Darra station (as a land bank for future use as a TOD and bus/rail hub);
- Dinmore station;
- Redbank station; and
- East Ipswich station.

The increasing dispersion of urban activity in western Brisbane and related travel brings with it the need to critically examine existing systems and investigate not only cross town and reverse commute bus routes along with extension of existing routes, but also alternative forms of overall system design.

The objective of both strategies would be to maximise the utilisation of existing assets, whilst providing sufficient capacity and good quality of service to public transport users.

In addition to the above stations, the following new Park ‘n’ Ride facilities would be of significant benefit to travellers:

- Kenmore Village bus interchange;
- Albany Creek bus interchange; and
- Aspley bus interchange.


PARK 'N' RIDE STATIONS
FOR EXPANSION / UPGRADE
PETRIE
LAWNTON
BRAY PARK
STRATHPINE
BALD HILLS
CARSELDINE
ZILLMERE
GEEBUNG
SUNSHINE
VIRGINIA
NORTHGATE
NUNDAH
TOOMBUL
EAGLE JUNCTION
WOOLOOWIN
ALBION
WINSDOR
BOWEN HILLS
BRUNSWICK STREET
ROMA STREET
MILTON
AUCHENFLOWER
TOOWONG
TARINGA
INDOOROOPILLY
10 KMS
CHELMER
GRACEVILLE
SHERWOOD
CORINDA
DARRA
RICHLANDS
WACOL
GAILES
GOODNA
RIVERVIEW
DINMORE
REDBANK
EBBW VALE
BOOVAL
BUNDAMBA
IPSWICH
EAST IPSWICH
FERNY GROVE
GROVELY
OXFORD PARK
MITCHELTON
KEPERRA
GAYTHORNE
ENOGGERA
ALDERLEY
NEWMARKET
WILSTON
not to scale
WESTERN BRISBANE TRANSPORT NETWORK INVESTIGATION
LEGEND
PARK 'N' RIDE (FOR EXPANSION)
PARK 'N' RIDE (LAND BANK FOR FUTURE TOD AND BUS/RAIL HUB)
Queensland Government
connect west consortium
N

8.6 Public transport options assessment

Following the development of strategic rail and bus operations strategies, the public transport network development options identified in Chapter 6 were assessed.

The overall methodology employed in the assessment of public transport network development options was as follows:

- Estimate of future corridor demand for 'Low' and 'High' public transport growth scenarios for 2026;
- Estimate potential public transport capacity along key corridors for 2026;
- Development of rail and bus network options (including options suggested by the community or agency stakeholders or in response to identified future demand);
- Development of strategic directions based on both a rail emphasis and a bus emphasis approach to accommodate future demand for either growth scenario;
- Broad pair-wise comparison of competing rail and/or bus network development options based on bus warrants and strategic rail operational approaches; and
- Development of a balanced public transport strategic direction that responds to 'Low' and 'High' public transport demand growth and the evaluation of public transport network options.

Public transport evaluation criteria

A strategic multi-criteria framework has been developed to evaluate the 24 public transport network development options. Each option was assessed on the basis of consistent technical criteria at a quantitative and qualitative level to compare each option relative to other options. Due to the strategic nature of the options evaluation, the criteria are not scored and the options are not ranked.

The public transport network development options were evaluated using the following quantitative and qualitative criteria:

Capacity of mode

- Headways/frequency per hour;
- Vehicle type and size; and
- Capacity of the infrastructure.

Demand within corridor

- Passenger demand; and
- Number of trains/buses during peak.

Cost of option

- Corridor requirements;
- Construction cost; and
- Traffic impacts

Travel time comparisons

- Waiting time;
- Interchange time;
- Bus/rail journey time; and
- Comparative travel time to car.

Desired attributes

- Reliability;
- Park 'n' Ride; and
- Interchange opportunity.

Consideration was given to the range of bus priority and rail capacity improvement measures and the capacity they can provide under projected 'Low' and 'High' public transport growth demand scenarios for 2026 (refer Chapter 4.4).

In addition, the land use, social and environmental impacts of each public transport option were assessed at a strategic level. A summary of the results is presented in this chapter.

8.6.1 Rail options assessment

The results of the comparative assessment of rail network improvement options are presented in Table 8.9 and Table 8.10.

Table 8.9 Peak period two hour demand projections for rail options, 2026

Option	Peak period capacity	AM peak period demand	
		'Low' PT scenario	'High' PT scenario
Ipswich Rail	Max. capacity between 32,000 pax and 58,000 pax, 2–3 min peak frequency between Redbank and CBD, 6 min peak frequency between Ipswich/Darra and the CBD, seven car sets and ATO	18,500 pax between Ipswich and Darra sector, 32,200 pax between Indooroopilly and CBD. Caboolture line 26,400 on 13tph from Eagle Junction to Central 38,700 pax	24,300 pax between Ipswich and Darra sector, up to 47,200 pax between Indooroopilly and CBD. Caboolture line 34,600, additional 12,500 from Doomben/Shorncliffe/Airtrain. From Eagle Junction to Central total of 47,100 pax
Ferny Grove Rail	Max. capacity between 19,200 pax and 29,000 pax between Ferny Grove and CBD, 3–6 min peak frequency between Mitchelton and CBD, 6–9 min peak frequency Ferny Grove to Mitchelton, seven car sets and ATO	12,300 pax between Ferny Grove and CBD	18,600 pax between Ferny Grove and CBD
Caboolture Rail	Max. capacity between 32,000 pax and 58,000 pax, 2–3 min peak frequency between Petrie and CBD, 10 min frequency between Caboolture and CBD, seven car sets and ATO	38,200 pax between Caboolture and the CBD	39,600 between Caboolture and the CBD
North West Transport Corridor Rail Link	Max. 6,400 pax, 15 min peak frequency, six car sets	4,000 pax	6,000 pax
North West Transport Corridor Light Rail Link	Max. capacity 7,200–14,400 pax (5–10 min services)	4,000 pax	6,000 pax
Kelvin Grove to Everton Park Rail Link	Max. 6,400 pax, 15 min frequency, six car sets	4,000 pax	5,000 pax
Indooroopilly to Dutton Park Rail Link	Max. 12,800 pax, 15 min frequency, six car sets	6,500 pax	12,400 pax
Cross River Rail Link (Park Road to Bowen Hills)	Max. capacity between 32,000 and 46,460 pax, 2–3 min peak frequency, seven car sets	23,700 pax	35,700 pax
CBD Metro Rail (Park Road to Everton Park Rail Link)	Max. 6,400 pax, 15 min frequency, six car sets	up to 4,000 pax	up to 6,000 pax
Ferny Grove Metro Rail extension	Max. 19,200 to 29,000 pax in conjunction with existing Ferny Grove track	850 Park 'n' Ride spaces	1,600 Park 'n' Ride spaces
Everton Park to Albany Creek Rail Link	Max. capacity 7,200–14,400 pax (5–10 min services) LRT option. Max. 6,400 pax if heavy rail	2,000 pax	3,000 pax
CBD Mass Transit (UQ to Newstead)	Max. capacity BRT 4,800–9,600 (5–10 min services), as per BCC Taskforce report. LRT option max. capacity 7,200–14,400 pax	1,000 (from BCC Taskforce report)	3,000 (using TransLink's high growth rate)
Kenmore to CBD Rail Link	Max. capacity LRT 7,200–14,400 pax (5–10 min services)	Kenmore to Indooroopilly up to 2,000, Indooroopilly to CBD 6,000–9,000 pax	Kenmore to Indooroopilly up to 3,000, Indooroopilly to CBD 12,000–16,000 pax

Table 8.10 Comparative assessment of rail options

Total capital cost [1]		Travel time benefits				
'Low' PT	'High' PT	'Low' PT	'High' PT	Desired attributes	Dependence/impact on other projects	Recommendation
Ipswich Rail						
$650 million (including Ferny Grove and Caboolture line upgrades), sectorisation, stabling changes and timetable improvements, requires additional rolling stock $1.5 billion	$850 million, Full sectorisation and timetable improvements, signalling upgrades, additional rolling stock and higher capacity trains @ $2.5 billion, introduction of metro-style operations	Average travel time savings of 5 min, journey time 46 min Ipswich to CBD, minimal waiting and transfer time	Average travel time savings of 5 min, journey time 46 min Ipswich to CBD, minimal waiting and transfer time	Regular and reliable express services, interchange opportunities, Park 'n' Ride, easy access to rail stations, bus feeder services to Ipswich, Goodna and Darra, upgraded rail stations	Improvements to Ipswich line will also mean improvement to Caboolture line, impacts on other rail lines and associated costs, operational constraints for entire network can limit extent of works	Sectorisation and timetable revision sufficient for 'High' PT demand, new seven car sets and ATO signalling instigates mode shifts, maximises existing assets and infrastructure
Ferny Grove Rail						
$650 million (including Ipswich and Caboolture line upgrades), sectorisation, stabling changes and timetable improvements, requires additional rolling stock $1.5 billion	$850 million, Full sectorisation and timetable improvements, signalling upgrades, additional rolling stock and higher capacity trains @ $2.5 billion, introduction of metro-style operations	Journey time Ferny Grove to Central similar to today, however minimal waiting and transfer time	3-minute improvement to journey time Ferny Grove to Central. Minimal waiting and transfer time	Regular and reliable services, interchange opportunities, Park 'n' Ride, easy access to rail stations, bus feeder services to Ferny Grove, Mitchelton and Enoggera, upgraded rail stations	Removal of at grade level crossings to reduce road traffic impacts, operational constraints for entire network can limit extent of works, improvements to Ferny Grove line will also mean improvement to Cleveland/Beenleigh/ Gold Coast group of lines	Sectorisation and timetable revision sufficient for 'High' PT demand, new seven car trains and ATO signallling instigates mode shift, maximises existing assets and infrastructure
Caboolture Rail						
$650 million (including Ipswich and Ferny Grove line upgrades), sectorisation, stabling changes and timetable improvements, requires additional rolling stock $1.5 billion	$850 million, Full sectorisation and timetable improvements, signalling upgrades, additional rolling stock and higher capacity trains @ $2.5 billion, introduction of metro-style operations	Average travel time savings of around 5 min, minimal waiting and transfer time	Average travel time savings of around 5 min, minimal waiting and transfer time	Regular and reliable services, interchange opportunities, Park 'n' Ride, easy access to rail stations, bus feeder services to Strathpine, upgraded rail stations	Removal of at grade level crossings to reduce road traffic impacts, operational constraints for entire network can limit extent of works, improvements Caboolture line will also mean improvement to other lines	Sectorisation and timetable revision sufficient for 'High' PT demand, new seven car trains and ATO signallling instigates mode shift, maximises existing assets and infrastructure

Table 8.10 Comparative assessment of rail options cont'd

Total capital cost [1]		Travel time benefits				
'Low' PT	'High' PT	'Low' PT	'High' PT	Desired attributes	Dependence/impact on other projects	Recommendation
North West Transport Corridor Rail Link						
Single track between Alderley and Strathpine, $1.2 billion. Plus rolling stock	Single track between Alderley and Strathpine, $1.2 billion. Plus rolling stock	Separate right-of-way would ensure competitive journey time along this corridor, otherwise impacted by traffic conditions	Separate right-of-way would ensure competitive journey time along this corridor, otherwise impacted by traffic conditions	Surface rail, regular and reliable service, interchange opportunity, interchange at Alderley	Use of North West Transport Corridor to relieve Gympie Road to allow Northern Busway	Existing public transport demand relatively low, however the corridor has the potential to densify to support a rail link after 2026
North West Transport Corridor Rail Link						
$350 million, within existing corridor, light rail/rail/ bus interchange at Everton Park/ Alderley, light rail would not connect into anything	$350 million, within existing corridor, light rail/rail/ bus interchange at Everton Park/ Alderley, light rail would not connect into anything	Separate right-of-way would ensure competitive journey time along this corridor, otherwise impacted by traffic conditions	Separate right-of-way would ensure competitive journey time along this corridor, otherwise impacted by traffic conditions	High frequency services	LRT would not connect into anything, requires significant land use densification for light rail	Existing public transport demand relatively low, very high cost option per passenger, light rail would need to extend to connect to the CBD
Kelvin Grove to Everton Park Rail Link						
$650 million within existing road corridor, very high cost if in tunnel	$650 million within existing road corridor, very high cost if in tunnel	Separate right-of-way would ensure competitive journey time along this corridor, otherwise impacted by traffic conditions.	Separate right-of-way would ensure competitive journey time along this corridor, otherwise impacted by traffic conditions.	High frequency services	If light rail, would not connect into anything, heavy rail would need to connect into Central or Roma Street station	Bus lane would be as effective to increase level of service at a fraction of the cost
Indooroopilly to Dutton Park Rail Link						
Very high, rail tunnel under UQ at St Lucia	Very high, rail tunnel under UQ at St Lucia	Reduced travel time for east-west trips instead of journey through CBD, reduced waiting & transfer time.	Reduced travel time for east-west trips instead of journey through CBD, reduced waiting and transfer time.	Regular and reliable service, interchange opportunity at Indooroopilly, Dutton Park and Park Road	Impact on Beenleigh/ Gold Coast/Cleveland rail lines, Cross River Rail link, capacity of existing Corinda to Yeerongpilly (Tennyson) rail link	Bus priority on existing roads as effective to increase level of service and provide connectivity at a fraction of the cost, Tennyson rail link can perform similar function.

Table 8.10 Comparative assessment of rail options cont'd

Total capital cost [1]		Travel time benefits				
'Low' PT	'High' PT	'Low' PT	'High' PT	Desired attributes	Dependence/impact on other projects	Recommendation
Cross River Rail Link (Park Road to Bowen Hills)						
$7 billion, rail tunnel under the eastern edge of the CBD between Park Road and Bowen Hills	$7 billion, rail tunnel under the eastern edge of the CBD between Park Road and Bowen Hills	Similar journey time to CBD as today, however additional interchange facilities and reduced transfer time	Similar journey time to CBD as today, however additional interchange facilities and reduced transfer time	Regular and reliable service, interchange opportunity at Park Road and Bowen Hills	Inner city rail capacity is exhausted, Park Road grade separation to avoid conflicts between Gold Coast and Cleveland lines, potential and costs of eight and nine car sets	Timing needs to be confirmed, likely to be post-2026 under demand assumptions, rail may provide sufficient capacity to 2026
CBD Metro Rail (Park Road to Everton Park Rail Link)						
$7 billion, rail tunnel under the eastern edge of the CBD between Park Road and Bowen Hills	$7 billion, rail tunnel under the eastern edge of the CBD between Park Road and Bowen Hills	Similar journey time to CBD as today, however additional interchange facilities and reduced transfer time	Similar journey time to CBD as today, however additional interchange facilities and reduced transfer time	Regular and reliable service, interchange opportunity at Park Road and Bowen Hills	Inner city rail capacity is exhausted, Park Road grade separation to avoid conflicts between Gold Coast and Cleveland lines, potential and costs of eight and nine-car sets	Timing needs to be confirmed, likely to be post-2026 under demand assumptions, rail may provide sufficient capacity to 2026
Ferny Grove Metro Rail extension						
Single track through hilly terrain, $150 million	Single track through hilly terrain, $150 million	Reduced waiting & transfer time	Reduced waiting and transfer time	Provides more Park 'n' Ride spaces	Ferny Grove TOD development	High Ferny Grove rail station access demand makes this option feasible for 'High' PT scenario
Everton Park to Albany Creek Rail Link						
$100 million – $400 million for LRT	$100 million – $400 million for LRT	Travel time advantage in separate right-of-way	Travel time advantage in a separate right-of-way	Regular and reliable service, interchange opportunity at Enoggera	Adverse traffic impacts along South Pine Road	Bus lane would be as effective to increase level of service at a fraction of the cost

Table 8.10 Comparative assessment of rail options cont'd

Total capital cost [1]		Travel time benefits				
'Low' PT	'High' PT	'Low' PT	'High' PT	Desired attributes	Dependence/impact on other projects	Recommendation
CBD Mass Transit						
BRT $150 million, LRT $600 million (BCC Taskforce report Table 1–2)	BRT $150 million, LRT $600 million (BCC Taskforce report Table 1–2)	Separate right-of-way would ensure competitive journey time along this corridor, otherwise impacted by traffic conditions	Separate right-of-way would ensure competitive journey time along this corridor, otherwise impacted by traffic conditions	High frequency services and interchange opportunity within CBD & frame	Bridge across the river between UQ and West End and/or duplication of Victoria Bridge, new stops, right-of-way along existing roads and easing of bottlenecks in inner city busway system	More cost effective to maximise use of existing rail lines and busway, competes with existing inner city bus and rail market
Kenmore to CBD Rail Link						
$800 million, within existing road corridor	$800 million, within existing road corridor	Separate right-of-way would ensure competitive journey time along this corridor, otherwise impacted by traffic conditions	Separate right-of-way would ensure competitive journey time along this corridor, otherwise impacted by traffic conditions	High frequency services	Traffic impacts due to reallocation of existing road space, requires significant land use densification for light rail	Insufficient demand for LRT, would compete with high capacity Ipswich rail line, more cost effective to use existing rail line with bus-rail hubbing at Indooroopilly

Note:

1. These are pre-project estimates in $2008. Estimating has been carried out using a strategic estimate method for a cost comparison only. It is not to be used as a project budget. The strategic estimates make no allowance for risk and opportunities.

8.6.2 Bus corridor options assessment

The results of the comparative evaluation of bus corridor improvement options from Chapter 6.3 are presented in Table 8.11 and Table 8.12.

Following direction from the Queensland Government, the Indooroopilly to Dutton Park Bus Link was removed from the analysis (refer Chapter 9.8).

Table 8.11 Peak period demand projections for bus corridor options, 2026

Option	Peak period capacity	AM peak period demand	
		'Low' PT	'High' PT
Kenmore to CBD Bus Corridor	Max. capacity 4,000–10,000 pax (40–100 services per hour), busway 18,000 (up to 300 services per hour), pick up and drop off, CBD constraints	6,000–9,000 pax	12,000–16,000 pax
Darra to Toowong Bus Corridor	Max. capacity 18,000 pax (busway, up to 300 services per hour), pick up and drop off, CBD constraints	4,800 pax	6,200 pax
Kedron to Bracken Ridge (Northern Busway)	Max 18,000 pax (busway, up to 300 services per hour), pick up and drop off, CBD constraints	9,100 pax	9,400 pax
Kelvin Grove to Everton Park Bus Corridor	Max. capacity 4,000–10,000 pax (40–100 services per hour), busway 18,000 pax, pick up and drop off, CBD constraints	4,000 pax	5,000 pax
Kelvin Grove to Ashgrove Bus Corridor	Max. capacity 4,000–10,000 pax (40–100 services per hour), busway 18,000 pax, pick up and drop off, CBD constraints	4,300 pax	5,400 pax
North West Transport Corridor Bus Link	Max. capacity 4,000–10,000 pax (40–100 services per hour), pick up and drop off	4,000 pax	6,000 pax
Everton Park to Kedron Bus Link	Max. capacity 4,000–10,000 pax (40–100 services per hour), pick up and drop off	1,000 pax	2,000 pax
Old Northern Road Bus Corridor	Max. capacity 3,000–4,000 pax (30–40 services per hour), pick up and drop off	2,000 pax	3,000 pax

Table 8.12 Comparative assessment of bus corridor options

Total capital cost [1]		Travel time benefits				
'Low' PT	'High' PT	'Low' PT	'High' PT	Desired attributes	Dependence/impact on other projects	Recommendation
Kenmore to CBD Bus Corridor						
$500 million for Moggill Road widening to allow for dedicated bus lane with indented bus bays	$500 million for Moggill Road widening for dedicated bus lane with indented bus bays	Average 5-minute travel time improvement, increased reliability	Average 5-minute travel time improvement, increased reliability	Regular and reliable service, interchange opportunities	Requires Northern Link to free up road space on Coronation Drive	Opportunity to reallocate road space along Coronation Drive to bus at a very low cost, Moggill Road contraints
Darra to Toowong Bus Corridor						
$250 million, widening of an already very constrained transport corridor to 8 lanes	$250 million, widening of an already very constrained transport corridor to 8 lanes	Travel time improvement for bus services from Centenary suburbs, increased reliability	Travel time improvements for bus services from Centenary suburbs, increased reliability	Regular and reliable service, interchange opportunity at Darra and Indooroopilly, Park 'n' Ride in outer suburbs	Requires Northern Link as direct connection into Inner Northern Busway	Sufficient demand for a bus lane or busway if a strategy of investing in rail is not adopted, lower demand if high rail investment, then HOV should be considered
Kedron to Bracken Ridge (Northern Busway)						
$400 million within corridor, $1.2 billion with widening Gympie Road, 7 busway stations, cycle and pedestrian bridges	$400 million within corridor, $1.2 billion with widening Gympie Road, 7 busway stations, cycle and pedestrian bridges	Average 22-minute improvement on travel time, increased reliability	Average 22-minute improvement to travel time, increased reliability	Regular and reliable service, interchange opportunity at Chermside and RBH	Gympie Road capacity, North West Transport Corridor	High demand public transport corridor, existing land uses would support a busway
Kelvin Grove to Everton Park Bus Corridor						
$30 million, conversion of T3 into bus lane with indented bus bays	$30 million, conversion of T3 into bus lane with indented bus bays	Average 4-minute travel time improvement, increased reliability	Average 4-minute travel time improvement, increased reliability	Regular and reliable service, interchange opportunity at Enoggera rail station	Traffic impacts as T3 becomes bus lane, land use constraints	Demand warrants kerbside bus lanes, cost-effective
Kelvin Grove to Ashgrove Bus Corridor						
$120 million, widening of Musgrave Road to allow for dedicated bus lane with indented bus bays	$120 million, widening of Musgrave Road to allow for dedicated bus lane with indented bus bays	Average 1-minute travel time improvement, increased reliability	Average 1-minute travel time improvement, increased reliability	Regular and reliable service, interchange opportunities	Traffic impacts as T3 becomes bus lane, land use constraints	Demand warrants kerbside bus lanes

Table 8.12 Comparative assessment of bus corridor options cont'd

Total capital cost [1]		Travel time benefits				
'Low' PT	'High' PT	'Low' PT	'High' PT	Desired attributes	Dependence/impact on other projects	Recommendation
North West Transport Corridor Bus Link						
$800 million, bus lane between Enoggera and Bald Hills	$800 million, bus lane between Enoggera and Bald Hills	Separate right-of-way would ensure competitive journey time along this corridor, otherwise impacted by traffic conditions	Separate right-of-way would ensure competitive journey time along this corridor, otherwise impacted by traffic conditions	Regular and reliable service, interchange opportunity at Enoggera	Kelvin Grove bus lane capacity	Existing land use density is low, however the corridor has future growth at northern end, potential for future densification to support bus lanes
Everton Park to Kedron Bus Link						
$400 million, bus stops, minor bus priority along Stafford Road, cycle and pedestrian improvements	$403 million, bus stops, minor bus priority along Stafford Road, cycle and pedestrian improvements	Facilitates direct east-west trips, Separate right-of-way would ensure competitive journey time along this corridor, otherwise impacted by traffic conditions	Facilitates direct east-west trips, Separate right-of-way would ensure competitive journey time along this corridor, otherwise impacted by traffic conditions	Regular and reliable service, interchange opportunity at Enoggera and Kedron/Lutwyche	Airport Link, Northern Busway	Provides for east-west public transport link from Mitchelton/ Enoggera to Australia TradeCoast, plus connection to Northern Busway, insufficient demand for busway or bus lanes
Old Northern Road Bus Corridor						
$250 million for bus lanes	$244 million for bus lanes	Separate right-of-way would ensure competitive journey time along this corridor, otherwise impacted by traffic conditions	Separate right-of-way would ensure competitive journey time along this corridor, otherwise impacted by traffic conditions	Regular and reliable service, interchange opportunity at Enoggera	Intersection of South Pine Road and Stafford Road	Insufficient demand for bus priority, potential for future densification of land use to support bus lane

Note:

1. These are pre-project estimates in $2008. Estimating has been carried out using a strategic estimate method for a cost comparison only. It is not to be used as a project budget. The strategic estimates make no allowance for risk and opportunities.

8.6.3 Preferred public transport options for 'Low' and 'High' PT scenarios

Based on the quantitative and qualitative assessment of public transport network improvement options as shown in the previous section, the most appropriate options to cater for 'Low' and 'High' public transport growth scenarios were chosen, incremental to SEQIPP and the 2007 TransLink Network Plan. Rail and bus emphasis strategies were developed and for each bus and rail emphasis strategy, all those options of that particular mode were reviewed to meet forecast demand before investigating an alternative mode. Only where a set of options within a public transport mode could not meet estimated future demand were alternative modes explored. Based on that comparison, a set of balanced public transport options for 'Low' and 'High' public transport scenario was determined, i.e. a strategy that contains a balanced approach to rail and bus modes.

'Low' public transport strategy

The public transport improvement options for a 'Low' balanced public transport strategy would include:

- Ipswich and Ferny Grove Rail (Phase 1 – full sectorisation and new timetables);
- Kedron to Chermside busway (existing SEQIPP project extends Northern Busway to Bracken Ridge, however busway beyond Chermside would not be necessary if projected public transport demand were catered for with bus feeder services to high frequency Caboolture Rail);
- Moggill Road/Coronation Drive bus lane between Centenary Motorway and Brisbane CBD;
- Kelvin Grove to Ashgrove bus lane along Musgrave Road; and
- Kelvin Grove to Everton Park bus lane along Enoggera Road/Kelvin Grove Road.

'High' public transport strategy

The public transport options for a 'High' balanced public transport strategy would include:

- Full metro-style rail operations on the Ipswich, Caboolture and Ferny Grove lines as well as on other rail lines in SEQ. Full sectorisation, higher capacity trains (seven car sets) and signalling upgrades would allow Moving Block/Automatic Train Operations (ATO);
- Kedron to Chermside busway (existing SEQIPP project extends Northern Busway to Bracken Ridge, however busway beyond Chermside would not be necessary if projected public transport demand were catered for with bus feeder services to high frequency Caboolture rail);
- Kenmore to CBD extension of Moggill Road/ Coronation Drive bus lane west of the Centenary Motorway to Kenmore Village;
- Kelvin Grove to Ashgrove bus lane along Musgrave Road;
- Kelvin Grove to Everton Park bus lane along Enoggera Road/Kelvin Grove Road;
- Old Northern Road bus lanes;
- Everton Park to Kedron bus lanes along Stafford Road to connect to Australia TradeCoast; and
- Short rail extension of Ferny Grove line towards Samford with inclusion of Park 'n' Ride at terminus.

The extent and viability of some bus corridor options are related to the implementation of road options. For the 'Low' and 'High' balanced public transport strategy, the Moggill Road/Coronation Drive bus corridor could be linked to the implementation of Northern Link to relieve congestion and free up road space. Similarly, the development of the North West Transport Corridor could allow the construction of the Northern Busway as bus lanes within the existing Gympie Road corridor. As the North West Transport Corridor should only be constructed as a multi-modal corridor, the Northern Busway could terminate at Chermside. A bus priority facility on the North West Transport Corridor would provide the capacity to facilitate reliable, high frequency services from the outer northern and north-western suburbs.

Given the level of projected demand and the relatively low density living outside the Brisbane CBD, it would be prudent to maximise the utilisation of existing bus and rail infrastructure and facilities. Light rail options could become an appropriate mode if:

- Public transport demand significantly exceeds the high growth scenario within the area of the CBD and frame;
- Higher densities in the frame and inner city suburbs are achieved; and
- The capacity of busways and rail lines has been exceeded to provide sufficient demand for an additional market for public transport trips within the CBD, city frame and the inner city suburbs.

It is noted that these options only provide sufficient capacity for projected future demands, and the provision of these infrastructure schemes does not guarantee full utilisation of the public transport capacity provided. Future changes in fuel prices and other transport policy settings will influence resultant mode shifts to public transport. The public transport capacity provided under 'Low' and 'High' public transport growth scenarios was analysed by means of the Brisbane Strategic Transport Model (BSTM).

8.6.4 Qualitative impact assessment of preferred public transport options

The strategic nature of the investigation precluded a detailed quantitative analysis of the environmental and social effects of the preferred public transport improvement options. Qualitative comparative indicators were therefore used to assess the different economic and social impacts of the various options. Options have been assessed on a rating scale from 1 to 5 for each indicator based on the potential impact of an option, i.e. beneficial impact, no impact, low impact, medium adverse impact and high negative impact.

The qualitative economic, environmental and social criteria used for the strategic assessment of options were based on the Australian Transport Council's (2006) National Guidelines for Transport System Management in Australia. The criteria that are quantitative are presented later in the document (refer Chapter 9).

The results of the qualitative economic, social and environmental assessment of preferred public transport options are presented in Table 8.13.

Table 8.13 Qualitative economic, social and environmental assessment of public transport options

Indicator	Ipswich Rail	Ferny Grove Rail	Caboolture Rail	Kenmore to CBD bus corridor	Indooroopilly to Dutton Park bus link	Northern Busway	Kelvin Grove to Everton Park bus corridor	Kelvin Grove to Ashgrove bus corridor	North West Transport Corridor bus link	Everton Park to Kedron bus link	Everton Park to Albany Creek bus corridor
Economic											
Integration with land use	1	1	1	1	1	1	1	3	2	2	2
Congestion/Reliability	1	1	1	1	1	1	1	1	1	1	1
Social											
Dislocation	1	1	1	3	2	3	1	1	3	3	1
Property acquisition	1	1	1	3	3	3	2	3	4	5	2
Public security	1	1	1	1	1	1	1	1	1	1	1
Access to public transport	1	1	1	2	1	2	2	1	2	3	2
Severance	1	1	1	2	2	2	2	3	4	4	2
Urban design	1	1	1	1	2	2	2	1	2	4	1
Pedestrians & cyclists	2	2	2	1	2	1	3	3	1	1	1
Mobility	2	2	2	2	1	2	2	1	1	2	1
Amenity	2	2	2	2	2	2	2	3	5	4	1
Social policy context	1	1	1	1	2	1	1	1	1	3	1
Environmental											
SEQ Regional Planning context	1	1	1	1	1	1	1	3	2	2	2
Community uses and spaces	1	1	1	4	4	4	4	5	2	4	4
Environmentally sensitive areas	2	2	2	3	2	2	2	2	4	3	4
Waterway crossings	2	2	2	4	2	3	1	2	4	1	3

Legend: 1 to 5 = beneficial to high negative impact

9.0 Assessment of strategic network improvement options

9.1 Introduction

The process and findings of the assessment of the network improvement options are presented in this chapter.

Reference to 'Low' public transport and 'High' public transport are used throughout this chapter for ease of reporting. The underlying public transport scenarios for 'Low' and 'High' growth were discussed in Chapter 4.4. The potential project components of 'Low' and 'High' public transport were described in Chapter 8.6.3.

The assessment framework is based on the Australian Transport Council's National Guidelines for Transport System Management in Australia (2006) and is consistent with input from the community.

The chapter is arranged under the following headings:

- Analysis process;
- Assessment framework;
- Operational assessment;
- Qualitative assessment of options;
- Quantitative assessment of options;
- Pair-wise comparison of options; and
- Key findings.

9.2 Analysis process

This investigation focused on a strategic analysis of the regionally significant transport network in western Brisbane as illustrated in Figure 9.1. The detailed appraisal of individual projects on the network has not been investigated. A technical assessment of a range of network improvement options including bus, rail and road improvements was undertaken in order to identify a range of potential network strategy choices which would best satisfy government and transport objectives to 2026.

The South East Queensland Strategic Transport Model (SEQSTM) was developed for forecasting road network conditions in 2026. It is capable of testing alternative future land use and road based transportation scenarios across SEQ and within western Brisbane. It has been used to forecast the effects of alternative network strategy options on travel demand patterns.

It has also been used to forecast the effects of public transport investment on the road network by applying public transport mode share scenarios to 2026 total travel demand.

The Brisbane Strategic Transport Model (BSTM) Version 6 was amended and used to verify public transport input assumptions and resultant network effects output from the SEQSTM and other spreadsheet analysis.

There are some limitations to the use of strategic transport models such as SEQSTM and BSTM in the assessment of alternative transport options. In particular, such models are not designed to forecast effects at a detailed local level. Whilst the models may forecast that a particular corridor will not be subject to congestion, this may ignore pinch points within the corridor such as at intersections where congested conditions could still arise based on the amount of demand forecast on the corridor from local access. Such investigations are outside the scope of this strategic investigation.

This investigation is more concerned with differences in network outcomes rather than absolute values, in the determination of strategy direction. A multi-criteria assessment framework was used for the evaluation of network improvement options and strategy choices against a range of transport objectives. Multi-criteria analysis allows the assessment of the relative merit of different network improvement options to be compared using a range of quantitative and qualitative indicators. The indicators are based on economic, social and environmental effects of transport. In addition, specific indicators for a strategic assessment of network improvement options have been developed, as well as financial indicators to estimate the relative affordability of each network improvement option.

The network assessment framework was presented for public consultation during February 2008. Based on extensive community feedback, it was considered that the framework adequately covers the major concerns expressed by the public, however further refinement was applied at a corridor level of assessment.

It was assumed that each network improvement option represents the year 2026 and is incremental to the transport network and travel demand patterns of a 2026 Base Case.

Each network improvement option was assessed within the multi-criteria assessment framework using the SEQSTM and a combination of other quantitative and qualitative methods.

Different combinations of public transport and road network improvement options were assessed against strategic network objectives and compared against the forecast 2026 Base Case for their predicted network performance in 2026. The result was a short list of public transport and road network improvement options which were incorporated into five strategic network choices (discussed in Chapter 12).

As the assessment was undertaken with the SEQSTM, the public transport improvement options have been considered as 'Low' public transport and 'High' public transport investments as discussed in Chapter 9.6. Resultingly, the 'Low' and 'High' public transport investments were combined with the various road improvement options for analysis and assessment.

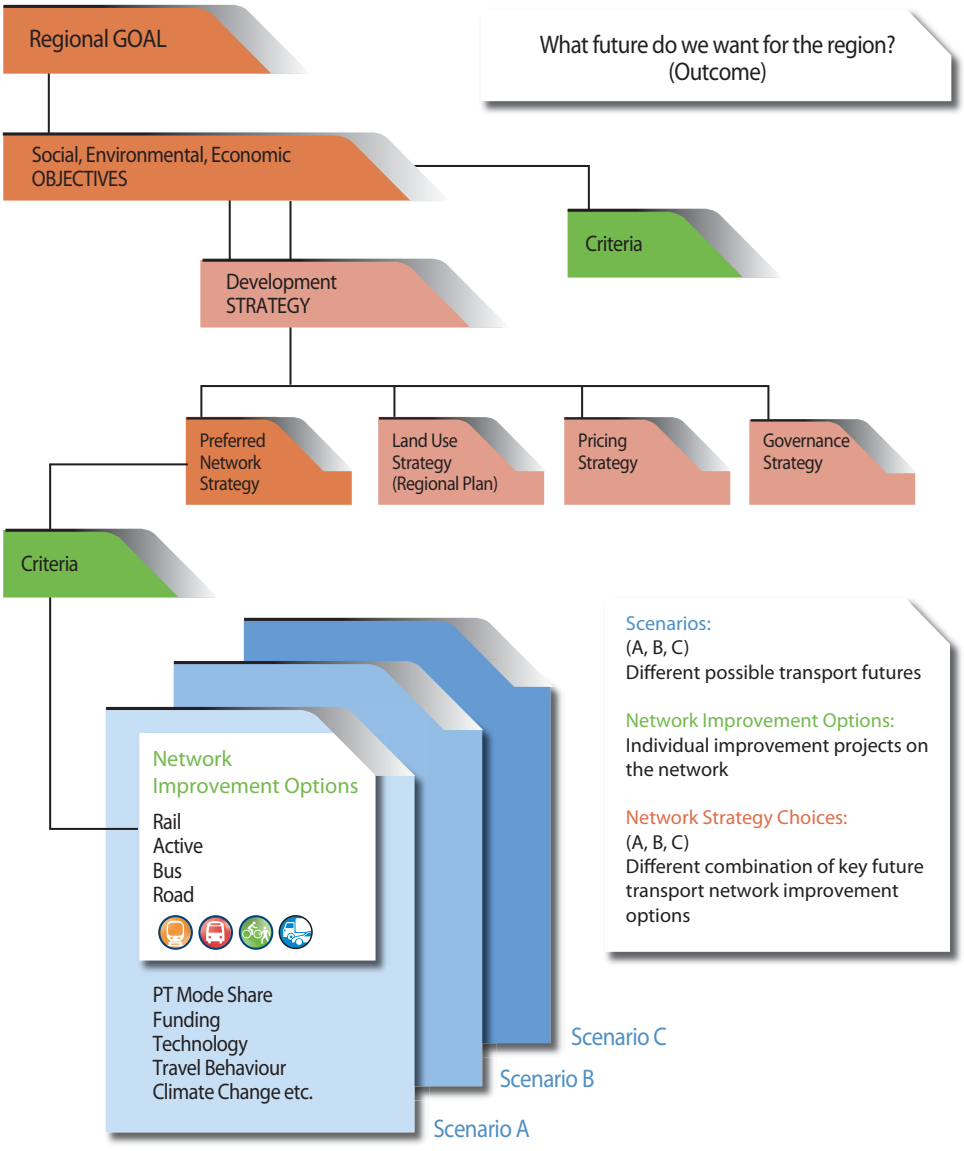


Figure 9.1 Framework for the technical analysis process

9.3 Assessment framework

The assessment of strategic network improvement options was undertaken at two spatial levels; a network level and a corridor level. The assessment was also conducted using three modes of analysis; operational, qualitative and quantitative. For a description of results under each mode of analysis, see Chapters 9.4 to 9.7.

The aim of the multi-criteria assessment framework was to provide a tool for analysing the impact of a range of future transport network improvement options and to enable decision makers to make preferences between network improvement options and to identify those network improvement options which should comprise a future transport strategy. It was not intended that any one objective or criteria should be used as the single determinant of preference, rather it was intended that a balanced view should be reached taking into account the performance of a network improvement option across the range of objectives/criteria including those objectives/criteria which can only be measured qualitatively, especially the key objective of 'strategic fit'.

Operational assessment criteria

The assessment of operational criteria occurred on a network and corridor level and considered the following indicators:

- Distance travelled on the network;
- Time travelled on the network;
- Congestion on the network;
- Road safety in corridor; and
- Impact on road travel conditions along key corridors.

Network level assessment

The network level assessment criteria are presented in Tables 9.1 and 9.2. Community feedback on the assessment criteria have been incorporated and have also influenced the ratings for social effects of each option.

In order to assess the relative performance of each option against the regional and western Brisbane transport objectives, quantitative and qualitative criteria were developed based on the Australian Transport Council's guidelines, community input and study team assessment of issues for measurement.

Where possible, indicators have been converted to a 2005 equivalent monetary value (either a monetary benefit or cost) using in the first instance Australian Transport Council guidelines and in the second instance (where Australian Transport Council guidance does not provide the relevant assumption), Austroads Technical Report T70/06 Update of RUC unit cost values to June 2005.

Table 9.1 Strategic fit assessment

SEQ Regional Plan Transport Objectives	Effect	Qualitative Description
STRATEGIC FIT Provide integrated networks for long distance travel, linking regions together	Alignment with State Government objective 1 – Improve orbital/ring road network	1= Low alignment, 2= Medium alignment, 3= High alignment
	Alignment with State Government objective 2 – Provide sustainable travel choices	
	Alignment with State Government objective 3 – Provide an efficient and integrated freight transport system	
	Network integration for north-south movements	
	Network integration for east-west movements – Cater for demand between western Brisbane and CBD	
	Network integration for east-west movements – Provide additional capacity on the inner western corridor adjacent to Coronation Drive/Milton Road	
	Network integration for east-west movements – Cater for demand from west of Brisbane to Australia TradeCoast.	
	Dependence on other initiatives	1= High dependence, 2= Medium dependence, 3= Low dependence
	Major risks 1 – Increased demand for travel between regional centres	1= High risk, 2= Medium risk, 3= Low risk
	Major risks 2 – Investment required in public transport rather than road	
	Major risks 3 – Investment in public transport delays the need for highway investment	
	Major risks 4 – Higher congestion from west into CBD	
	Economic development	1= Low impact, 2= Medium impact, 3= High impact
	Staging	1= Low potential, 2= Medium potential, 3= High potential
	Private sector funding	1= Low potential, 2= Medium potential, 3= High potential

Table 9.2 Network level assessment framework

SEQ Regional Plan Transport Objectives	Effect	Qualitative Description	Quantitative Measure	Assessment
ECONOMIC Maximise use of existing transport assets and services Invest in the transport system to maximise community benefit Provide an efficient and integrated freight transport system	Private passenger transport			
	Occupant time costs		Annual VHT by vehicle type	PVB ($m 2005)
	Vehicle operating costs		Annual VOC by vehicle type	PVB ($m 2005)
	Congestion/reliability	1 = Low impact 2 = Medium impact 3 = High impact	–	Rating
	Public passenger transport			
	Integration with land use	1 = Low impact 2 = Medium impact 3 = High impact	–	Rating
	Passenger time costs		Annual VHT by mode	PVB ($m 2005)
	Vehicle operating costs		Annual VOC by mode	PVB ($m 2005)
	Congestion/reliability	1 = Low impact 2 = Medium impact 3 = High impact	–	Rating
	Freight transport			
	Driver + freight time costs		Annual VHT by vehicle type	PVB ($m 2005)
	Vehicle operating costs		Annual VOC by vehicle type	PVB ($m 2005)
	Congestion/reliability	1 = Low impact 2 = Medium impact 3 = High impact	–	Rating
	Access to freight intermodal facilities		–	Rating
	Use of preserved corridors	1 = Low utilisation 2 = Medium utilisation 3 = High utilisation	–	Rating
SOCIAL Improve accessibility – support the accessibility needs of all members of community including walking, cycling and public transport use Provide urban design opportunities to promote non-motorised travel	Dislocation	1 = Beneficial impact 2 = No or minimal impact 3 = Low negative impact 4 = Medium negative impact 5 = High negative impact	–	Rating
	Property acquisition		–	Rating
	Severance		–	Rating
	Access		–	Rating
	Mobility		–	Rating
	Amenity		–	Rating
	Social policy context		–	Rating

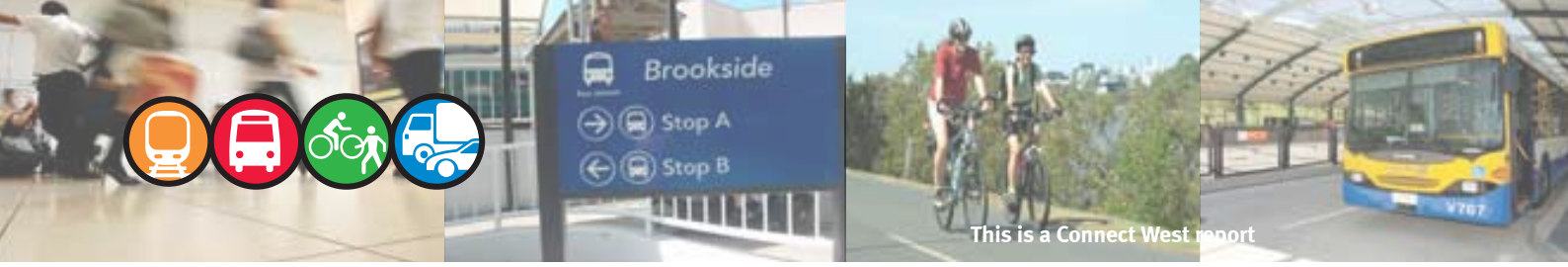


Table 9.2 Network level assessment framework cont'd

SEQ Regional Plan Transport Objectives	Effect	Qualitative Description	Quantitative Measure	Assessment
SOCIAL cont'd	Access to public transport	1 = Low impact 2 = Medium impact 3 = High impact	–	Rating
	Pedestrians and cyclists		–	Rating
	Public security		–	Rating
	Accidents		Annual reduction in accidents by severity	PVB ($m 2005)
ENVIRONMENTAL Provide sustainable travel solutions	State Government Regional Planning context	1 = Beneficial impact 2 = No or minimal impact 3 = Low negative impact 4 = Medium negative impact 5 = High negative impact	–	Rating
	Community uses and spaces		–	Rating
	Urban character and amenity		–	Rating
	Environmentally sensitive areas		–	Rating
	Impact on waterway crossings		–	Rating
	Greenhouse gas		Annual reduction in CO_2 tonnes	PVB ($m 2005)
	Air quality		Annual Reduction in VKT	PVB ($m 2005)
	Landscape			PVB ($m 2005)
	Water			PVB ($m 2005)

Note:

PVB = Present Value Benefit

VHT = Vehicle Hours Travelled

VKT = Vehicle Kilometres Travelled

VOC = Vehicle Operating Costs

Corridor level assessment

This level of analysis incorporated the measurement of operational and qualitative criteria such as road travel conditions, public transport reliability and quality of cycle/walk routes on numerous key transport corridors identified within the study. The criteria measured at this level were:

- Daily average vehicle travel time (minutes);
- Daily average vehicle travel speed (kph);
- AM peak average road congestion (volume-capacity ratio);
- Road safety (number of accidents);
- Bus and cycle reliability (qualitative assessment);
- Impact on walking (qualitative assessment);
- Bus average speed (qualitative assessment);
- Rail reliability and frequency (qualitative assessment); and
- Rail average travel time (qualitative assessment).

The key corridors analysed were:

- Coronation Drive;
- Moggill Road (from Mt. Crosby Road to Coronation Drive);
- Milton Road;
- Metroad 5 (between Frederick Street and South Pine Road);
- Centenary Motorway;
- Western Freeway;
- Gympie Road/Lutwyche Road;
- Gateway Motorway North;
- Inner City Bypass;
- Kelvin Grove Road;
- Stafford Road;
- Old Northern Road (between South Pine Road and Dayboro Road);
- Waterworks Road;
- Samford Road (between Enoggera Road and Settlement Road); and
- Brisbane Valley Highway.

9.4 Operational assessment

9.4.1 Network level assessment

Distance travelled on the network

Figure 9.2 compares forecast distance travelled on the Brisbane road network in the various network improvement options in 2026.

The analysis suggests that the primary factor impacting on travel distance is the level of investment in public transport. All network improvement options with a high level of public transport investment ('High' PT or HPT) generate lower distances travelled than all network improvement options with a base level of investment in public transport ('Low' PT or LPT).

The road network improvement option which increases travel distance to the greatest degree is Inner Orbital (IO) plus the Northern Crosslink Corridor (IO + NCC). This is followed by Northern Link plus the Northern Crosslink Corridor (NL + NCC), Inner Orbital (IO), Northern Link plus Inner Orbital (NL + IO) and Inner Orbital plus East-West Link (IO+EWL).

East-West link shows no discernable impact on distance travelled in the network.

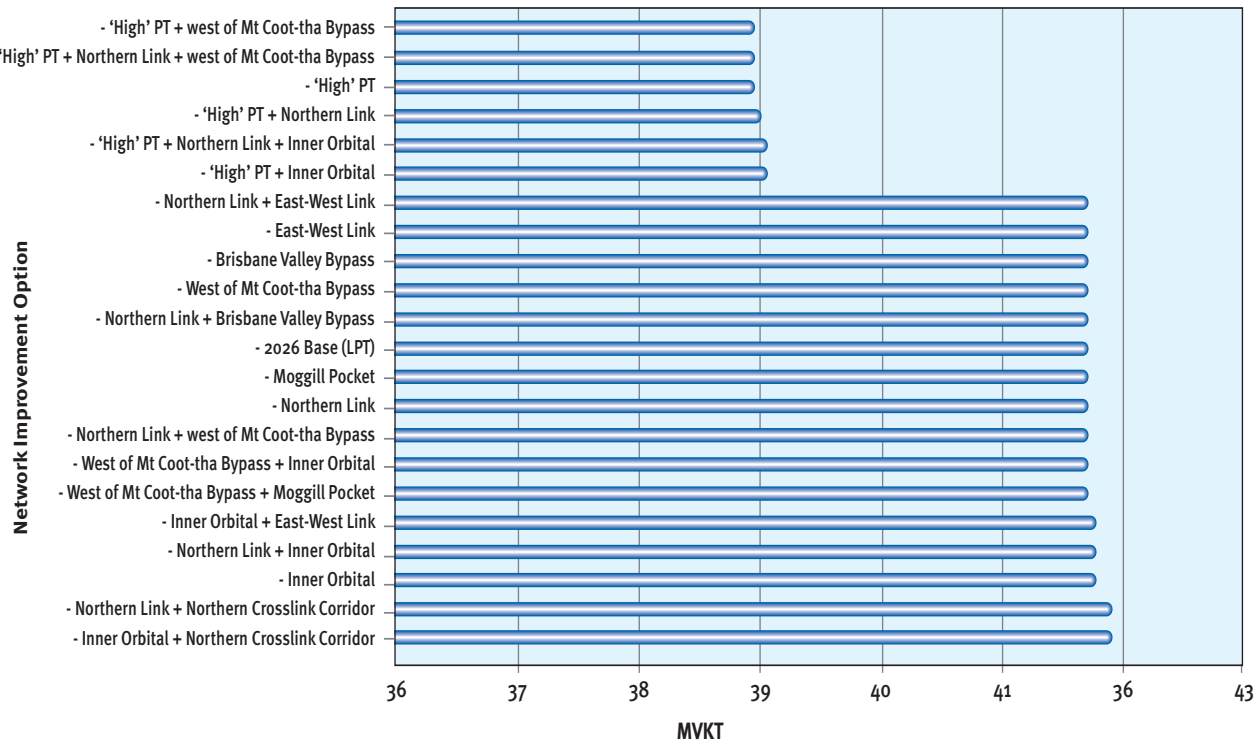


Figure 9.2 Forecast daily Million Vehicle Kilometres Travelled (MVKT) on Brisbane road network, 2026

Time travelled on the network

Figure 9.3 compares forecast time travelled on the Brisbane road network in the various network improvement options in 2026. Again, the primary factor is the level of investment in public transport. All network improvement options, including 'High' PT, generate lower vehicle minutes travelled than all network improvement options including 'Low' PT. Inner Orbital shows the greatest impact on reducing time travelled of all the road options. Moggill Pocket (MP), Brisbane Valley Bypass (BVB) and East-West Link (EWL) show the least impact in time travelled on the network.

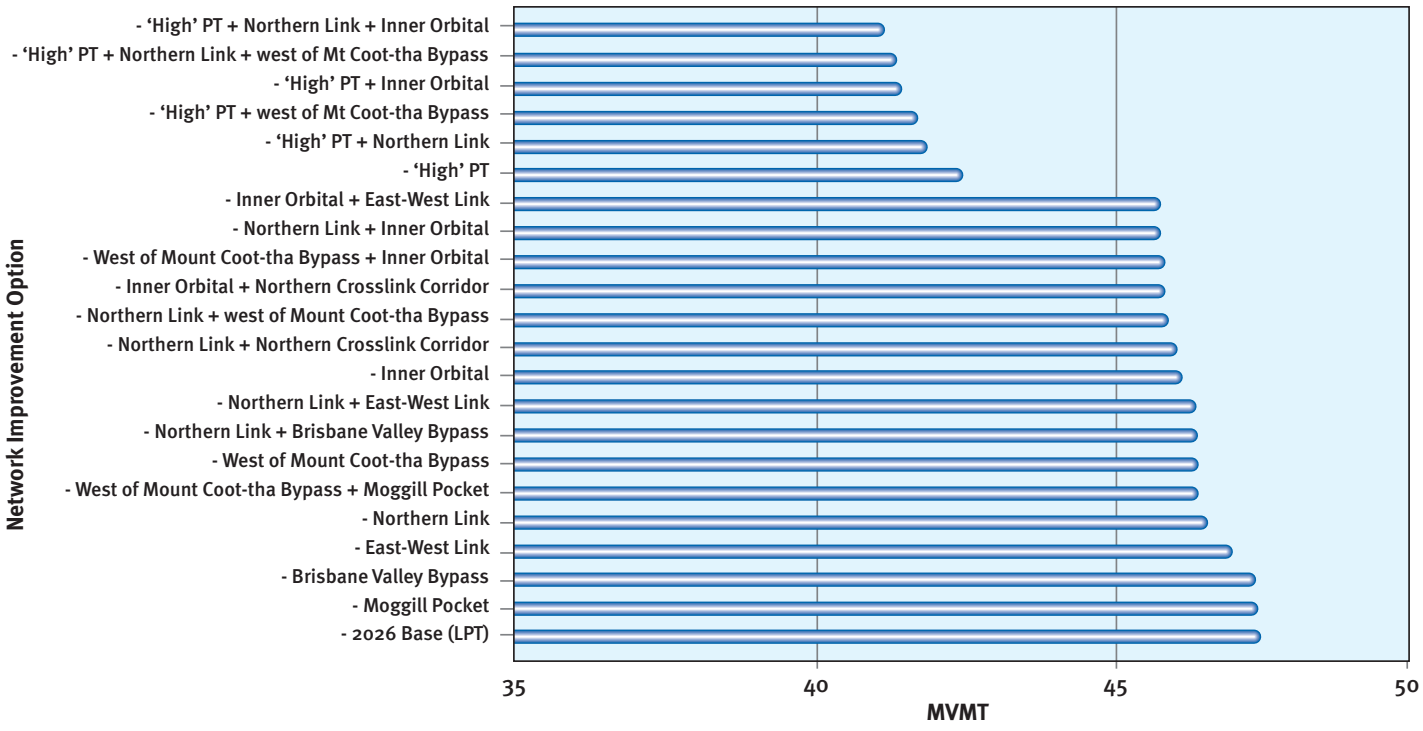


Figure 9.3 Forecast daily Million Vehicle Minutes Travelled (MVMT) on Brisbane road network, 2026

Congestion on the network

Congestion has been assessed using the ratio of volume divided by capacity (V/C ratio) on the Brisbane-wide network. The following summarises the results of this assessment;

Inner Orbital (Toowong to Everton Park) is forecast to generate more network-wide benefits than Northern Link including the following impacts:

- Congestion relief on the inner western corridor including Coronation Drive, Milton Road and removal of congestion along the Metroad 5;
- Significant reduction of congestion along Gympie Road;
- Congestion relief along Old Northern Road; and
- Other pockets of congestion relief across inner northern Brisbane.

Northern Link is forecast to generate significant congestion relief on a specific part of the network, i.e. the inner western corridor comprising Coronation Drive, Milton Road and Metroad 5.

West of Mt. Coot-tha Bypass (MCB) is forecast to generate congestion relief on Ipswich Motorway, Metroad 5 and Old Northern Road as well as other pockets of congestion relief across northern and southern Brisbane.

Brisbane Valley Bypass is forecast to generate very little congestion relief across Brisbane.

The **combination of Northern Link and Inner Orbital** (Toowong to Everton Park) is forecast to generate all the benefits identified above in relation to these two options:

- Significant congestion relief on a specific part of the network, i.e. the inner western corridor comprising Coronation Drive, Milton Road and Metroad 5;
- Congestion relief along Gympie Road;
- Congestion relief along Old Northern Road; and
- Other pockets of congestion relief across inner northern Brisbane.

The **combination of Northern Link and West of Mt. Coot-tha Bypass** is forecast to include the following impacts:

- Significant congestion relief on Coronation Drive and Milton Road and to a more significant degree on Metroad 5 (compared to either Northern Link or Mt. Coot-tha Bypass on their own); and
- Other pockets of congestion relief across northern and southern Brisbane.

The **combination of Inner Orbital (Toowong to Everton Park) and West of Mt. Coot-tha Bypass** is forecast to generate all the benefits identified in relation to Inner Orbital above:

- Congestion relief on the inner western corridor including Coronation Drive, Milton Road and complete removal of congestion along the Metroad 5 north of Mt. Coot-tha Road;
- Significant reduction of congestion along Gympie Road;
- Congestion relief along Old Northern Road;
- Other pockets of congestion relief across northern Brisbane; and
- Congestion relief on Ipswich Motorway and other pockets of congestion relief in southern Brisbane due to Mt. Coot-tha Bypass.

The **combination of Inner Orbital (Toowong to Everton Park), North West Transport Corridor and Northern Crosslink Corridor** is forecast to provide all the congestion relief benefits identified above in relation to Inner Orbital:

- Congestion relief on the inner western corridor including Coronation Drive, Milton Road and complete removal of congestion along the Metroad 5 north of Mt. Coot-tha Road;
- Congestion relief along Gympie Road;
- Congestion relief along Old Northern Road;
- Other pockets of congestion relief across inner northern Brisbane; and
- It is also forecast to cause higher congestion along Inner Orbital itself and Airport Link (due to the improved connection attracting more traffic).

Moggill Pocket is forecast to generate congestion relief along Ipswich Motorway.

The **combination of Moggill Pocket and West of Mt. Coot-tha Bypass** is forecast to generate the combined congestion relief benefits of the Moggill Pocket and West of Mt. Coot-tha Bypass options as identified above:

- Congestion relief along Ipswich Motorway; and
- Congestion relief on Metroad 5 and Old Northern Road as well as other pockets of congestion relief across northern and southern Brisbane.

East-West Link is forecast to provide congestion relief benefits across the inner part of South Brisbane.

The **combination of Northern Link and East-West Link** is forecast to provide the combined congestion relief benefits of Northern Link and East-West Link as identified above:

- Congestion relief on a specific part of the network, i.e. the inner western corridor comprising Coronation Drive, Milton Road and Metroad 5 north of Mt. Coot-tha Road; and
- Congestion relief benefits across the inner part of southern Brisbane.

The **combination of East-West Link and Inner Orbital (Toowong to Everton Park)** is forecast to provide the following combined congestion relief benefits of East-West Link and Inner Orbital as identified above:

- Congestion relief benefits across the inner part of South Brisbane;
- Significant reduction of congestion along Gympie Road;
- Congestion relief along Old Northern Road;
- Other pockets of congestion relief across inner northern Brisbane; and
- Removal of congestion on most of the inner western corridor comprising Coronation Drive, Milton Road and Metroad 5 north of Mt. Coot-tha Road.

The **combination of Northern Link and Northern Crosslink Corridor** is forecast to include the following effects:

- All the congestion relief benefits identified above in relation to Northern Link, i.e. congestion relief on the inner western corridor comprising Coronation Drive, Milton Road and Metroad 5 north of Mt. Coot-tha Road;
- Congestion relief along Old Northern Road;
- Congestion relief along Gympie Road; and
- Higher congestion along the North West Transport Corridor and Airport Link.

9.4.2 Corridor level assessment

Road safety in corridors

Figure 9.4 presents the estimated number of accidents on the key road corridors for each network improvement option. These forecasts have been derived by calculating accident rates for these corridors using existing Brisbane City Council (BCC) and Department of Main Roads (DMR) accident data and applying these accident rates to forecast total vehicle kilometres travelled in each network improvement option (extracted from SEQSTM) on each corridor.

In general, the number of accidents remains relatively constant across all network improvement options on each corridor. The most substantial change is forecast on Gympie Road, where all network improvement options including Inner Orbital would bring about a significant reduction in accidents due to the reduction in traffic volumes.

Due to the high current number of accidents on Samford Road and Gympie Road, these corridors are forecast to be subject to the highest number of accidents in the majority of network improvement options, with over 100 crashes generally forecast per annum.

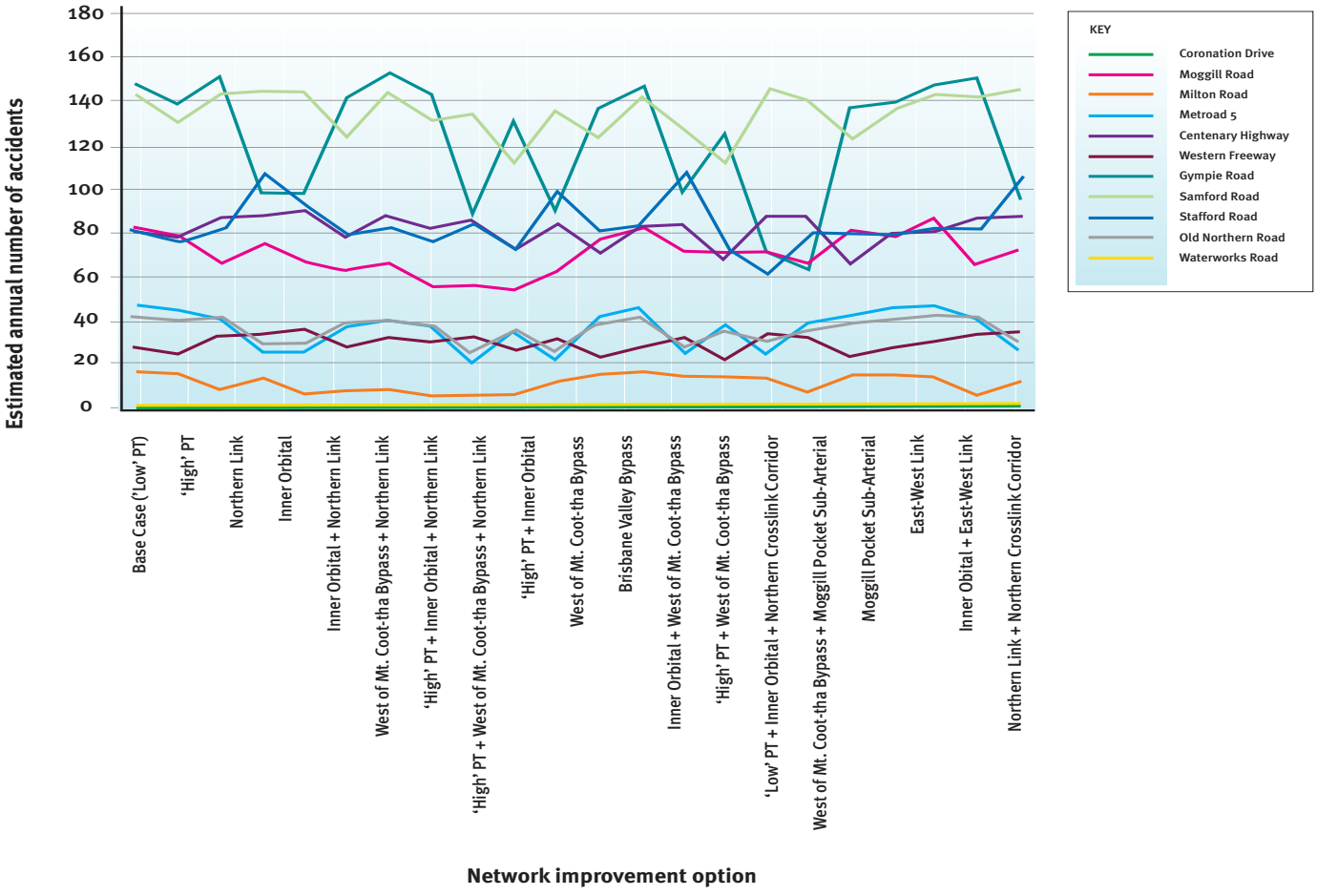


Figure 9.4 Forecast annual number of accidents by corridor, 2026

Impact on road travel conditions along key corridors

Indicators of road travel conditions on each of the key corridors (daily average travel time, daily average speed and AM peak vehicle congestion V/C ratio) were extracted from the SEQSTM.

Coronation Drive

- Northern Link would provide the greatest benefit to travel conditions along this corridor of all the individual network improvement options (there is a 30–40 per cent decrease in travel times along this corridor compared to the 2026 Base Case).
- 'High' PT (8–21 per cent decrease in travel times) would provide significant benefits.
- Inner Orbital (30 per cent decrease in travel times) would provide significant benefits.
- The provision of Inner Orbital in combination with Northern Link would generate some marginal extra benefits (30–40 per cent decrease in travel times).
- The provision of East-West Link in combination with either Inner Orbital or Northern Link would generate significant extra benefits. A combination of East-West Link and Northern Link is forecast to generate a 44 per cent reduction in congestion (compared to 22 per cent with Northern Link on its own). A combination of East-West Link and Inner Orbital is forecast to generate a 33 per cent reduction in congestion (compared to 14 per cent with Inner Orbital on its own) in the critical inbound direction during the AM peak.

Moggill Road

- All network improvement options would generate marginal changes in travel conditions along this corridor.
- Northern Link would generate highest benefits (a 3–8 per cent decrease in travel time).
- East-West Link would generate disbenefits (a 4–5 per cent increase in travel time).

Milton Road

- Northern Link would provide the greatest benefit to travel conditions along this corridor of all the individual network improvement options; there is approximately a halving of travel times and a doubling of travel speeds generated by this network improvement option compared to the Base Case.
- Inner Orbital would also provide significant benefits to travel conditions along this corridor; there is a halving of travel times and a doubling of travel speeds in the inbound direction compared to the Base Case.
- 'High' PT would provide significant benefits to travel conditions along this corridor (a 30 per cent improvement in travel times).
- East-West Link would provide significant benefits to travel conditions along this corridor (a 10–30 per cent improvement in travel times).
- Moggill Pocket would cause a marginal worsening of travel conditions along this corridor (3–4 per cent increase in travel times). Moggill Pocket in combination with West of Mt. Coot-tha Bypass would generate a decrease in travel time in the critical inbound direction of 27 per cent, while west of Mt. Coot-tha Bypass on its own would generate a 35 per cent decrease in inbound travel time.

Metroad 5

- Inner Orbital would provide the greatest benefit to travel conditions along this corridor. There would be an approximate 40 per cent reduction in congestion along this corridor compared to the 2026 Base Case.
- Northern Link would have an impact on improving travel conditions along this corridor (5–13 per cent reduction in congestion).
- West of Mt. Coot-tha Bypass on its own would improve congestion by 4–18 per cent along this corridor.
- Northern Link has little impact if Inner Orbital is in place, but Inner Orbital has reasonable impact on Northern Link.
- East-West Link would not have much impact on congestion or travel times.

Centenary Motorway

- Moggill Pocket would provide the greatest benefit to travel conditions along this corridor (a 7–12 per cent improvement in travel times) and a 5 per cent reduction in congestion in the critical inbound direction. When Moggill Pocket is combined with West of Mt. Coot-tha Bypass, these improvements in travel conditions would be maintained (9–14 per cent improvement in travel times).
- 'High' PT and the West of Mt. Coot-tha Bypass are the only other schemes which would improve travel conditions along this corridor. There is a 7 per cent reduction in travel times forecast in both directions in the 'High' PT option. There is a 10 per cent reduction in travel times forecast in the outbound direction with the addition of the West of Mt. Coot-tha Bypass.
- There are 2–10 per cent increases in travel time forecast on this corridor with the addition of Northern Link, Inner Orbital and a combination of Northern Link and Inner Orbital.
- East-West Link would have no discernable impact on travel conditions along this corridor.

Western Freeway

- 'High' PT would have the greatest impact on improving travel conditions along this corridor, with approximately a 5–10 per cent reduction in travel time.
- West of Mt. Coot-tha Bypass would have the next greatest impact on improving travel conditions along this corridor, with approximately a 2–5 per cent reduction in travel time.
- Northern Link would result in a worsening of travel conditions along this corridor, with approximately a 14 per cent increase in congestion in the inbound direction.
- Inner Orbital would result in a worsening of travel conditions along this corridor, with approximately a 15 per cent increase in congestion in the inbound direction.
- East-West Link would generate a 6 per cent increase in congestion in the inbound and outbound directions.

Gympie Road/Lutwyche Road

- The Inner Orbital plus Northern Crosslink Corridor and Northern Link plus Northern Crosslink Corridor would have the greatest impact on improving travel conditions along this corridor (both approximately a 40 per cent reduction in congestion in the critical inbound direction).
- Inner Orbital would also have a significant impact on reducing congestion along this corridor (between 24 and 34 per cent in the AM peak).
- 'High' PT would have some impact on reducing congestion along this corridor (between 4 and 7 per cent in the AM peak).
- West of Mt. Coot-tha Bypass would also have some impact on reducing congestion along this corridor (between 2–9 per cent in the AM peak).

Gateway Motorway North

- There are marginal improvements in travel conditions forecast along this corridor in the 'High' PT, Inner Orbital, West of Mt. Coot-tha Bypass and Inner Orbital plus Northern Crosslink Corridor network improvement options.

Inner City Bypass

- There are no discernible changes in travel conditions forecast on this corridor in all network improvement options. However, this does not imply the same findings in travel conditions at the intersections along this corridor. More detailed analysis would be required to identify whether the demand levels generated in each network option would have an impact at intersections.

Kelvin Grove Road

- There are marginal improvements in travel conditions forecast along this corridor in the 'High' PT, Inner Orbital and West of Mt. Coot-tha Bypass network improvement options.

Stafford Road

- Inner Orbital is forecast to have the effect of causing higher travel times (approximately 13 per cent) and lower travel speeds (approximately 9 per cent) along this corridor. These changes are offset when Inner Orbital is combined with the Northern Crosslink Corridor.

Old Northern Road

- Inner Orbital would generate some marginal improvements in travel conditions (5–6 per cent improvement in travel time).
- West of Mt. Coot-tha Bypass would generate some marginal improvements in travel conditions (3–4 per cent improvement in travel time).

Waterworks Road

- Inner Orbital would generate some significant increases in travel time (approximately 13 per cent) along the western section of Waterworks Road.
- West of Mt. Coot-tha Bypass would generate some marginal increases in travel time (approximately 5–8 per cent) along the western section of Waterworks Road.

Samford Road

- Inner Orbital would generate some marginal increases (approximately 3–5 per cent) in travel time along this corridor.
- West of Mt. Coot-tha Bypass would have minimal impact on Samford Road.

Brisbane Valley Highway

- The Brisbane Valley Bypass would generate significant improvements in travel conditions along this corridor, including approximately a 16 per cent reduction in travel time along the southern section.

9.5 Qualitative assessment of options

Qualitative assessment has been made of the eleven network improvement options comprising individual options (not combinations of options), i.e. 'Low' PT, 'High' PT and nine road network improvement options.

9.5.1 Summary of effects

Most of the social and environmental indicators were assessed based on a strategic evaluation of each network improvement option. As part of this assessment, the potential land use, social and environmental values within and adjacent to each network improvement option were documented. Environmental, land use and social issues raised during community engagement activities as part of the options consultation were applied. The public comments were extracted from database entries recorded in the consultation manager database. The land use, social and environmental criteria were then scored from 1 to 5 based on their potential impact, i.e. beneficial impact (1), no or minimal impact (2), low negative impact (3), medium negative impact (4), and high negative impact (5).

A strategic assessment has also been made of strategic fit and qualitative economic indicators, in addition to investment in existing and new pedestrian and cyclist facilities and public security of existing and new public transport facilities. This assessment has used a rating scale of 1 to 3, whereby a rating of 3 indicates the most positive impact.

The following sections provide a more detailed description of the rationale underlying the ratings of each network improvement option against each indicator.

Table 9.3 summarises the qualitative assessment of the network improvement options.

Table 9.3 Summary of qualitative assessment of network improvement options

Indicators	Qualitative Description	'Low' PT	'High' PT	Northern Link	Northern Crosslink Corridor	North West Transport Corridor	Toowong to Everton Park tunnel (Inner Orbital)	Samford Valley Sub-Arterial Corridor	East-West Link	Moggill Pocket Sub-Arterial	Brisbane Valley Bypass	West of Mt. Coot-tha Bypass
Strategic Fit												
Alignment with Queensland Government Objective 1 – Invest in an effective transport system to improve the orbital/ring road network in Greater Brisbane	1=Low alignment 2=Medium alignment 3=High alignment	1	1	2	3	3	3	1	3	1	1	2
Alignment with Queensland Government Objective 2 – Provide sustainable travel choices by investing in new public transport services and infrastructure		2	3	2	2	2	2	1	1	1	1	1
Alignment with Queensland Government Objective 3 – Provide an efficient and integrated freight transport system by managing and protecting strategic freight routes		1	1	2	3	3	3	1	1	1	2	2
Network integration for north-south movements	1=Does not meet this objective 2=Partly meets this objective 3=Meets this objective	1	1	1	3	3	3	1	1	1	1	2
Network integration for east-west movements		1	1	2	2	2	2	1	1	1	1	2
Dependence on other initiatives	1=High dependence 2=Medium dependence 3=Low dependence	3	3	1	2	2	2	1	1	1	3	3

Table 9.3 Summary of qualitative assessment of network improvement options cont'd

Indicators	Qualitative Description	'Low' PT	'High' PT	Northern Link	Northern Crosslink Corridor	North West Transport Corridor	Toowong to Everton Park tunnel (Inner Orbital)	Samford Valley Sub-Arterial Corridor	East-West Link	Moggill Pocket Sub-Arterial	Brisbane Valley Bypass	West of Mt. Coot-tha Bypass
Major Risk 1 – Increased demand for travel between regional centres results in orbital/non-radial routes becoming increasingly important	1=High risk 2=Medium risk 3=Low risk	1	1	1	2	2	2	1	2	1	1	2
Major Risk 2 – Significant increase in PT mode share due to increase in road user costs requires investment in PT rather than highways		2	3	2	2	2	2	1	1	1	1	1
Major Risk 3 – Investment in PT could delay the need for highway investment which could yield higher economic benefits		2	1	3	3	3	3	3	3	3	3	3
Major Risk 4 – Employment self-containment forecast in western Brisbane does not materialise resulting in higher congestion on routes into CBD		1	2	2	1	1	1	1	1	2	1	2
Economic development	1=Negative or low beneficial impact 2=Medium beneficial impact 3=High beneficial impact	1	1	1	2	2	2	2	2	2	1	2

Table 9.3 Summary of qualitative assessment of network improvement options cont'd

Indicators	Qualitative Description	'Low' PT	'High' PT	Northern Link	Northern Crosslink Corridor	North West Transport Corridor	Toowong to Everton Park tunnel (Inner Orbital)	Samford Valley Sub-Arterial Corridor	East-West Link	Moggill Pocket Sub-Arterial	Brisbane Valley Bypass	West of Mt. Coot-tha Bypass
Staging of Infrastructure	1=Low potential	n/a	n/a	1	2	2	2	1	1	2	2	3
Private sector funding	2=Medium potential 3=High potential	n/a	n/a	2	3	3	3	2	3	2	1	2
Economic												
Integration with land use	1=Low integration 2=Medium integration 3=High integration	2	3	2	2	2	2	1	2	1	1	1
Congestion/reliability	1=Negative or low beneficial impact 2=Medium beneficial impact 3=High beneficial impact		3	1	1	1	1	1	1	1	1	1
Access to freight intermodal facilities	1=Negative or low beneficial impact 2=Medium beneficial impact 3=High beneficial impact	n/a	n/a	2	3	3	3	1	1	1	2	2

Table 9.3 Summary of qualitative assessment of network improvement options cont'd

Indicators	Qualitative Description	'Low' PT	'High' PT	Northern Link	Northern Crosslink Corridor	North West Transport Corridor	Toowong to Everton Park tunnel (Inner Orbital)	Samford Valley Sub-Arterial Corridor	East-West Link	Moggill Pocket Sub-Arterial	Brisbane Valley Bypass	West of Mt. Coot-tha Bypass
Social												
Dislocation	1=Beneficial impact 2=No or minimal impact 3=Low negative impact 4=Medium negative impact 5=High negative impact	n/a	n/a	2	1	3	2	4	2	4	5	5
Property acquisition		n/a	n/a	4	3	4	3	5	4	4	5	5
Severance		n/a	n/a	3	2	4	2	4	3	4	4	4
Access		n/a	n/a	2	2	2	1	2	2	2	2	2
Mobility		n/a	n/a	2	2	1	1	2	2	1	2	2
Amenity		n/a	n/a	5	3	5	2	4	5	4	4	4
Social policy context		n/a	n/a	1	3	1	1	3	1	2	3	3
Investment in existing and new pedestrian & cyclist facilities	1=Low investment 2=Medium investment 3=High investment	3	3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Public security of existing and new public transport facilities	1=Negative or low beneficial impact 2=Medium beneficial impact 3=High beneficial impact	2	3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Table 9.3 Summary of qualitative assessment of network improvement options cont'd

Indicators	Qualitative Description	'Low' PT	'High' PT	Northern Link	Northern Crosslink Corridor	North West Transport Corridor	Toowong to Everton Park tunnel (Inner Orbital)	Samford Valley Sub-Arterial Corridor	East-West Link	Moggill Pocket Sub-Arterial	Brisbane Valley Bypass	West of Mt. Coot-tha Bypass
Environmental												
State Government Regional Planning context (land use)	1=Beneficial impact 2=No or minimal impact 3=Low negative impact 4=Medium negative impact 5=High negative impact	n/a	n/a	1	2	2	1	4	1	4	5	5
Community uses and spaces		n/a	n/a	3	1	2	3	3	3	2	2	2
Urban character and amenity		n/a	n/a	1	1	2	2	4	2	4	4	4
Environmentally sensitive areas		n/a	n/a	1	3	4	4	5	3	5	5	5
Impact on waterway crossings		n/a	n/a	1	1	4	4	5	3	5	5	5

9.5.2 Strategic fit

A key objective of this investigation was to develop a strategy which improves the way in which the Greater Brisbane transport network operates as a system that serves as many of the key demands placed on it as possible. Strategic fit broadly includes indicators which measure the way in which the Greater Brisbane transport network operates as a system (refer Table 9.1).

Alignment with Queensland Government objectives

Assessment has been made against three key Queensland Government objectives based on the Regional Plan:

- Government Objective 1 – Invest in an effective transport system to improve the orbital/ring road network in Greater Brisbane;
- Government Objective 2 – Provide sustainable travel choices by investing in new public transport services and infrastructure; and
- Government Objective 3 – Provide an efficient and integrated freight transport system by managing and protecting strategic freight routes.

In relation to Objective 1, a number of the network improvement options are orbital schemes and therefore score a high rating of 3. Northern Link provides less of an orbital function as it provides connections to the CBD frame whilst West of Mt. Coot-tha Bypass is forecast to be less effective in attracting traffic; therefore, these network improvement options score a medium rating of 2.

In relation to Objective 2, 'High' PT would provide a major investment in public transport services and infrastructure. 'Low' PT would also provide a significant, but lesser investment. A number of network improvement options provide the opportunity to give greater priority to public transport either along each alignment or on competing, adjacent routes; these network improvement options have been given a medium rating of 2.

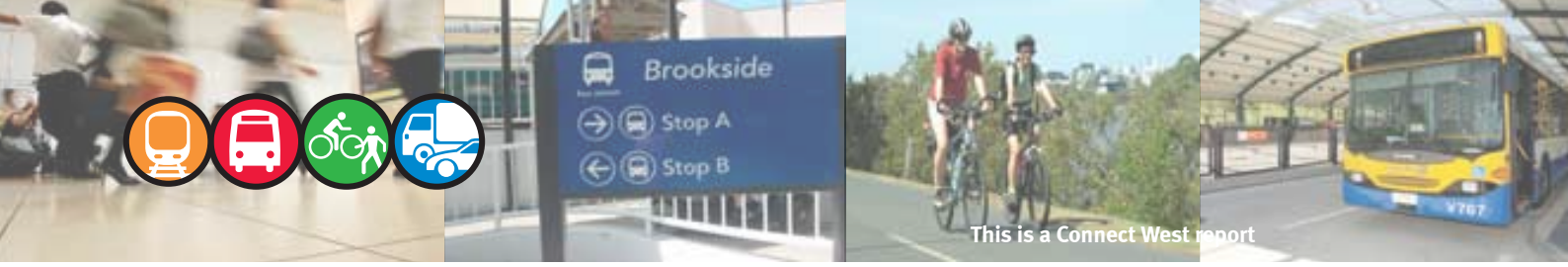
In relation to Objective 3, Inner Orbital, North West Transport Corridor and Northern Crosslink Corridor would together operate as a system in providing new access to the Australia TradeCoast as well as improving north-south freight links around Brisbane. Northern Link, in combination with other TransApex improvements, would provide improved access to Australia TradeCoast. West of Mt. Coot-tha Bypass and Brisbane Valley Bypass would provide improve north-south freight linkage.

Network integration for north-south movements

The transport planning objective relevant to this strategic objective is to cater for the forecast strong future demand between the north of Brisbane and the Brisbane CBD, and between the western suburbs and the inner northern suburbs.

Taking the role of each road network improvement option in turn, the following conclusions can be drawn:

- Northern Link would serve the north-south demand to some extent, albeit taking traffic that is not bound for the Brisbane CBD relatively close to the CBD (into the CBD frame);
- Inner Orbital would cater for demand between the south-west and north of Brisbane;
- West of Mt. Coot-tha Bypass would cater for demand between the south-west and north of Brisbane;
- Brisbane Valley Bypass would not serve the north-south demand;
- Moggill Pocket would not serve the north-south demand;
- Samford Valley Sub-Arterial would not serve the north-south demand;
- Northern Crosslink Corridor would to a small degree serve the north-west demand by distributing traffic between Old Northern Road and Lutwyche/Gympie Roads;
- North West Transport Corridor would cater for that demand; and
- East-West Link would not serve the north-south demand.



Network integration for east-west movements

The following transport planning objectives are relevant to this strategic objective:

Objective 1) To cater for strong demand between west Brisbane and the CBD.

Objective 2) To provide additional capacity on the inner western corridor adjacent to Coronation Drive/Milton Road.

Objective 3) To cater for demand from west of Brisbane to Australia TradeCoast.

Taking the role of each network improvement option in turn, the following conclusions can be drawn as to their performance in relation to these objectives:

- Northern Link meets Objectives 2 and 3 – would cater for demand between west of Brisbane and Australia TradeCoast;
- Inner Orbital, North West Transport Corridor and Northern Crosslink Corridor would meet Objective 3 but not Objectives 1 and 2;
- West of Mt. Coot-tha Bypass would meet Objective 1 but not Objectives 2 and 3;
- Brisbane Valley Bypass would not meet any of the objectives;
- Moggill Pocket would not meet any of the objectives; and
- East-West Link would not meet any of the objectives.

Dependence on other initiatives

An assessment was made of how dependent the key transport options are on other schemes being built in order that they can fulfill their role within the transport system. Northern Link and East-West Link would have a high dependence on other initiatives, as they are dependent on TransApex road network developments and widening of Centenary Motorway. Inner Orbital would have a medium dependence on other initiatives, as it is dependent on widening of Centenary Motorway and Stafford Road.

Major risks

An assessment was made of how each network improvement option would perform in relation to four major risks, which have been identified in relation to the investigation being able to meet its overall objectives.

The four major risks identified were:

- Major Risk 1 – Increased demand for travel between regional centres would result in orbital/non-radial routes becoming increasingly important.
- Major Risk 2 – Significant increase in public transport mode share due to increase in road user costs would require investment in public transport rather than highways.
- Major Risk 3 – Investment in public transport could delay the need for highway investment which could yield higher economic benefits.
- Major Risk 4 – Employment self-containment forecast in western Brisbane would not materialise resulting in higher congestion on routes into CBD.

In relation to Major Risk 1, a number of network improvement options are orbital and therefore reduce this risk; these have been given a medium risk rating of 2. Although an orbital road, the Brisbane Valley Bypass is forecast to attract a low amount of traffic and therefore this option has been given a high risk rating of 1.

In relation to Major Risk 2, 'High' PT would provide a major investment in public transport services and infrastructure. 'Low' PT would also provide a significant, but lesser investment. A number of road network improvement options provide the opportunity to give greater priority to public transport either along each alignment or on competing, adjacent routes; these network improvement options have been given a medium risk rating of 2.

In relation to Major Risk 3, the same factors apply as in relation to Major Risk 2. In this case, growth in public transport use is seen as a risk; therefore, ratings are reversed.

In relation to Major Risk 4, those network improvement options which would provide additional capacity between western Brisbane and the CBD would reduce this risk and are given a medium risk rating of 2.

Economic development

An assessment was made of how the network improvement options would perform in relation to enhancing economic development. This was done by assessing how each option contributed towards providing improved transport access across the network for the movement of people and freight.

The combination of Inner Orbital, North West Transport Corridor, Northern Crosslink Corridor and West of Mt. Coo-tha Bypass would provide the greatest opportunity for improved transport access across the whole western Brisbane transport network.

Staging of infrastructure

An assessment was made of how each road option performs in terms of its ability to be staged. The staging of infrastructure is considered advantageous from the viewpoint of reducing overall project cost or fitting budget programs over time. West of Mt Coo-tha Bypass would have high potential in this regard. A number of other network improvement options would have a medium level of potential to be staged.

Private sector funding

An assessment was made of how each road option would perform in terms of its potential to attract private sector investment. This assessment is essentially determined by forecast patronage on each road option, as revenue from road projects is driven by patronage. As the combination of Inner Orbital and North West Transport Corridor as a Western Orbital plus Northern Crosslink Corridor is forecast to attract a significant level of patronage, these network improvement options have a high potential for attracting private sector investment.

Summary of strategic fit

Summarising the analysis of network improvement options against 'strategic fit' objectives, the key points to take forward are:

- 'High' PT would meet with the strategic Queensland Government objectives more effectively than 'Low' PT;
- 'High' PT represents a higher investment in better and more integrated public transport;
- However, by itself 'High' PT would not provide sufficient strategic benefits including:
    - Support economic development;
    - Provide for freight movement;
    - Provide an integrated transport hierarchy on the western Brisbane network; and
    - Provide significantly improved accessibility during non-peak periods, including weekends;
- Of the road options, the most effective in meeting Queensland Government objectives, delivering network integration and reducing investment risk would be Western Orbital (i.e. Inner Orbital plus North West Transport Corridor), Northern Link and Northern Crosslink Corridor. West of Mt. Coot-tha Bypass also scores well in some instances whilst Brisbane Valley Bypass and East-West Link do not meet these key objectives;
- Any combination of Northern Link, Western Orbital (Inner Orbital plus North West Transport Corridor), Northern Crosslink Corridor and West of Mt. Coot-tha Bypass would more effectively meet 'strategic fit' objectives than any one option on its own; and
- A strategy reliant on road improvements only would not meet the high demands on access to the Brisbane CBD during peak periods that would result from a market-driven CBD employment growth, compared with growth assumed in the Regional Plan.

9.5.3 Network social effects

Mobility

The qualitative assessment of mobility was made in regards to reduced reliance on cars and improved access to public and active transport options. Mobility also encompasses the community's perception toward safety for public transport modes, and relates to the social justice elements of transport access. In particular it relates to whether people on lower incomes or with mobility impairment will have more transport options available to them, and whether their transport costs will be decreased.

All options would offer an improvement for mobility by increasing the transport options in western Brisbane. Some options would have some minor effects through changes to existing links.

Amenity

The assessment of amenity included a wide range of indicators such as changes to visual amenity, increased ambient noise levels, light pollution at night, reduced air quality, and a reduction in people's perception of the pleasantness of the local environment. As the assessment was undertaken at a strategic level, the rating of the effects are preliminary and only at a project level could the impacts be more thoroughly analysed.

Nevertheless, at a high level the North West Transport Corridor, Northern Link and East-West Link options would potentially have an impact on amenity. Potential impacts could include noise levels leading to the requirement for significant noise mitigation structures. These could impact on views and cause overshadowing and psychological severance, impacting on the pleasantness of the property and area.

Access to public transport

The most significant means of improving access to public transport is to extend the public transport network into areas currently underserviced. However, due to the strategic nature of the study, that level of analysis was not conducted. Nonetheless, a qualitative assessment was made of improvements in public transport accessibility to be incorporated into the 'Low' PT and 'High' PT options. The 'High' PT option would represent a more substantial investment in public transport facilities, particularly in local walk/cycle/PT infrastructure. Therefore, the 'High' PT option would provide a greater improvement in public transport accessibility compared to the 'Low' PT option, both in terms of the amount of and the purpose of investment.

Based on the assessment above and using a rating of 1 to 3 (1 representing a low level of improvement to public transport accessibility and 3 representing a high level of improvement to public transport accessibility), the 'Low' PT option scores a rating of 2 whilst the 'High' PT option scores a rating of 3.

Investment in existing and new pedestrian and cyclist facilities

There are significant improvements proposed to the walk and cycle networks in western Brisbane as part of this investigation. It is recommended by this investigation that these improvements (common to both 'Low' PT and 'High' PT network strategy options) are incorporated in full as part of any strategy to be taken forward. On this basis, both 'Low' PT and 'High' PT network strategy options would score a high rating of 3 in terms of the level of investment in existing and new pedestrian and cyclist facilities.

Public security of existing and new public transport facilities

For the purpose of this strategic assessment, public security refers both to security of passengers and infrastructure from criminal acts. As a significant investment in public transport infrastructure and services, the 'High' PT network improvement option would provide a high level of improvement in public security. The 'Low' PT network improvement option would also provide a significant improvement in public security.

9.5.4 Network environmental effects

SEQ Regional Plan context

The overarching provision of the Regional Plan is the regional land use pattern. The regional land use pattern identifies land which is designated, and appropriate for, existing and future urban development, defined as the urban footprint. Urban development that is located outside of the urban footprint is considered inconsistent with the objectives of the SEQ Regional Plan.

The Regional Plan outlines a number of regional outcomes for the region. The Desired Regional Outcome for urban development within the Regional Plan aims to achieve:

'A compact and sustainable urban pattern of well planned communities, supported by a network of accessible and convenient centres close to residential areas, employment location and transport'.

To achieve this outcome, the Regional Plan identified a network of Regional Activity Centres. These Activity Centres are to accommodate a range of uses and develop as a focus for the region. Activity centres are to be connected centres supported by denser residential development and public transport. Similarly, knowledge hubs and industrial precincts have also been identified within the SEQ Regional Plan to accommodate economic development for the Region.

On the basis of the above, all options, except for the Brisbane Valley Bypass and the West of Mt. Coot-tha Bypass, support development and change in accordance with the regional land use pattern within the urban footprint and support the development of centres identified on the Regional Activity Centres network and knowledge hubs and industrial areas.

Community uses and spaces

This indicator was used to assess potential impacts on community facilities and spaces (including open spaces) as defined within the Brisbane City Plan. Community uses and spaces that are reflected through this indicator include parks, recreation areas, schools, churches, community halls, youth clubs, libraries, aged care and retirement facilities, hospitals and health care facilities and open space areas identified on the network of open spaces within the City Plan.

Given that most options are in a tunnel or along an existing or preserved transport corridor, the potential impact on community uses would be moderate to low and only a small amount of area may be affected. However, this would need to be further investigated at a project level.

Urban character and amenity

Such a measure is more easily assessed at a project level. Increased densities can require increased transport capacity to support the higher densities. High population growth can also promote urban sprawl. However, for the purpose of strategic network investigations the impact on urban amenity is considered higher the closer the scheme is located to the urban core, as density is generally accepted to increase with proximity to the urban core.

Environmentally sensitive areas

The assessment of environmentally sensitive areas was undertaken for those areas that are known to contain habitat for rare and threatened species of flora and/or fauna and included areas identified as containing essential habitat, habitat under BAMM (Biodiversity Assessment Mapping Methodology) or koala areas. These areas may also contain remnant vegetation or have conservation significance, i.e. a reserve or forest park.

Options that would have a major impact on environmentally sensitive areas are:

- Samford Valley Sub-Arterial;
- Moggill Pocket;
- West of Mt. Coot-tha Bypass; and
- Brisbane Valley Bypass.

Waterway crossings

Waterway crossings are abundant in SEQ. Transport corridors that cross waterways have a number of impacts on the environment. Waterway crossings were assessed based on the number of crossings and significance of the waterway being impacted.

Options that would have a major impact on waterways are:

- Samford Valley Sub-Arterial;
- Moggill Pocket;
- West of Mt. Coot-tha Bypass; and
- Brisbane Valley Bypass.

9.5.5 Network economic effects

Public transport integration with land use

An assessment was undertaken of how effectively each public transport network improvement option would achieve integration of public transport with land use. As a significant investment in public transport infrastructure and services, 'High' PT offers the potential for a significant improvement in integration of public transport and land use. 'Low' PT would also offer potential for improvement in this area.

It should be noted that a combination of Inner Orbital, Northern Link and East-West Link would offer significant potential for integration of land use with public transport, as these schemes would free up existing road space for buses.

Public transport reliability

A strategic, high level assessment has been made of the effect of each network improvement option on the reliability of public transport for passengers. In general, 'Low' PT represents a significant improvement in frequency of rail services (100 per cent to 300 per cent increase) compared to today's level of provision and a less dramatic improvement in frequency of bus services. 'High' PT represents a proportionately small incremental improvement in frequency of rail services but a significant, doubling of frequency in bus services compared to 'Low' PT.

In terms of rail travel time, there would be a 15–25 per cent improvement in travel times on rail in 'Low' PT compared to existing service provision. Travel times would remain the same in 'High' PT as 'Low' PT.

'Low' PT would also provide greater reliability (compared to today) on the key public transport corridors, as a result of investment in bus priority measures. 'High' PT would provide further incremental bus priority measures on key public transport corridors.

Other than public transport improvements, the combination of Inner Orbital, North West Transport Corridor and Northern Crosslink Corridor would have quite significant network-wide impacts on reducing traffic congestion and therefore on improving bus speeds/travel times.

Therefore, in terms of their effect on public transport reliability, the 'High PT', 'Low PT' and Inner Orbital/North West Transport Corridor/Northern Crosslink Corridor network improvement options (in that order) would have the most positive impact.

Congestion

An assessment was undertaken of the overall effect of each network improvement option on road congestion across the Brisbane road network. 'High' PT is forecast to have a significant impact across the Brisbane road network. The road network improvement options are forecast to have more localised impacts on reducing congestion, although the combination of Inner Orbital, North West Transport Corridor and Northern Crosslink Corridor would also have network-wide impacts. Figure 9.5 shows the effect of 'High' PT on congestion levels on the Brisbane road network. The measure used is the traffic volume divided by capacity (volume/capacity ratio).

Access to freight intermodal facilities

A qualitative assessment was undertaken of how well each road network improvement option performs in terms of providing improved access for freight to key freight facilities.

The key freight facilities which generate traffic within Greater Brisbane are considered to be Australia TradeCoast and facilities north and south of Brisbane including Acacia Ridge, Bromelton and Brendale. Ipswich is a major generator of freight traffic to and from the Australia TradeCoast.

Inner Orbital, North West Transport Corridor and Northern Crosslink Corridor would together operate as a system in providing new access to the Australia TradeCoast as well as improving north-south freight links around Brisbane.

Northern Link, in combination with other TransApex improvements, would provide improved access to Australia TradeCoast. West of Mt. Coot-tha Bypass and Brisbane Valley Bypass would provide improved north-south freight linkage.

Use of preserved corridors

An assessment was made of how each option would utilise preserved corridors. Three of the options utilise preserved corridors, i.e. the North West Transport Corridor, Samford Valley Sub-Arterial and Moggill Pocket. Note that no assessment was undertaken to determine whether the use of existing corridors has any economic advantage in comparison to the use of new corridors.

Bus average speed

Bus speeds are primarily influenced by the speed of general traffic, except where bus priority measures are provided which provide segregated road space for buses. In this latter case, buses would be able to travel at their free flow speed between stops to pick up or drop off passengers. Therefore, 'Low' PT would have a significant impact on improving bus average speeds (and also travel time) along Coronation Drive, Kelvin Grove Road, Waterworks Road and the Gympie Road corridor. In addition to these impacts, 'High' PT would further improve bus average speeds along Moggill Road to Kenmore, Stafford Road and potentially along the North West Transport Corridor.

Northern Link and Inner Orbital would also have a significant impact on improving general road travel conditions along Milton Road. Likewise, Inner Orbital and North West Transport Corridor would have a significant impact on improving road travel conditions along Metroad 5 and Gympie Road respectively. All these improvements would also have a significant impact on the reliability of bus services along these corridors.

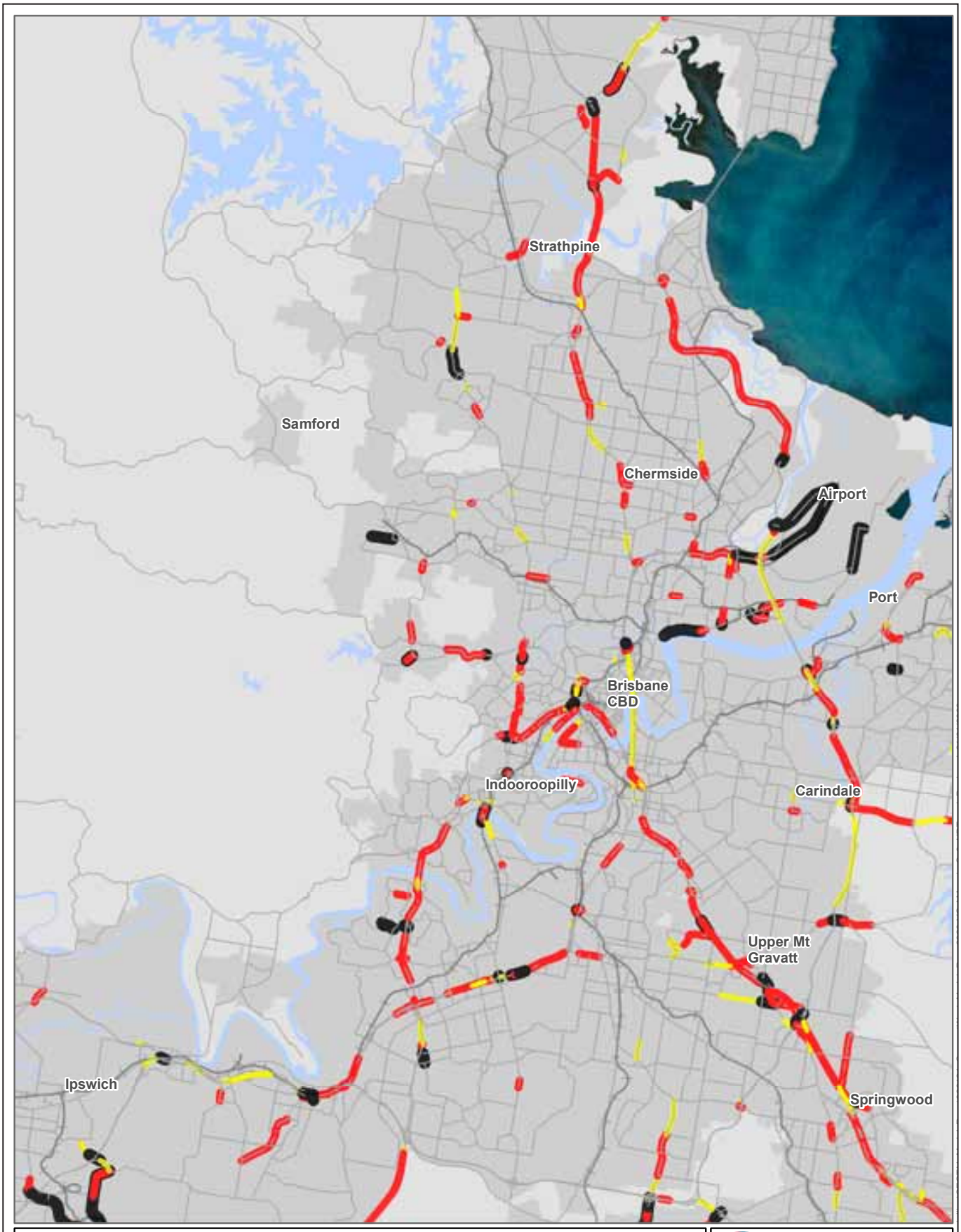
Therefore, in terms of their effect on bus speeds and travel times, the 'High' PT, 'Low' PT, Inner Orbital/North West Transport Corridor and Northern Link network improvement options (in that order) would have the most positive impact.

Rail reliability and frequency

'Low' PT would provide a significant improvement against this indicator compared to today's service provision, with over a doubling of frequency on the Ferny Grove and Ipswich rail lines and a quadrupling of frequency on the Caboolture rail line. 'High' PT would provide a further incremental improvement on top of this.

Rail average travel time

'Low' PT would provide a 15–25 per cent improvement in travel times compared to today's services on the Ferny Grove, Ipswich and Caboolture lines. Travel times would remain the same in 'High' PT as 'Low' PT.



Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

9.5.6 Corridor effects

Bus reliability

Table 9.4 shows a qualitative assessment of the performance of bus reliability in each of the key road corridors based on forecast changes in the level of general traffic congestion and operational road network performance. A high level rating system of 1 to 3 has been used, whereby a score of 1 indicates the network improvement option has a low beneficial or negative impact, a score of 2 indicates a medium beneficial impact and a score of 3 indicates a high beneficial impact.

There would be a high beneficial impact resulting from both 'Low' and 'High' PT along Coronation Drive, Kelvin Grove Road and Waterworks Road as these corridors are planned to have bus priority measures along their entire length as part of 'Low' PT. Northern Link is forecast to have a high beneficial impact along Coronation Drive and Milton Road. Inner Orbital is also forecast to have a high beneficial impact along Coronation Drive. The North West Transport Corridor is forecast to have a high beneficial impact along Gympie Road.

Table 9.4 Bus reliability along key corridors

	'Low' PT	'High' PT	Northern Link	Northern Crosslink Corridor	North West Transport Corridor	Toowong to Everton Park tunnel (Inner Orbital)	Samford Valley Sub-Arterial Corridor	East-West Link	Moggill Pocket Sub-Arterial	Brisbane Valley Bypass	West of Mt. Coot-tha Bypass
Coronation Drive	3	3	3	1	1	3	1	2	1	1	1
Moggill Road	1	1	1	1	1	1	1	1	1	1	1
Milton Road	1	2	3	1	1	2	1	2	1	1	2
Metroad 5	1	1	2	1	1	2	1	1	1	1	2
Centenary Motorway	1	1	1	1	1	1	1	1	2	1	1
Western Freeway	1	1	1	1	1	1	1	1	1	1	1
Gympie Road	1	1	1	1	3	1	1	1	1	1	1
Gateway Motorway	1	1	1	1	1	1	1	1	1	1	1
Inner City Bypass	1	1	1	1	1	1	1	1	1	1	1
Kelvin Grove Road	3	3	1	1	1	1	1	1	1	1	1
Stafford Road	1	1	1	1	1	1	1	1	1	1	1
Old Northern Road	1	1	1	1	1	1	1	1	1	1	1
Waterworks Road	3	3	1	1	1	1	1	1	1	1	1
Samford Road	1	1	1	1	1	1	1	1	1	1	1
Brisbane Valley Highway	1	1	1	1	1	1	1	1	1	2	1

Rating – Low beneficial or negative impact (1), medium beneficial impact (2), high beneficial impact (3) on reliability.

Impact on walking and cycling

Table 9.5 shows a qualitative assessment of the impact of each network improvement option on walking and cycling along a number of key road corridors. It is based on forecast changes in the level of general traffic volume along each corridor in each network improvement option. A high level rating system of 1 to 3 has been used, whereby a score of 1 indicates the network improvement option has a low beneficial or negative impact, a score of 2 indicates a medium beneficial impact and a score of 3 indicates a high beneficial impact.

Freight vehicle reliability/ average travel time

Freight vehicles on each corridor are subject to the same travel conditions as private vehicles, as freight and private vehicles share the same road space. Therefore, general road travel conditions (described earlier) apply equally to freight.

Table 9.5 Impact on walking and cycling along key corridors

	'Low' PT	'High' PT	Northern Link	Northern Crosslink Corridor	North West Transport Corridor	Toowong to Everton Park tunnel	Samford Valley Sub-Arterial Corridor	East-West Link	Moggill Pocket Sub-Arterial	Brisbane Valley Bypass	West of Mt. Coot-tha Bypass
Coronation Drive	3	3	3	1	1	2	1	2	1	1	1
Moggill Road	3	3	2	1	1	2	1	1	1	1	1
Milton Road	3	3	3	1	1	2	1	1	1	1	1
Metroad 5	3	3	2	1	1	3	1	1	1	1	2
Centenary Motorway	3	3	1	1	1	1	1	1	2	1	2
Western Freeway	3	3	1	1	1	1	1	1	1	1	2
Gympie Road	3	3	1	2	3	1	1	1	1	1	1
Gateway Motorway	3	3	1	1	1	1	1	1	1	1	1
Inner City Bypass	3	3	1	1	1	2	1	1	1	1	1
Kelvin Grove Road	3	3	1	1	1	1	1	1	1	1	1
Stafford Road	3	3	1	3	1	1	1	1	1	1	1
Old Northern Road	3	3	1	1	2	1	1	1	1	1	1
Waterworks Road	3	3	1	1	1	1	1	1	1	1	1
Samford Road	3	3	1	1	1	1	1	1	1	1	2
Brisbane Valley Highway	3	3	1	1	1	1	1	1	1	2	1

Rating – Low beneficial or negative impact (1), medium beneficial impact (2), High beneficial impact (3) on reliability

9.6 Quantitative assessment of options

Options were assessed quantitatively by converting effects to monetary values and comparing these values to the 2026 Base Case (the 'Low' PT Option). All monetary values reported in Table 9.6 are therefore incremental to the 2026 Base Case ('Low' PT Option).

9.6.1 Summary of effects

The monetary assessment of 'High' PT, and the range of road network improvement options comprises social, environmental and economic and financial effects. These effects are combined to form a single ratio between benefits and costs for each network improvement option. The results of the assessment are summarised in Table 9.6. The following sections provide a description of the results provided in the table.

9.6.2 Network social effects

Accident cost

An assessment was made of the cost to society of accidents forecast on the road network in each network improvement option.

'High' PT is forecast to have by far the greatest effect on reducing accidents and the related costs to society of accidents. The other network improvement options are forecast to have a minor impact, either a slight increase or decrease in the cost to society of accidents, due to a slight increase or reduction in accidents respectively.

9.6.3 Network environmental effects

Greenhouse gas emissions

Greenhouse gas emissions were assessed at a link level within the SEQSTM model, by firstly calculating fuel consumption using assumptions contained in Austroads guides and then converting to greenhouse gas emissions. Total link fuel consumption was calculated by multiplying unit fuel consumption for each network link by the length of the link and total demand on the link. The level of greenhouse gas emissions was converted to a monetary value based on a greenhouse gas emission cost of $40 per tonne.

The forecast annual greenhouse gas emissions generated in each network improvement option on the Brisbane network indicates the following:

- The most important factor in affecting greenhouse gas emissions is the level of public transport investment, as the 'High' PT network improvement option shows significantly greater greenhouse gas emission savings than all other network improvement options; and
- All the road network improvement options generate relatively low savings in greenhouse gas emissions.

Table 9.6 Summary of quantitative effects of network improvement options ($m 2005)

	'High' PT	Northern Link	Western Orbital^	Mount Coot-tha Bypass	Brisbane Valley Bypass	Moggill Pocket	East-West Link	Northern Link + Northern Crosslink Corridor*	Western Orbital^ + Northern Crosslink Corridor
Social									
Annual crash cost savings ($)	43.59	-0.02	-1.12	0.09	0.18	-0.02	0.23	-2.96	-2.97
Environment									
Annual greenhouse gas emission savings ($)	15.64	2.60	2.50	1.78	0.05	0.13	1.60	2.46	2.74
Annual benefit of change in air quality ($)	36.54	0.04	-0.95	-0.05	0.29	0.38	0.41	-3.78	-3.22
Annual benefit of change in landscape impact ($)	3.81	0.02	-0.10	-0.03	0.07	0.14	0.10	-0.72	-0.52
Annual benefit of change in water impact ($)	5.52	0.03	-0.15	-0.05	0.11	0.22	0.15	-1.13	-0.80
Economic									
Annual private vehicle occupant time savings ($)	415.93	69.11	101.96	81.24	7.02	6.32	37.01	108.04	121.02
Annual private vehicle operating cost ($)	-170.66	-11.73	-8.63	-7.99	-0.38	0.02	-7.70	-6.78	-7.14
Annual public transport passenger time savings ($)	82.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual public transport vehicle operating cost ($)	+65.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual freight vehicle time savings ($)	161.33	35.56	53.95	42.34	3.73	3.19	18.50	55.25	62.84
Annual freight vehicle operating cost ($)	-62.81	-26.39	-39.89	-27.04	-2.58	-2.92	-15.68	-31.03	-42.14
Financial									
Infrastructure capital cost ($)	2,360.00	2,537.68	7,109.36	6,302.19	3,202.63	1,259.95	4,676.19	6,178.36	9,209.67
Annual road recurrent cost ($)	1.96	12.28	36.03	21.98	7.16	3.64	24.56	25.61	48.95
Rolling stock capital cost – rail ($)	770.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rolling stock capital cost – bus ($)	195.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual pt operating subsidy ($)	31.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: The values are incremental to the 2026 Base Case and are in $2005.

* Includes North West Transport Corridor and Everton Park to Kedron Bus Lanes.

^ Combination of Inner Orbital and North West Transport Corridor.

Air quality, landscape and water

It is usual to assess air quality, landscape and water quality impacts from transport infrastructure changes at a project level. Strategic investigations are concerned with network-wide effects and therefore this assessment used accepted relationships between those effects and changes in travel on the network from previous research.

The change in private and freight vehicle kilometres travelled in each network improvement option compared to the base option was used as an indicator to calculate the effect of each network improvement option on air quality, landscape and water. A monetary value was applied to the change in private vehicle kilometres travelled, derived from externality user cost rates for passenger vehicles (cents per vehicle km). Monetary values have been applied to freight vehicles, based on net tonne vehicle kilometres travelled by light, medium and heavy commercial vehicles respectively.

The monetary benefit of changes in private and freight vehicle kilometres travelled on air quality, landscape and water in comparison to the 2026 Base Case indicates the following:

- The most important factor in affecting air quality, landscape and water is the level of public transport investment, as 'High' PT shows significantly greater savings than all other network improvement options; and
- All the road network improvement options generate relatively low savings or dis-savings.

The monetary benefit of changes in private and freight vehicle kilometres travelled on air quality, landscape and water in comparison to the 2026 Base Case was also forecast within western Brisbane only. In contrast to Brisbane, it indicates lower benefits/higher disadvantages incurred in all network improvement options compared to Brisbane as a whole. Therefore, shorter distances are being travelled outside western Brisbane in each network improvement option, with consequently better impacts on air quality, landscape and water.

Summary

Summarising the performance of each network improvement option against monetary environmental effects, the key point to take forward is 'High' PT meets these objectives more effectively than 'Low' PT, due to a significant reduction in private vehicle kilometres travelled in the 'High' PT option.

9.6.4 Network economic effects on public transport

Passenger time cost

An assessment was made of the incremental passenger time benefit derived from improvements to public transport in both 'Low' PT and 'High' PT network improvement options. This assessment took into account public transport corridor improvements identified as part of both 'Low' PT and 'High' PT network improvement options and potential future improvements to the remainder of the western Brisbane public transport network.

It is forecast that the 'High' PT network improvement option would generate in the order of $80m of annual travel time savings in 2026 over 'Low' PT.

Public transport vehicle operating costs

An assessment was made of public transport vehicle operating costs within western Brisbane in both the 'Low' and 'High' PT network improvement options (refer Figure 9.6). This considered potential changes to the structure of the bus route network and likely service improvements required to cater for demand for public transport services in 2026.

For the purposes of the assessment, an incremental public transport vehicle operating cost was calculated for the 'High' PT network improvement option. No account was taken of incremental public transport vehicle operating cost in the 'Low' PT network improvement option as costs associated with 'Low' PT were assumed to be sunk costs within the 2026 Base in the same way that highway costs associated with SEQIPP are sunk within the 2026 Base.

9.6.5 Network economic effects on private transport

Private vehicle occupant time cost

Forecast annual time savings in each network improvement option indicate the following:

- The most important single factor in affecting travel time savings is the level of public transport investment, as the 'High' PT network improvement option shows significantly greater time savings than all the road network improvement options;
- Inner Orbital shows higher time savings than both Northern Link and a West of Mt. Coot-tha Bypass. Inner Orbital would achieve even higher time savings if combined with Northern Crosslink Corridor; and
- The least travel time savings are achieved by Brisbane Valley Bypass, Moggill Pocket and East-West Link.

Private vehicle operating cost

Unit vehicle operating costs were calculated at a link level within the SEQSTM model, using assumptions contained in Austroads guides. Total link vehicle operating cost was calculated by multiplying unit vehicle operating cost for each network link by the length of the link and total demand on the link.

Annual private vehicle operating costs forecast in each network improvement option in Brisbane indicate the following:

- The most important single factor in affecting total vehicle operating cost savings is the level of public transport investment, as 'High' PT shows lower vehicle operating costs than all other network improvement options; and
- All the road network improvement options generate relatively low savings in private vehicle operating cost.

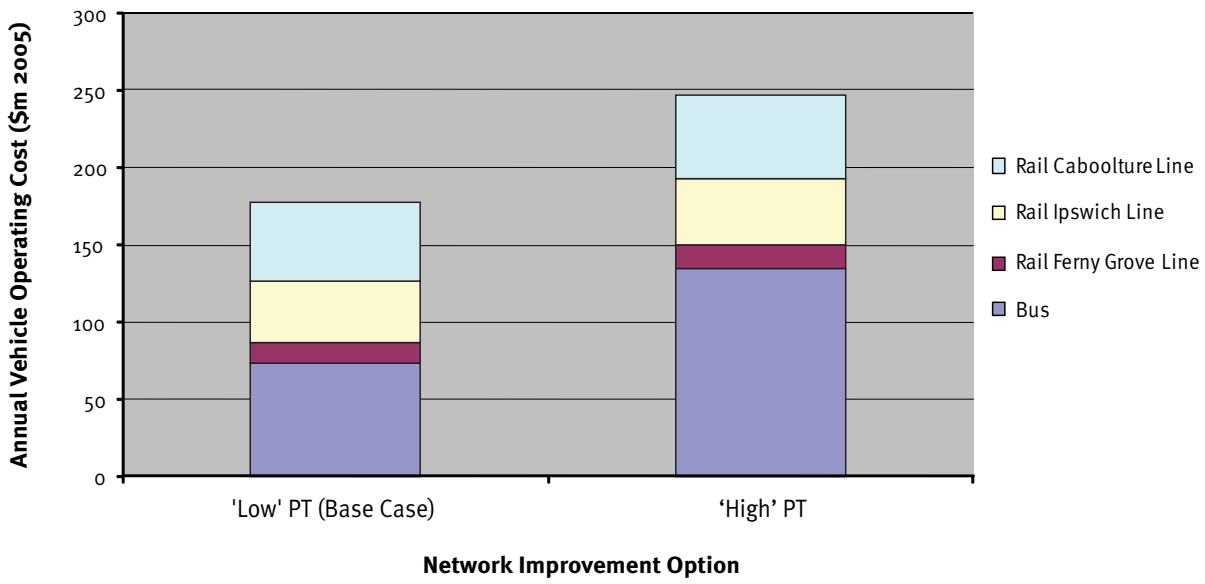


Figure 9.6 Annual public transport vehicle operating costs in western Brisbane ($m 2005), 2026

9.6.6 Network economic effects on freight transport

The following assessment is based on the results of the SEQSTM analysis, which provides a broad indication of likely effects to freight vehicles using the network at peak periods.

Freight vehicle occupant time cost

Forecast annual freight time savings in each network improvement option indicate the following:

- The most important factor in affecting travel time savings is the level of public transport investment, as 'High' PT shows significantly greater time savings than all other network improvement options; and
- The lowest travel time savings would be achieved by Brisbane Valley Bypass, Moggill Pocket and East-West Link.

Freight vehicle operating costs

The same methodology was used to calculate vehicle operating costs for both private and freight vehicles.

Forecast annual freight vehicle operating cost savings in each network improvement option indicate the following:

- The most important factor in affecting vehicle operating cost savings is the level of public transport investment as 'High' PT shows significantly greater vehicle operating cost savings than all other network improvement options;
- Inner Orbital shows higher operating cost savings than both Northern Link and a West of Mt. Coot-tha Bypass; and
- The least operating cost savings would be achieved by the Moggill Pocket and East-West Link network improvement options.

9.6.7 Network financial effects

Strategic estimates have been made of the capital and operating costs of each network improvement option.

The combination of Inner Orbital, North West Transport Corridor and Northern Crosslink Corridor is estimated to incur the highest overall cost.

9.7 Pair-wise comparison of options

Following the detailed analysis of individual network improvement options, the options with the highest potential were compared against their most appropriate alternative in a pair-wise assessment.

Hence the following pair-wise comparisons have been performed:

- 'Low' PT and 'High' PT;
- West of Mt. Coot-tha Bypass and Brisbane Valley Bypass;
- Western Orbital (Inner Orbital plus North West Transport Corridor) and West of Mt. Coot-tha Bypass; and
- Northern Link and Inner Orbital.

This pair-wise comparison showed that:

- 'High' PT is preferable to 'Low' PT;
- The first-choice road investment is Western Orbital; and
- The second-choice road investment is Northern Link.

The reasons for this are, firstly, that 'High' PT would generate network-wide congestion relief benefits compared to 'Low' PT and would align better with social and environmental objectives.

Secondly, a Western Orbital would provide more network-wide benefits than Northern Link. Northern Link would provide greater congestion relief on Coronation Drive (-23 per cent with Northern Link vs. -14 per cent with Western Orbital) and Milton Road (-61 per cent with Northern Link vs. -8 per cent with Western Orbital) than a Western Orbital. However, Western Orbital would also significantly reduce congestion along Lutwyche Road (-16 per cent), Gympie Road (-24 per cent), Metroad 5 (-34 per cent) and Old Northern Road (-25 per cent).

By contrast, Brisbane Valley Bypass would have no significant impact on congestion across Brisbane while the West of Mt. Coot-tha Bypass reduces congestion on Metroad 5 north of Waterworks Road (-18 per cent), Moggill Road (-10 per cent), Centenary Motorway (-4 per cent), and in localised areas to the north and south of Brisbane.

Assuming that the cost of providing all three network improvement options is considered affordable, one of the potential strategy directions to be taken forward from the preliminary investigations could include all three options. Each network improvement option has been shown through this assessment to meet different transport objectives. Therefore a strategy including 'High' PT, Northern Link and a Western Orbital (combination of Inner Orbital and North West Transport Corridor) would have the effect of meeting the widest range of transport objectives identified as part of this study.

'Low' PT short-comings

As a result of growth in western Brisbane, the 'Low' PT scenario is forecast to be unable to cater for a number of critical travel demands. The requirement to cater for these travel demands is the key transport planning issue for western Brisbane:

- Strong demand between north of Brisbane and CBD;
- Relatively small demand for bypassing Brisbane between west and north;
- Strong demand between west of Brisbane and CBD; and
- Less strong but significant demand between west of Brisbane and Australia TradeCoast.

'Low' PT is also forecast to be subject to congestion on the road network. Managing increasing congestion is another important transport planning issue for western Brisbane. Features of 'Low' PT are:

- High use of CBD rail services and significant increase in peak services are required, especially to the CBD, to reduce road congestion during commuter peaks;
- High use of Gympie Road and Gateway Motorway;
- High congestion along certain sections of Gympie Road and Gateway Motorway;
- Gateway Motorway does not provide a direct route into CBD;
- High use of Centenary Motorway and Ipswich Motorway;
- High congestion along certain sections of Centenary Motorway and Ipswich Motorway;
- High use of Coronation Drive;
- High congestion along Coronation Drive and certain sections of Milton Road;
- High demand along sections of road between the CBD and Australia TradeCoast; and
- High congestion along certain sections between the CBD and Australia TradeCoast.

'High' PT option

The 'High' PT investment option would perform best in most respects, except certain aspects of strategic fit, economic development and support for the freight network.

Northern Link

Northern Link would also perform well in most respects and has the highest economic return for its investment. It also provides significant opportunities to assist bus transport.

Brisbane Valley Bypass

Brisbane Valley Bypass would do little to add value to the needs of the network up to 2026.

West of Mt. Coot-tha Bypass

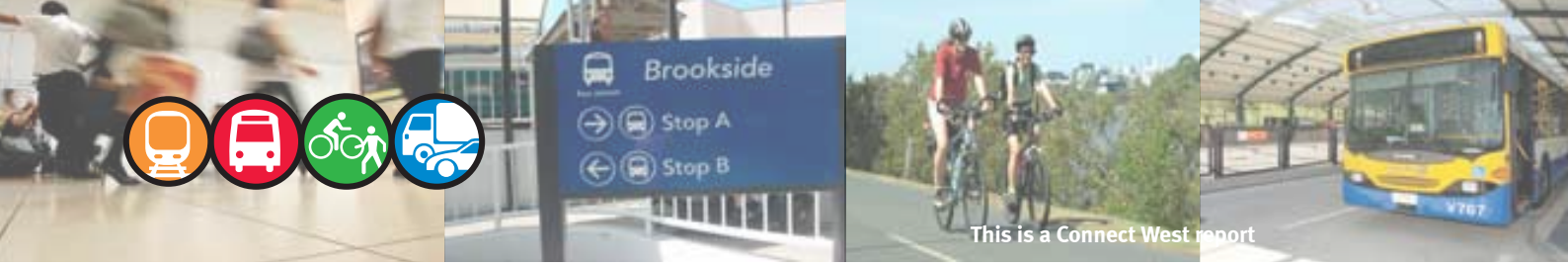
A bypass to the west of Mt. Coot-tha would perform better than a bypass in Brisbane Valley in terms of the network development options. It would not however relieve network congestion on the existing network over the period to 2026.

Western Orbital

The Western Orbital (combination of Inner Orbital and North West Transport Corridor) would provide the best strategic fit to the network and adds considerable value to developing a road hierarchy and assisting public transport, including supporting public transport in the North West Transport Corridor and Gympie Road corridors.

East-West Link

East-West Link on its own does not improve traffic conditions and its biggest impact would only be on Milton Road. However, Northern Link has more significant impact on traffic on the local network. The East-West Link would have a low strategic fit due to its low impact on improving road network integration and its high risk in relation to increased public transport mode share.



9.8 Key findings

From a multi-criteria assessment of the full list of options, key findings emerged:

(i) The future (2026) low demand for travel between the west/south-west and north/north-west would not justify investing in a far western bypass (Brisbane Valley), in the period up to 2026 with the currently planned land use (SEQ Regional Plan).

For this reason an outer western bypass was not investigated further.

(ii) Under all scenarios and strategies, the **Ipswich and Ferny Grove rail lines will remain the backbone of the transport network in western Brisbane, especially for peak period journeys to the CBD**. A metro-style service would provide significant operational and capacity benefits using existing network assets.

(iii) An effective doubling of public transport use in 2026 compared with the 2026 Base Case **would provide significant congestion benefits during peak hours, particularly on routes to the CBD**.

Increasing public transport mode share by itself would not satisfy strategic network development objectives, assist freight and economic development, or provide satisfactory off-peak and weekend levels of service and improved accessibility across western Brisbane.

(iv) The continuing low levels of existing investment in walking and cycling and the relatively poor existing levels of service and facilities, would not contribute significantly to satisfy social and sustainability objectives or to reducing dependence on motor cars for local trips.

A significant increase in investment in active transport would be required to make any significant difference to travel behaviour.

(v) An improved (and necessary) regional road hierarchy in western Brisbane **would need either a western bypass or a Western Orbital, in addition to Northern Link. East-West link would not be required under such a scenario.**

(vi) Increasing levels of bus and rail passenger demand and traffic volumes on the network under all scenarios tested, **would require a significant number of network improvements common to all future scenarios**.

The following conclusions can be drawn:

(i) 'Low' PT, that is a future with public transport investment but no further major road investment in western Brisbane, would not be enough to enable efficient social and economic development to take place, nor would it service the expected population increase in SEQ. 'Low' PT in itself would not satisfy any of the network objectives, including environmental sustainability.

(ii) A western bypass (Brisbane Valley and West of Mt. Coot-tha) would be unacceptable in terms of its impact on land use and the current Regional Plan (i.e. it would promote urban development outside the planned urban footprint). Furthermore, the future (2026) demand for a south-west to north movement would be equivalent to a relatively small number of trips of between 2,000 to 6,000 vehicles a day, depending on alignment and interchange points.

Importantly, a western bypass would not provide significant relief to congestion on the existing network, neither would it satisfy network objectives very well, including value for money. The cost of a western bypass would be at least in the same order of magnitude as the Western Orbital but with only a third of the forecast traffic volume (see Table 9.7). However, a western bypass may be required over the longer term, i.e. beyond 2026 when the network cannot cope with the longer term population growth and urban development.

(iii) A large number of network improvement options would be common to any scenario, given the expected increase in population and employment development in western Brisbane over the next 10–20 years. The network strategy that best satisfies the network development objectives, should also accommodate expected changes to the Regional Plan, that is towards a more compact city.

Table 9.7 Comparative average daily traffic volumes for 2026

	Brisbane Valley Bypass	West of Mt. Coot-tha Bypass	Western Orbital	Northern Link
2026 forecast (24-hour)	5,000	25,000	80,000	85,000

Source: SEQSTM, untolled.

As a consequence of the above conclusions on the western bypass options, on 3 April 2008, the Deputy Premier and Minister for Infrastructure and Planning, The Honourable Paul Lucas and the Minister for Transport, Trade, Employment and Industrial Relations, The Honourable John Mickel, announced by media realease (see box) that the Brisbane Valley and West of Mt. Coot-tha bypass options had been ruled out.

They also announced that the public transport option from Indooroopilly to Dutton Park had been ruled out (refer Chapter 8.6.2).

Media release by Deputy Premier and Minister for Infrastructure and Planning The Honourable Paul Lucas and the Minister for Transport, Trade, Employment and Industrial Relations The Honourable John Mickel on Thursday, April 03, 2008.

New options for Brisbane's transport future

The State Government has ruled out building a road bypass west of Brisbane.

But Acting Premier Paul Lucas today said it would continue to investigate a range of projects including new tunnels, new public transport options and new roads on preserved corridors as part of its Western Brisbane Transport Network Investigation.

Launching the next stage of the study with Minister for Transport John Mickel, Mr Lucas said the State Government had ruled out two surface road options for any western bypass because of low traffic volumes but would investigate a tunnel closer to the city as part of a long term alternative.

Mr Lucas said while none of the projects had been committed to by the State Government and most would be long term, it was important to talk to the community and begin proper planning as soon as possible.

"The State Government is planning improvements for 2026 and beyond and this is an important opportunity for communities to have their say about western Brisbane's transport future," Mr Lucas said.

"The numbers for a western bypass simply do not stack up but we are actively looking at a range of options that will make a significant difference to traffic and public transport in South East Queensland in the future."

"Keeping Queensland moving is important to the State Government, which is why we're spending $100 million a week on building and maintaining our roads, railways, busways and ports."

"That funding is delivering projects like the Gateway upgrade, the Tugun Bypass and the Inner Northern Busway."

"But if we're going to adequately deal with the extra 1,000 people a week coming to South East Queensland, we need to look at options for the longer term."

Major options in the study that would now be considered further include:

- A future tunnel from Toowong to Everton Park (between the Western Freeway and Stafford Road);
- A future road link from Stafford to Aspley (Trouts Road Corridor) that would connect with the Toowong to Everton Park tunnel;
- Upgrading Stafford Road between Everton Park and Kedron, including constructing a tunnel for private vehicles while public transport priority would use Stafford Road; and
- Protecting road corridors already preserved and planning future road upgrades to service Samford Valley and Moggill.

"I want to make it clear that these are long term options and will be subject to further analysis of traffic volumes, engineering and environmental considerations, costings and public consultation," Mr Lucas said.

"This investigation consolidates many studies done in the past which have identified transport corridors, some of which, including the 8km corridor between Gympie Road at Carseldine and Stafford Road at Everton Park; the 13km corridor from Ferny Grove to Samford; and 19km corridor between the Warrego Highway, North Tivoli and the Centenary Highway at Fig Tree Pocket, are already preserved."

"Connecting people to where they live, work, study and play is central to our options planning for western Brisbane. We are considering all types of transport options – walking, cycling, public transport, roads and freight," Mr Lucas said.

Mr Lucas said work already done by study consultants Connect West showed neither of the surface road western bypass options was viable because of low traffic volumes and constraints from the regional plan.

"Even in 20 years – with the expected growth it would only carry from as low as 5,000 vehicles a day on one option to 25,000 vehicles on another."

"But given that's only a quarter of the number of vehicles using roads like the Ipswich Motorway and the Gateway every day, it's just not feasible."

"And in terms of vehicles using the road as an actual bypass – i.e. travelling its entire distance – the numbers range from as low as 1,200 a day to a maximum of 6,000 a day."

Mr Lucas said the State Government had also ruled out further study into a public transport tunnel link from Indooroopilly to Dutton Park given a full busway link from the city to the university would be complete by 2010, despite the option being canvassed in some newsletters.

Minister for Transport John Mickel asked for the public to help shape the vision for future transport in Brisbane's west.

"It is vital that local residents give feedback on the transport options being investigated during April and May. Public comment helps us to plan for the future and to determine the best combination of transport options for this area."

Mr Mickel said advertisements signalling the start of community consultation would begin late next week. These will include details of the transport options for western Brisbane under consideration, and where the public can find further information.

"Details of the options will also available online, and I encourage everyone, but particularly residents of western Brisbane, to give us your feedback," Mr Mickel said.

The public consultation ends on May 31, 2008, for more details visit www.wbtni.net.au or phone the Western Brisbane Transport Network Investigation hotline on 1800 636 896.

10.0 Road network and freight investigations

10.1 Introduction

In order to understand the operational issues of the transport network and the constraints faced by growing private vehicle demand on the network, investigation into the existing road transport network with respect to traffic, safety and performance was carried out. Further, by identifying the specific traffic issues across the network, the effectiveness of each strategic network improvement option was better defined and their alternatives evaluated.

The scope of the road network analysis was based on the observed existing condition of the road transport network within western Brisbane and establishing those capacity constraints on the existing strategic road network which would be deemed as essential to upgrade in order to maximise the efficiency of the existing network in light of future demand. This can be considered as at least a do-minimum scenario. Following from that, those strategic network improvement options which have the potential to address these existing network issues were identified, and modelled on a 2026 network.

Data on freight movement on the network is difficult to find. The basis of the freight investigation was a synthetic analysis of freight vehicle demand in vehicle kilometres of travel in each road corridor, based upon existing land use/economic relationships along the corridor and on forecasts of changes in the corridor over time.

10.2 Strategic road corridors

The strategic road network within western Brisbane consists of eight key radial and orbital arterial or motorway corridors. While generally local or sub-regional in function, many of the corridors play a dual role of serving local private and public transport demand together with forming part of the regional transport network catering for regional traffic demand. The eight key corridors considered under this analysis are as follows:

1. Moggill Road/Coronation Drive – Moggill Road/ Mt. Crosby Road to Coronation Drive/Hale Street
2. Centenary Motorway/Milton Road – Centenary Motorway/Ipswich Motorway to Milton Road/ Petrie Terrace
3. Metroad 5 Corridor – Frederick Street to South Pine Road/Stafford Road
4. Stafford Road Corridor – South Pine Road to Gympie Road
5. Old Northern Road Corridor – South Pine Road/ Stafford Road to Youngs Crossing Road/ Dayboro Road
6. Kelvin Grove/Enoggera/Samford Road Corridor – Kelvin Grove Road/Musgrave Road to Samford Road/ Mt. Glorious Road
7. Waterworks Road Corridor – Musgrave Road/ Hale Street to Waterworks Road/Settlement Road
8. Gympie Road Corridor – Lutwyche Road/ Horace Street to Gympie Arterial Road/Gateway Motorway

These eight key corridors were assessed through desktop and field inspection and public comment to determine the existing and possible future strategic network issues to be addressed.

10.3 Analysis methodology

10.3.1 Road network

Peak period and daily traffic volumes, accident data and performance data were extracted from relevant State and local traffic count databases over recent years.

The analysis of levels of service and capacity are Austroads equivalent, generally described in terms of parameters such as speed and travel time, degree of saturation and safety. These parameters, combined with field observations, provided a basis for the assessment of identifying existing network issues.

While the existing function of the road guided the assessment for possible need for an immediate upgrade, the SEQSTM was used to predict the future growth on the network and indicate the scale of works required under various strategic network improvement options. Generally, the process was undertaken as a predict-and-provide strategic analysis.

10.3.2 Freight analysis

A factor modelled approach was used to predict changes in freight movement Vehicle Kilometres Travelled (VKT) in each corridor.

The freight factor model uses published ABS and other verified data sources to apply relationships between general economic activity and population growth rates to current freight activity to deduce a causal relationship. This relationship is then extended to forecast future freight activity as a function of expected economic and population growth over the period to 2026.

10.4 Network benefits on key corridors

The eight key corridors were assessed in light of the existing and projected issues on the road network and the effects of the strategic network improvement options. The results of this analysis were compiled into a Road Network Improvement Program (RNIP) outlining a high level list of projects deemed necessary based on the 2026 Base Case and future strategic network improvement options.

Due to the strategic nature of the investigation, the assessment is only indicative. While a comprehensive list of projects was developed, this should not be considered exclusive or definite and must be considered in the context of the strategic planning process. Furthermore, detailed analysis would need to be undertaken on the corridors to confirm extent of works required to meet demand. Detailed analysis of each strategic network improvement option would also be required to confirm the effectiveness of the option and the details of its connections.

The RNIP is an indicative program of works in the case that no strategic network improvement options are delivered or a do-minimum scenario occurs. In all circumstances the upgrade would be along the existing surface corridor and in most circumstances would result in significant property impacts due to the constrained nature of the corridors and lack of access control from adjacent developments. This would cause high social impact and result in limited regional network benefits.

As this is a strategic planning study, the level of analysis has not included local traffic modelling to confirm the extent of upgrade or their benefits.

The RNIP table only addresses existing and projected strategic performance issues and does not take into account policy on adequate standard according to road function and hierarchy, and levels of safety (although safety is considered inherent in the reduction of congestion). In this regard, corridors may still have to be protected for upgrade but consideration would have to be given to the function of the existing road in light of any strategic network improvement option and therefore their priority.

10.5 Network upgrade alternatives

An evaluation was carried out on the traffic effects of the strategic network improvement options on the eight existing key road transport corridors in western Brisbane.

Table 10.1 highlights key strategic network improvement options tested and their effectiveness to relieve issues on the eight existing key transport corridors. Complimentary options have been assessed in combination (i.e. Inner Orbital (IO) and North West Transport Corridor (NWTC)). Those items checked identify that the option would reduce the volume of traffic at those points in the network and perhaps avoid the need for an upgrade.

As can be seen from the results, individual options do not address all network issues. Only in combination with each other and together with public transport improvements could some of the performance issues on the existing key corridors be addressed.

The benefit of a particular strategic network improvement option is the ability to avoid widening of an existing corridor for general traffic and the significant environment, both built and natural, and social impacts associated with that. The alternative to the strategic network improvement options is the RNIP.

While it is considerably less costly in most circumstances to upgrade the existing corridor for private vehicles, it may not provide the same level of benefit and would not adequately meet the objectives of the strategic network improvement options delivering sound network structure through a high quality primary motorway network with sustainable capacity for the future. Further, there are significant direct environmental and social impacts associated with widening the existing roads for general purpose traffic together with the indirect impacts of additional traffic that the upgrades could attract.

High investment in public transport may reduce congestion along some corridors, enough to avoid the need to widen for general purpose capacity. This can be seen particularly along such corridors that are typically radial into the CBD like Kelvin Grove Road and Musgrave Road/Waterworks Road. Further analysis would be required to determine if existing road capacity could be captured for bus priority or if additional capacity would need to be provided to make the bus transport efficient.

In some circumstances a strategic network improvement option may significantly reduce the demand on an existing competing corridor to create opportunities for public transport within that corridor through bus priority. For instance, this can be seen with an option including the North West Transport Corridor. The traffic on Gympie Road is significantly reduced avoiding the need to widen for general traffic. This could provide the opportunity to deliver bus lanes or even busway within the Gympie Road corridor. A similar effect could be generated by Northern Link in providing opportunity for bus priority along Coronation Drive.

In the case of the Centenary Motorway, under the 2026 Base Case, upgrading to six lanes as identified in SEQIPP may be sufficient to meet the demand in 2026. However, the delivery of either Northern Link or the Inner Orbital and North West Transport Corridor may require further capacity improvements on the Centenary Motorway.

Table 10.1 Network advantage of strategic network improvement options on the Road Network Improvement Program

RNIP				Options								
Corridor	Road	Section	Details	Base Case (LPT)	'High' PT	Northern Link	NWTC + NCC + NL	IO+NWTC	MP	East-West Link	MCB	BVB
Moggill Road/ Coronation Dr	Moggill Rd	Mt Crosby Rd to Pinjarra Rd	Upgrade to 4 lanes		✓				✓		✓	
		Kilkivan Av to Kenmore Rd	Upgrade to 4 lanes						✓			
		Marshall Ln to Western Fwy	Upgrade to 6 lanes						✓			
		Western Fwy to Jephson Rd	Upgrade to 6 lanes			✓	✓					
		Jephson Rd to Coronation Dr	Toowong Bypass			✓	✓					
Centenary Motorway/ Milton Rd	Centenary Mwy	Ipswich Mwy to Brisbane River	Upgrade to 8 lanes	✓	✓				✓		✓	✓
	Western Fwy (Centenary Mwy)	Brisbane River to Toowong Roundabout	Upgrade to 8 lanes	✓	✓						✓	✓
		Toowong Roundabout	Intersection upgrade			✓	✓	✓				
	Milton Road	Frederick St to Hale St	Upgrade to 6 lanes		✓	✓	✓	✓		✓		
Metroad 5	Frederick St/ Rouen Rd	Milton Rd to Latrobe Tce	Upgrade to 4 lanes					✓				
	MacGreggor Terrace/Jubilee Tce	LaTrobe Tce to Coopers Camp Rd	Upgrade to 4 lanes					✓				
	Jubilee Tce	Coopers Camp Rd to Stuart Rd	Upgrade to 4 lanes					✓				
		Waterworks Rd Intersection	Intersection upgrade									
	Wardell St	Stuart Rd to Samford Rd	Intersection upgrades					✓				
		Samford Rd	Intersection upgrade					✓				
	South Pine Rd	Samford Rd to Stafford Rd	Intersection upgrades					✓				
		Stafford Rd	Intersection upgrades				✓	✓				
Stafford Rd	Stafford Rd	South Pine Rd to Webster Rd	Upgrade to 6 lanes				✓	✓				
Old Northern Rd	South Pine Rd	Stafford Rd to Keona Rd	Intersection upgrades		✓		✓	✓				
Kelvin Grove/ Enoggera/ Samford Rd	Kelvin Grove Rd	Musgrave Rd to Herston Rd	Upgrade to 6 lanes		✓							
	Enoggera Rd	Newmarket Rd & Baradine St	Intersection upgrades		✓			✓				
		Samford Rd	Intersection upgrades		✓			✓				
	Samford Rd	Pickering St	Intersection upgrades		✓							
Waterworks Rd	Musgrave Rd	Petrie Tce to Enoggera Tce	Upgrade to 6 lanes		✓							
	Waterworks Rd	Enoggera Tce to Payne Rd	Upgrade to 4 lanes		✓							
Gympie Rd	Gympie Rd	Stafford Rd to Hamilton Rd	Upgrade to 8 lanes		✓		✓	✓				
		Hamilton Rd to Beams Rd	Upgrade to 8 lanes				✓	✓				
		Beams Rd	Intersection upgrades				✓	✓				

NWTC = North West Transport Corridor
NCC = Northern Crosslink Corridor
NL = Northern Link
IO = Inner Orbital
MCB = West of Mt. Coot-tha Bypass
BVB = Brisbane Valley Bypass
MP = Moggill Pocket Sub-Arterial

10.6 Freight investigation

10.6.1 Background

Freight activity is an induced demand. It is dependent on general economic activity and household consumption. The Department of Transport and Main Roads Freight Demand Study (2004) estimated that around 23% of total freight moved results from household demand, and 28% from production requirements.

More than 90% of freight moved in SEQ is moved on roads, 60% of which is inter-regional activity.

Rail, being optimised for bulk materials haulage of goods that are not time critical over long distances accounts for around 5% of the total freight task, 40% of the inter-regional task and 15% of the interstate task.

Urban freight is thus the preserve of road freight. This task is characterised by courier and mail services, urban movements such as warehouse and distribution services, bulk materials associated with construction and waste management, and the urban component of long haul freight services. Consequently, there is very little opportunity for rail freight services to gain significant market share in the urban freight task.

Heavy vehicles make up about 4–5% of the general vehicle traffic stream during peak periods and on average up to 10% of the daily (AADT) volumes. Light commercial traffic, although carrying very little of the freight tonnage, on average accounts for about 15% of the general traffic stream. This percentage is growing and is expected to continue to do so. Light freight flows will therefore be of increasing importance with respect to efficient traffic flow and network efficiency in the future.

There is little research or data to enable suitable examination of the nature and function of freight activity in small geographical areas such as the study area. There is even less information specific to individual corridors. Therefore, freight traffic modelling has relied on standardised ratios to enable a suitable 'base' estimate of the future freight within the study area.

The SEQSTM modelling has resulted in a forecast average increase in freight traffic by 2026 of 25%. This contrasts with the generally accepted perception that freight will 'double' over the next 20 years.

To verify this presumption in the context of the study area, a factored model of freight determination was generated. This factored model used existing Australian Bureau of Statistics (ABS) and other verified data to identify relationships between aspects of economic and production activity, and population growth forecasts within the study area and existing freight activity. By applying forecast production activity and forecast population growth within the defined areas to existing freight activity, a forecast of future freight activity generation along key road corridors can be made.

10.6.2 Results of investigation

The factored model results in an expected increase in freight annual activity in the study area of about 150% over the period 2008 to 2026 (compared with 25% using SEQSTM). This accords with the 'double the freight task' presumption and largely accounts for the stronger than average economic and population growth in SEQ.

The results also indicate that freight vehicle volumes will grow at a higher 4–5% per year compared with light vehicle at 1.5–2% per year. This will mean that by 2026 the proportion of heavy freight vehicles in the daily traffic volume (AADT) on the network will increase from about 10% today to 16%. There will be a necessary importance in the planning and the management of freight vehicles on the network.

It is estimated that of the 2026 freight task, 27% of all vehicle kilometres travelled (VKT) would relate to household consumption and 30% to production inputs. The balance, 43% would be related to general distribution of goods.

The factored model was further applied to the SEQSTM traffic forecasts of each major corridor within the study area to provide some indications of the likely future freight traffic in these corridors.

The projected effects of various network options were assessed and incremental estimates of the freight traffic flows generated in the model. These flows are reported by corridor and by strategic network improvement option, and comparisons presented for the SEQSTM model and the factored model.

The results of this analysis are shown in Figure 10.1 and Table 10.2.

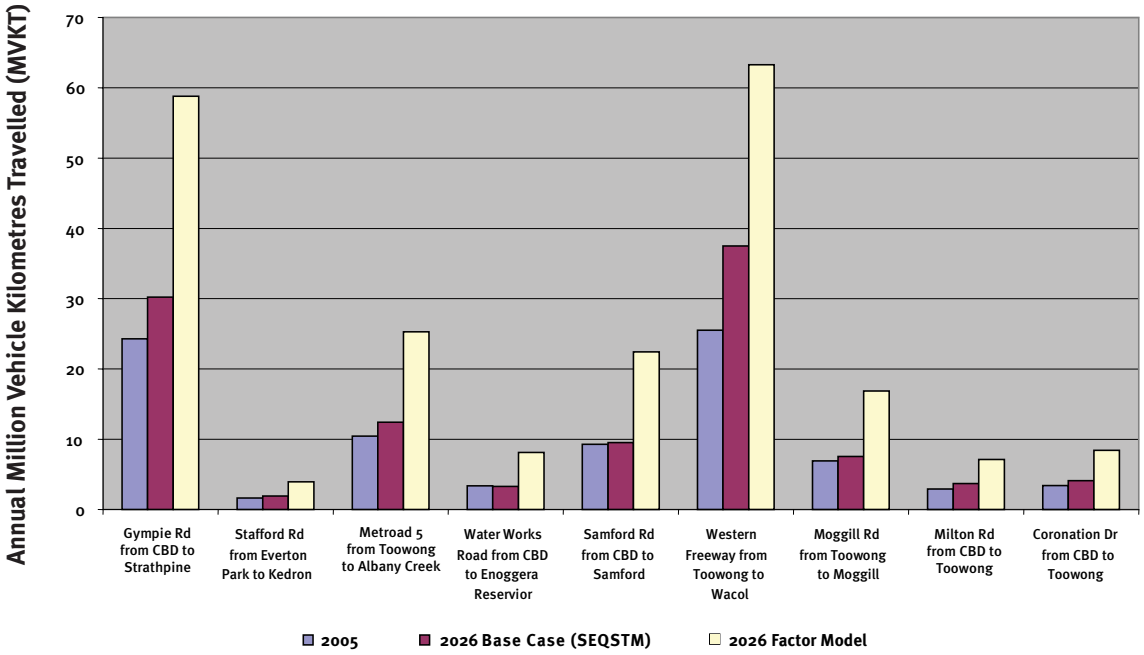


Figure 10.1 Comparison of commercial Vehicle Kilometres Travelled (VKT) by corridor

Table 10.2 Summary of % change in commercial Vehicle Kilometres Travelled (VKT) by corridor from network improvement options, compared with the 2026 Base Case

Option	Gympie Road	Stafford Road	Metroad 5	Waterworks Road	Samford Road	Centenary Motorway	Moggill Road	Milton Road	Coronation Drive	Total (all)
Low Public Transport + Mt.Coot-tha Bypass + Northern Link	-12	-5	-28	9	-25	-11	-19	-32	-20	-16
High Public Transport + Mt.Coot-tha Bypass + Northern Link	-12	-5	-25	8	-22	-10	-16	-31	-16	-14
Low Public Transport + Inner Orbital + Northern Link	-46	50	-49	11	-10	30	-18	-41	27	-11
Low Public Transport + Inner Orbital	-46	57	-48	12	-5	28	-13	23	16	-10
High Public Transport + Inner Orbital + Northern Link	-47	51	-50	9	-4	33	-16	-37	25	-10
High Public Transport + Inner Orbital + North West Transport Corridor	-48	56	-50	10	-1	31	-11	-19	11	-9
Low Public Transport + Brisbane Valley Bypass + Northern Link	-5	-3	-8	2	-4	11	-18	-34	-20	1
Low Public Transport + Northern Link	5	-3	-8	1	-4	11	-18	-35	-19	1
High Public Transport + Northern Link	6	-2	-5	1	-1	13	-16	-31	-15	2
High Public Transport	1	1	4	0	3	2	10	2	11	3

Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

10.6.3 Interpretation of results

The analysis has demonstrated that overall freight VKT growth on the network is likely to be higher (at 150%) compared with the SEQSTM model (25%). The SEQSTM growth applies to the peak volumes in 2026. The factor analysis is based on annual growth, largely outside the peak periods.

The identification of the preferred network improvement option, with respect to changes in commercial vehicle travel must be made in light of the decision criteria applied. A significant improvement (that is, reduction in freight vehicle travel, VKT) in one corridor at the apparent expense of deteriorating (increasing freight vehicle travel) flows in another corridor may be preferred to uniform and potentially marginal improvements across the network.

It is not appropriate to determine the 'best' option (with respect to reduction in freight VKT), as the resultant incremental effect of each network improvement option varies on each corridor. It would appear, however, that the option that achieves the most uniform incremental reduction in commercial vehicle VKT in all corridors is the combination of Mt. Coot-tha Bypass with Northern Link followed by the Inner Orbital with Northern Link (see Table 10.2).

11.0 Active transport investigations

11.1 Introduction

Active transport network improvement options were considered outside the model and assessment framework discussed in Chapter 9. This investigation recommends a regional principal cycle network to be taken forward under any future transport strategy. As a planning principle, this investigation also recommends that high quality cycleways and end of trip facilities are part of the planning and design of any public transport or road infrastructure option to be taken forward.

The investigation's priorities will raise the status of walking and cycling in western Brisbane by addressing the needs of those currently cycling, and encouraging new people to walk and cycle. They will remove barriers to active transport and promote social inclusion and improved health and fitness. The key aim is to create a strategic network of wide, safe, accessible, connected, direct and comfortable cycle paths.

Improving Brisbane's infrastructure to create a coherent network for pedestrians and cyclists including well designed cycle routes and improved en route and end of trip facilities will have a significant and positive impact on the levels of active transport use.

For this reason the investigation has created a longitudinal and latitudinal 'spine' network of continuous cycle routes ('Veloways') along the major transport corridors linking major activity centres, public transport stations and interchanges, business districts and educational campuses. In addition a number of river crossings ('River Links') have been identified to increase local and intersuburban connectivity and to tackle existing severance issues which the Brisbane River creates.

In addition, 'Active Transport Neighbourhoods' have been identified to improve the overall user friendliness of transport networks for pedestrians and cyclists.

The introduction of innovative active transport infrastructure and facilities would bring radical changes and improvements to western Brisbane's street environments.

11.2 Veloways

Veloways are innovative, wide, high quality cycle ways, with separate pedestrian facilities. State of the art surfacing, separation, safety, signage and consistency will provide a network of safe, dedicated and direct routes between key locations. Their design is intended to encourage a wide sector of the community, commuters, children cycling to school and recreational cyclists, to utilise active transport modes.

A number of Veloways were identified in Chapter 6.5, and comprise:

- Toowong to Everton Park Veloway;
- Indooroopilly to Dutton Park Veloway;
- Everton Park to Kedron Veloway;
- Darra to Indooroopilly Veloway;
- Kelvin Grove to Everton Park Veloway;
- Everton Park to Albany Creek Veloway;
- Kenmore to Bicentennial Veloway;
- Kedron to Chermside Veloway;
- North West Transport Corridor;
- Kedron to Royal Brisbane Hospital;
- City Regional Veloway;
- River Regional Veloway;
- Hamilton Road Veloway; and
- Ashgrove to The Gap Veloway.

The combination of these Veloways would constitute a spinal network of cycling routes across western Brisbane, linking to the Brisbane CBD and major activity centres, major rail stations and bus interchanges, schools, colleges and university campuses, and commercial and employment centres.

The vision for Veloways is that they would cater for experienced cyclists and would also be safe enough for occassional bike riders. This would be assessed against safety design standards, the numbers of cyclists using the routes and the change in travel behaviour to the extent that cycling is a frequently used mode of transport.

Currently less than 2% of all trips are made by bicycle. There are a number of reasons why levels of cycling are low which include lack of off road facilities, safety concerns, poor standard of infrastructure and unfavourable topography. The Queensland Government and Brisbane City Council targets are for 8% of all trips to be by bicycle by 2016. In order to achieve such a high target and modal shift in an 8 year time period, it is fundamental that innovative new cycle infrastructure, such as veloways, are built. It is anticipated, based on recent experience with Eleanor Schonell Bridge carrying 7,000 cyclists per day, that a veloway with connections to the CBD or a major activity centre could carry up to 20,000 cycle trips per day.

11.3 River Links

The establishment of a number of River Links, i.e. pedestrian and cycle only bridges, are designed to encourage more people to walk and cycle by increasing the number of locations to cross the Brisbane River. Each river crossing link would contain a number of generic characteristics including; pedestrian and cycle only access, typically about 14 metres wide, signage, interpretation boards, seating, water fountains and shading and cycle parking and toilets at either the entrance or exit point of each bridge.

One barrier to cycling is the lack of connectivity between suburbs. The objective of the river crossings is to encourage cross river movements, encourage and increase the number of active transport trips and eliminate the mobility severance caused by the Brisbane River.

However, the topography of the Brisbane River is such that some of the identified River Links would require a significant amount of cycle and pedestrian traffic to be economically justifiable. The West End to St. Lucia River Link is most likely to attract the largest number of users in the medium term. The other four identified River Links would require further study to ensure future demand justifies the construction of green bridges across a wide section of the river such as between Bellbowrie and Riverhills, or steep cliffs such as between Fig Tree Pocket and Sherwood.

11.4 Active Transport Neighbourhoods

A number of initial Active Transport Neighbourhoods were identified to support the Veloways and River Links. These Active Neighbourhoods should contain a network of high quality, user friendly pedestrian and cycle infrastructure and end of trip facilities to promote, support and encourage an increased number of journeys by active transport for short, local trips to school, local shops, leisure facilities and recreational sites.

The initial Active Transport Neighbourhoods are located in suburbs that start from a low or moderate active transport mode share and would be used to deliver a significant step change in walking and cycling levels to reduce the need to travel by private car for all trips, particularly short distance trips such as accessing local shops. Over time, the active neighbourhood concept should be rolled out across all western Brisbane suburbs. The initial suburbs could include Kedron, Darra, Chermside, Indooroopilly and the University of Queensland, Chapel Hill and Kenmore, Milton, Ferny Grove and Enoggera/Alderley.

Active Transport Neighbourhoods with their new on and off-road cycle lanes, wider pedestrian footpaths and public cycle parking could be supported by educational programmes such as child and adult cycle training and ‘try a bike’ cycle loan schemes.

One of the most important and fundamental projects within the Active Transport Neighbourhoods would be ‘Connect Two’. ‘Connect Two’ would ensure integration between active and public modes of transport.

New high quality, wide and safe pedestrian and cycle routes, predominately off road, would be created to all rail stations and bus interchanges in the Active Transport Neighbourhoods. Cycle facilities including secure bicycle storage, toilets, water fountains and personal belongings lockers would be provided at all rail stations and bus interchanges to assist commuter and other public transport users.

The 'Connect Two' projects would encourage increasing numbers of people to use active transport to access public transport. At present rail station commuter car parks are often full to capacity and residential streets surrounding stations are filled with commuters cars. The 'Connect Two' projects would address these issues and free up road space for active modes of travel.

The benefits of 'Connect Two' include increasing access to public transport for those within walking and cycling distance of a station and young people who do not have access to a car. 'Connect Two' would also support integrated transport planning and provision, the use of public transport for the journey to work and less car dependent suburbs.

Additional measures for Active Transport Neighbourhoods would include:

- 'Links to Schools' – safe off-road or dedicated cycle path infrastructure provided to all primary and high schools implemented in partnership with Council, students, parents, teachers and community groups with the provision of secure and sheltered cycle parking facilities;
- 'Accessible Activities' – new pedestrian and cycle routes would be created to all sports facilities and recreational areas such as parks and creeks. Recreational centres will be encouraged to provide cycle parking, showers, shaded rest areas and changing facilities or promote their existing end of trip facilities;
- 'Velo Streets' – the establishment of on-road cycle paths in low trafficked residential areas as an extension to the existing cycleway network. The 'Velo Street' network will comprise improved road markings and general directional signage. The 'Velo Streets' would create a network of feeder routes to the strategic Veloway cycle routes and to local facilities such as community centres;
- 'Pay-as-you-go' cycle hire – a 'Pay-as-you-go' cycle hire and velo-taxi scheme would be established in each active transport neighbourhood to encourage visitors and those without their own bicycle to cycle for short, commuter and business trips;
- 'Legible Locations' – each Active Transport Neighbourhood would see dramatic improvements to the quantity and quality of travel information for pedestrian and cyclists. The 'Legible Locations' programme will include new street signage with distance and directional information, local history and information interpretation boards, hard copy and electronic suburb walking and cycling maps;
- 'Velo Centres' – a one-stop cycle centre with cycle parking, showers, toilets, changing rooms, shaded rest areas, drinking water fountains and cycling information will be provided in each active transport neighbourhood; and
- 'School Safety Signs' – implementation of road safety treatments and traffic calming measures to improve safety awareness around areas with high presence of vulnerable road users and pedestrians.

12.0 Strategic network choices

The results of the assessment of network improvement options, discussed in Chapters 8 to 11, and the decision by the Queensland Government to not proceed with a western bypass, provide sufficient basis to develop five broadly different strategy choices. The five strategy choices are described below and in Figure 12.1.

A – SEQIPP:

This represents the do-minimum strategy with implementation of SEQIPP 2007 projects and other known State and Local Government projects of the primary road network. This is the 2026 Base plus SEQIPP 2008. It comprises limited transport investment in western Brisbane except for major upgrades as per the TransLink Network Plan, Council and DMR program of works and regression of public transport daily mode share to 5 per cent across SEQ and 7 per cent across western Brisbane.

B – Public Transport Priority Strategy:

This strategy includes major investment in public transport, but only minor investment in roads for western Brisbane. It results in similar travel patterns as today with a network-wide daily mode share for public transport of 7 per cent for the SEQ region and 11 per cent across western Brisbane.

C – Rail Strategy:

Full metro-style rail operations would be a central plank of this strategy. This strategy can be termed 'High Public Transport Strategy', with significantly higher public transport use than we have today and a daily public transport mode share of about 12 per cent across SEQ in 2026 and 19 per cent across western Brisbane.

D – Western Orbital Strategy:

This strategy includes major investment in public transport and in road projects for western Brisbane. This strategy could be termed 'Roads and Freight focus'. It results in much the same travel patterns as today with a daily public transport mode share of about 7 per cent across SEQ in 2026 and an Inner Orbital as part of the road network.

E – Balanced Transport Strategy:

This strategy includes implementation of the Rail and Western Orbital Strategies. It results in significantly higher daily public transport mode share than today of about 12 per cent across SEQ with an Inner Orbital included as part of the road network.

The following sections describe the five different network strategy choices in more detail. Strategy choices B to E are incremental to A and include a number of network improvement options that are required under any strategy including a far greater investment in active transport.

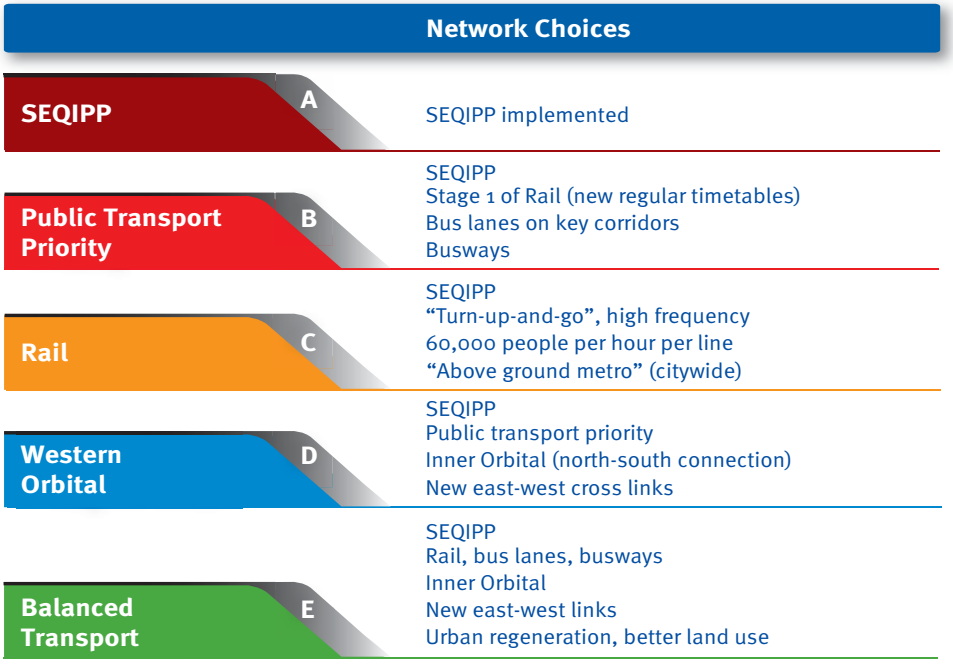
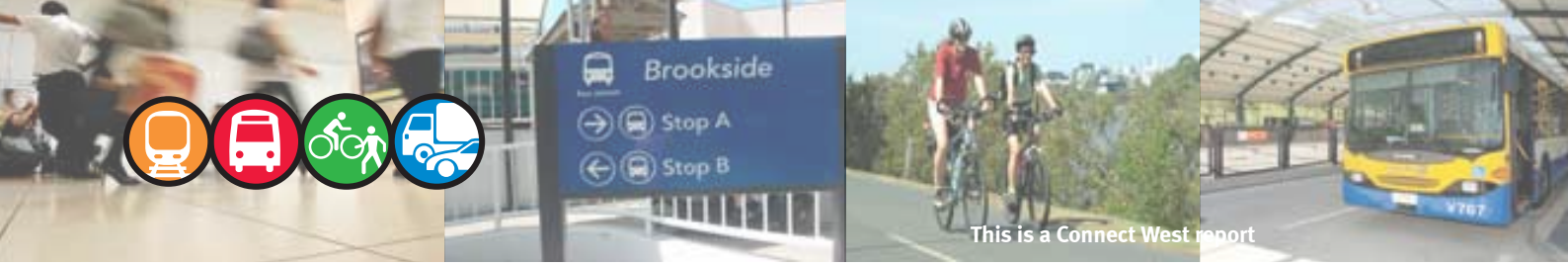


Figure 12.1 Strategic network choices

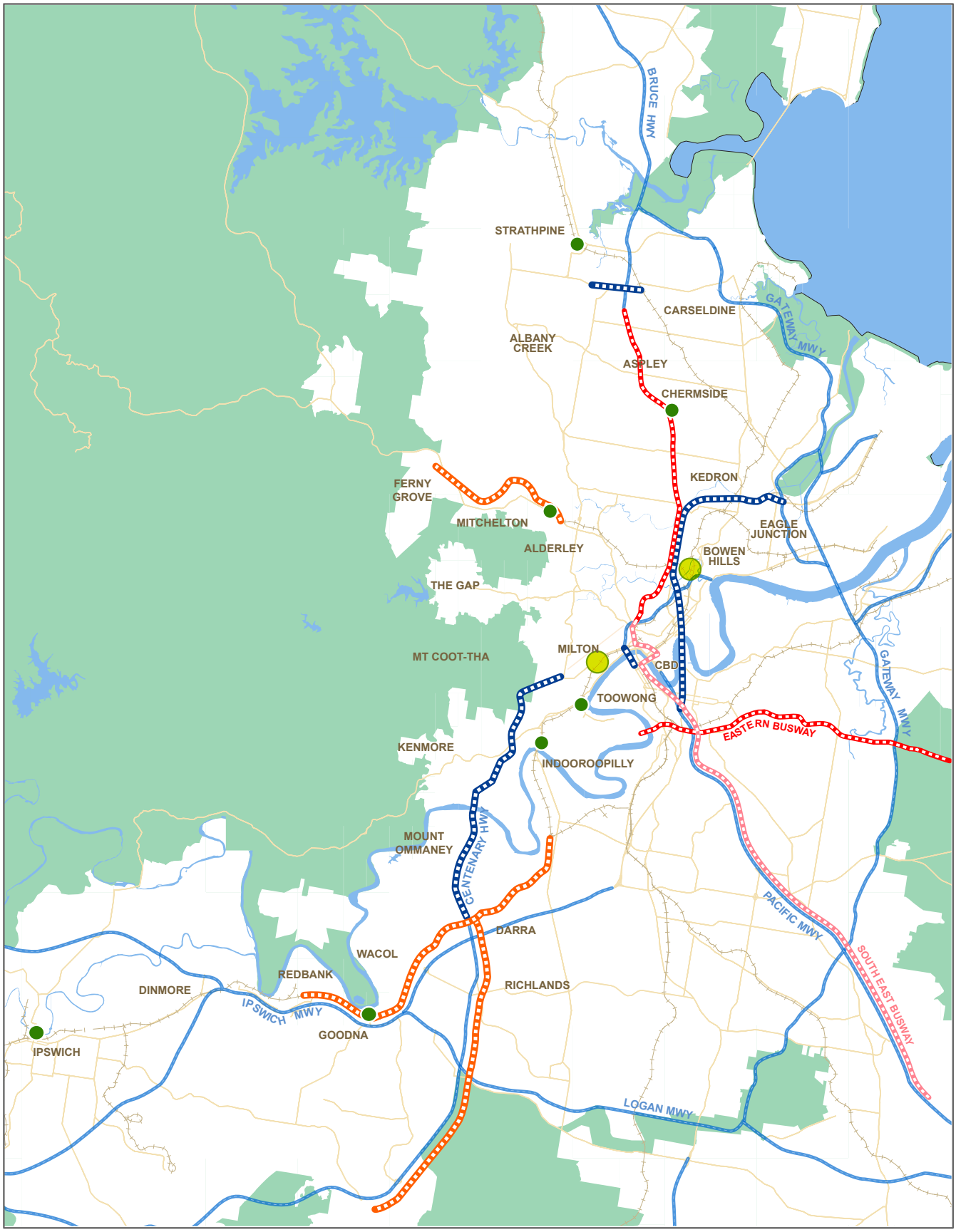


12.1 SEQIPP

While SEQIPP is not truly a strategy choice for western Brisbane, it is however a do-minimum strategy, which consists of the implementation of committed infrastructure and services in the western Brisbane area in accordance with the SEQ Infrastructure Plan and Program 2007–2026. This strategy choice would include the following road, public transport and active transport investments (Figure 12.2):

- Centenary Motorway new additional transit lanes between Ipswich Motorway and Toowong roundabout;
- North South Bypass Tunnel;
- Airport Link;
- Hale Street Bridge;
- Inner Northern Busway;
- Northern Busway, Royal Brisbane Hospital to Kedron;
- Metropolitan freight rail capacity upgrades;
- Springfield dual passenger railway line;
- Ipswich Rail: additional tracks between Corinda to Darra and a third track between Darra to Redbank;
- Ferny Grove Rail: Mitchelton to Ferny Grove track duplication;
- Caboolture Rail: Lawnton to Petrie third track; and
- Tank Street pedestrian/cycle bridge.

This strategy option also includes provision for a Kenmore bypass to relieve local road congestion on Moggill Road.



Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

12.2 Public Transport Priority Strategy

The Public Transport Priority Strategy, as shown in Figure 12.3, would provide significantly increased capacity on the rail and bus network to cater for future public transport demand as projected under TransLink's 'Low' public transport growth scenario.

This strategy choice would provide a major shift towards operational improvements of the train services and that way significantly increase the capacity of the existing rail infrastructure. In addition to the infrastructure and service upgrades of SEQIPP this strategy would include the following improvements to passenger rail:

- Full sectorisation of the existing rail track network on the Ipswich, Caboolture and Ferny Grove rail lines and other rail lines outside the western Brisbane area;
- Operating two hour AM and PM peak period services;
- Timetable simplification resulting in 3-minute to 6-minute services on the Ipswich and Caboolture line and 5-minute services on the Ferny Grove line during peak periods with off-peak 15-minute services;
- No stabling or crew change-over in the Brisbane CBD during the peak period;
- Additional suburban stabling of rolling stock;
- Revised track running on Roma Street to Corinda;
- Additional 113 three car sets (incremental to SEQIPP, rolling stock requirement for all of SEQ); and
- Central station redevelopment to accommodate increased passenger movements from boarding and alighting.

The above operational improvements and 113 additional three car sets would provide an increase in train passenger capacity of around 80 per cent during the peak period compared with existing services. The train system would offer regular, faster, high frequency rail services between the Brisbane CBD and most regional activity centres across western Brisbane (i.e. Ipswich, Goodna, Indooroopilly, Toowong, Mitchelton and Strathpine, excluding Chermside, which would be accessible through the Northern Busway).

In addition to the above rail improvements, the following public transport infrastructure improvements would be part of this strategy choice:

- Kedron to Chermside busway (existing SEQIPP project extends Northern Busway to Bracken Ridge, however busway beyond Chermside would not be necessary if projected public transport demand were catered for with bus feeder services to high frequency Caboolture rail);
- Moggill Road/Coronation Drive bus lanes between Western Freeway and Brisbane CBD;
- Kelvin Grove to Ashgrove bus lanes along Musgrave Road;
- Kelvin Grove to Everton Park bus lanes along Enoggera Road/Kelvin Grove Road;
- Major bus-rail interchange upgrades at Ipswich CBD, Goodna, Darra, Indooroopilly, Alderley, Ferny Grove, Strathpine and Mitchelton (new platforms);
- Major bus interchange upgrades at Chermside and Mt. Ommaney;
- Additional 277 buses (incremental to SEQIPP); and
- Expansion of Park 'n' Ride facilities at East Ipswich, Dinmore, Redbank, Wacol, Oxley, Northgate, Zillmere and Bald Hills.

A number of road network improvements would be included with this strategy choice. These are:

- Widening of Centenary Motorway to 8 lanes to increase capacity along a bottleneck in the higher order road network;
- Northern Link, to relieve congestion along Milton Road, Coronation Drive and Toowong roundabout and to free up road space for a Moggill Road/Coronation Drive bus lane; and
- Local upgrades to intersections along Metroad 5.

The active transport improvements for this strategy choice would include:

- High quality cycleways (Veloways) between Kenmore and the Brisbane CBD, Toowong and Everton Park, Chermside and CBD, Everton Park and Kedron and McDowall and Chermside;
- High quality cycleway (Veloways) and pedestrian network upgrades within 5 km radius of Indooroopilly, Mitchelton, Alderley, Ferny Grove and Strathpine; and
- West End to St. Lucia pedestrian and cycle bridge, providing a direct link between Boundary Road and the University of Queensland campus.

This strategy would have limited scope for private finance, outside PPP opportunities to fund rolling stock needs.

Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

12.3 Rail Strategy

The distinguishing feature of the Rail Strategy would be the even stronger focus on improved public transport network capacity than the Public Transport Priority Strategy. The Rail Strategy is illustrated in Figure 12.4 and comprises all public transport improvement options listed under the Public Transport Priority Strategy plus further upgrades to the rail network to complete the transition to metro-style rail operation similar to mass transit above-ground rail systems operating in some major European and Asian cities. This strategy would provide further significant increases to the public transport capacity of up to 220 per cent over existing services to cater for TransLink's 'High' public transport growth scenario.

In addition to the infrastructure and service upgrades assumed as part of SEQIPP transport infrastructure projects and infrastructure required in the Public Transport Priority strategy, additional infrastructure and services are necessary to achieve a forecast high growth demand.

- Full metro-style rail operation of the Ipswich, Caboolture and Ferny Grove lines as well as other rail lines in SEQ. Full sectorisation, higher capacity trains (seven car sets) and signalling upgrades would allow Moving Block/Automatic Train Operations (ATO);
- Additional 233 three car sets (incremental to SEQIPP, rolling stock requirement for all of SEQ);
- 2-minute to 4-minute services on the Ipswich and Caboolture lines and 4-minute services on the Ferny Grove line during peak periods with off-peak 15-minute services;
- Grade separation program for rail level crossings;
- Extension of Moggill Road/Coronation Drive bus lanes west of the Western Freeway to Kenmore Village;
- Old Northern Road bus lanes;
- Everton Park to Kedron bus lanes along Stafford Road to connect to Australia TradeCoast;
- Additional Park 'n' Ride facility at Albany Creek;
- Major upgrade of bus/rail interchange at Alderley; and
- Short rail extension of Ferny Grove line towards Samford with inclusion of Park 'n' Ride at terminus to allow for development of a TOD at Ferny Grove.

The road and active transport network improvements would be the same as per the Public Transport Priority Strategy.

This strategy would have limited scope for private finance, outside PPP rolling stock opportunities.

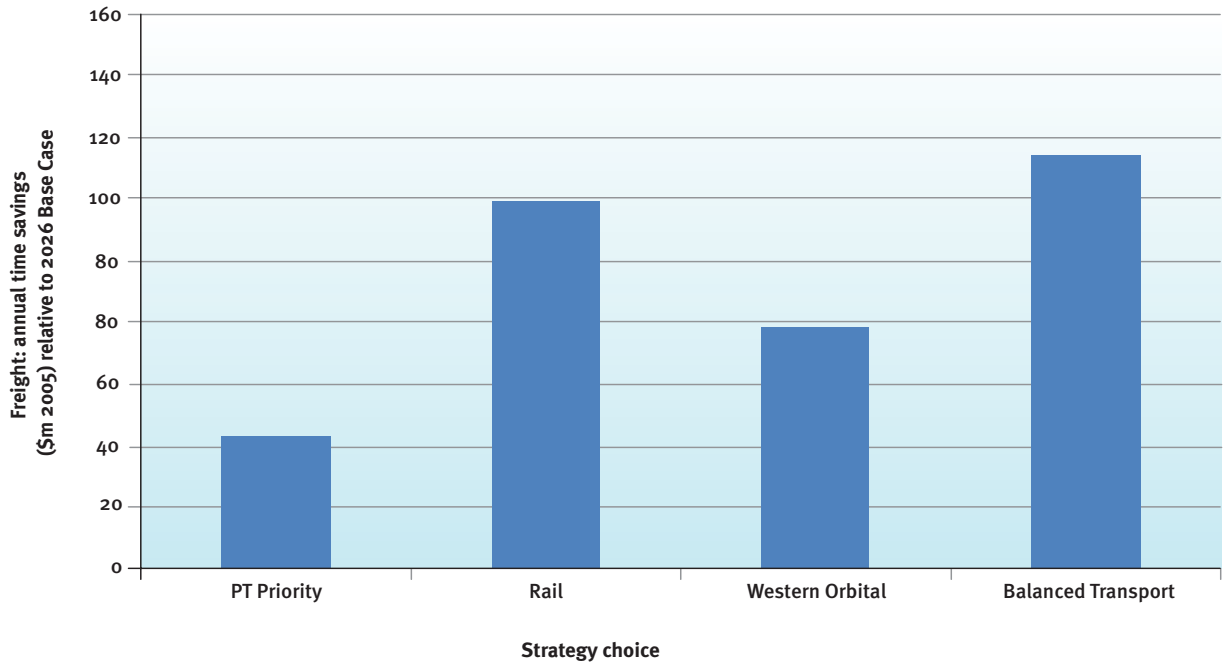


Figure 12.4 Rail infrastructure for western Brisbane, 2026

12.4 Western Orbital strategy

The distinguishing feature of the Western Orbital Strategy (Figure 12.5) is the inclusion of a Western Orbital to the 2026 road network. The Western Orbital would include the Inner Orbital tunnel between Toowong and Everton Park, the development of the North West Transport Corridor as a multi-modal transport corridor and the development of a motorway standard east-west link in the Everton Park to Kedron corridor to provide for access to the Australia TradeCoast from the west and north-west. The Western Orbital would complete the higher order road network in western Brisbane and offer a motorway-standard link between the south-west and north.

The Western Orbital Strategy would comprise the public and active transport infrastructure improvements as outlined for the Public Transport Priority Strategy. In addition, it would include the following road network infrastructure improvements:

- Inner Orbital four lane motorway tunnel between Toowong roundabout and Everton Park;
- North West Transport Corridor four lane motorway plus bus lane in each direction;
- Northern Crosslink Corridor four lane arterial in tunnel under Stafford Road and surface indented bus bays;
- Gympie Road bus lanes from Kedron to Chermside in lieu of the busway proposed under Public Transport Priority Strategy;
- Northern Link, to relieve congestion along Milton Road, Coronation Drive and Toowong roundabout and to free up road space for a Moggill Road/Coronation Drive bus lane; and
- Widening of Centenary Motorway to 8 lanes, to increase capacity along a bottleneck in the higher order road network.

The Western Orbital Strategy would have considerable scope to include private finance as part of its implementation strategy.

Note (a): *Strathpine and Ferny Grove stations are proposed as a Park 'n' Ride, then a Bus-Rail Interchange thereafter*

Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

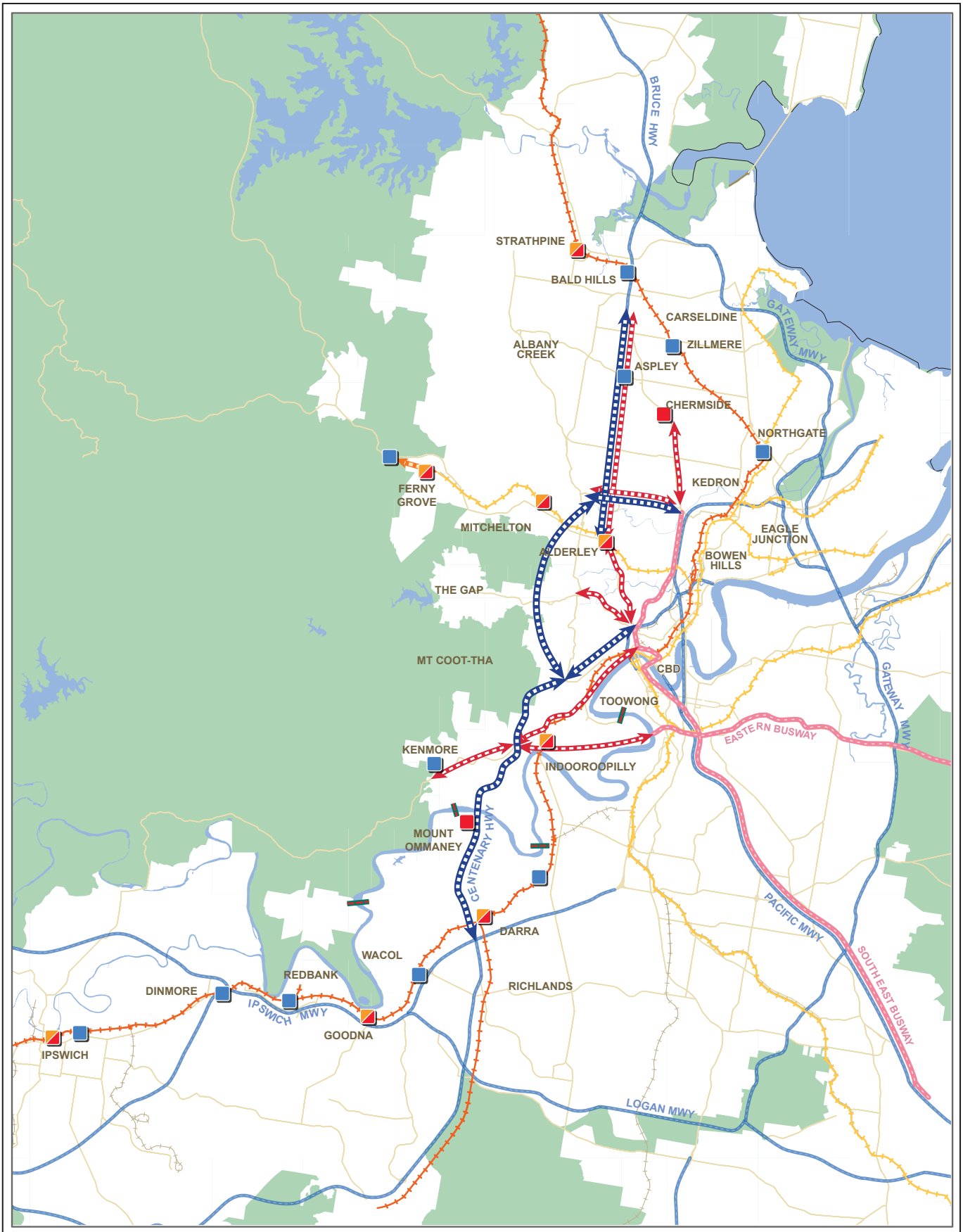
12.5 Balanced Transport Strategy

The Balanced Transport Strategy (as shown in Figure 12.6) recognises that public transport by itself or road investment alone would not satisfy all the network development objectives. Rail would remain the backbone of the transport network for radial journeys to the CBD. However, a public transport only strategy would not satisfy strategic fit objectives nor assist freight and economic development. For this reason, a balanced transport strategy would include the Inner Orbital which would manage congestion on the non-CBD route corridor and complement the large increases in public transport expenditure on radial routes to the Brisbane CBD.

The Balanced Transport Strategy would comprise the active and public transport infrastructure improvements as outlined under the Rail Strategy plus the road improvements as per the Western Orbital Strategy. In total, the following public transport, road and active transport improvements would be included in the Balanced Transport Strategy:

- Full metro-style rail operations on the Ipswich, Caboolture and Ferny Grove lines as well as on other rail lines in SEQ. Full sectorisation, higher capacity trains (seven car sets) and signalling upgrades would allow Moving Block/Automatic Train Operations (ATO);
- Additional 233 three car sets (incremental to SEQIPP, rolling stock requirement for all of SEQ);
- 2-minute to 4-minute services on the Ipswich and Caboolture lines and 4-minute services on the Ferny Grove line during peak periods with off-peak 15-minute services;
- Grade separation program for rail and level crossings;
- Gympie Road busway from Kedron to Chermside in lieu of the busway proposed under Public Transport Priority Strategy (variation on existing SEQIPP project extends Northern Busway to Bracken Ridge, however busway beyond Chermside would not be necessary if projected public transport demand were catered for with bus feeder services to high frequency Caboolture Rail);
- Kenmore Village to Brisbane CBD bus lanes along Moggill Road and Coronation Drive;
- Kelvin Grove to Ashgrove bus lanes along Musgrave Road;
- Kelvin Grove to Everton Park bus lanes along Enoggera Road/Kelvin Grove Road;
- Short rail extension of Ferny Grove line towards Samford with inclusion of Park 'n' Ride at terminus;
- Expansion of Park 'n' Ride facilities at East Ipswich, Dinmore, Redbank, Wacol, Oxley, Northgate, Zillmere and Bald Hills;
- Additional Park 'n' Ride facility at Aspley;
- Major upgrade of bus/rail interchange at Alderley;
- Rail station upgrades at Indooroopilly and Mitchelton (new platform);
- Bus-rail interchange upgrades at Ipswich CBD, Goodna, Darra, Indooroopilly, Alderley, Mitchelton, Ferny Grove and Strathpine;
- Bus interchange upgrades at Chermside and Mt. Ommaney;
- Additional 277 buses (incremental to SEQIPP);
- North West Transport Corridor four lane motorway plus bus lanes;
- Northern Crosslink Corridor four lane arterial in tunnel under Stafford Road and surface indented bus bays;
- Inner Orbital four lane motorway tunnel between Toowong roundabout and Everton Park;
- Northern Link tunnel;
- Widening of Centenary Motorway to 8 lanes;
- High quality cycleways (Veloways) between Kenmore and the Brisbane CBD, Ashgrove and CBD, Everton Park and CBD, Toowong and Everton Park, Chermside and CBD, Everton Park and Kedron, and McDowall and Chermside;
- High quality cycleway (Veloways) and pedestrian network upgrades within a 5 km radius of Ipswich CBD, Indooroopilly, Mitchelton, Alderley, Ferny Grove, Chermside and Strathpine;
- Provision of high quality cycleway (Veloways) along North West Transport Corridor; and
- West End to St. Lucia pedestrian and cycle bridge, providing a direct link between Boundary Road and the University of Queensland campus.

The Balanced Transport Strategy would provide considerable scope to include private finance as part of the strategy to minimise government expenditure.



Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

13.0 Assessment of strategy choices

13.1 Introduction

This chapter summarises the performance of the strategies against the multi-criteria assessment framework introduced in Chapter 9. Performance was measured using a combination of the following tools:

- Strategic road network model – South East Queensland Strategic Transport Model (SEQSTM);
- Public transport model – Brisbane Strategic Transport Model (BSTM);
- Spreadsheet analysis; and
- Qualitative assessment.

Where performance has been measured through the use of qualitative judgment, both information currently available and the technical studies within the investigation have been drawn upon.

Chapters 13.2 to 13.6 describe the performance of the strategies at a network-wide, strategic level. This includes a description of their performance against strategic fit (Chapter 13.2), economic and financial (Chapter 13.3), social (Chapter 13.4) and environmental (Chapter 13.5) indicators as set out in the multi-criteria assessment framework. It also includes, in Chapter 13.6, a description of their performance on a network operational basis, using indicators such as distance and time travelled on the network.

Chapter 13.7 describes the performance of the strategies at a corridor level, i.e. their impact on travel conditions for private vehicles, public transport users, cyclists and pedestrians along major transport corridors such as Coronation Drive and Gympie Road.

Chapter 13.8 uses the analysis undertaken in Chapters 13.2 to 13.7 to carry out a number of pair-wise assessments between strategies. Chapter 13.9 presents a conclusion and a preferred strategy.

13.2 Strategic fit

The following section and Table 13.1 provide a summary of the performance of each strategy against a number of qualitative indicators, which have been grouped under the umbrella of 'strategic fit.' Strategic fit includes indicators which broadly measure the way in which the Greater Brisbane transport network operates as a system. The indicators have been assessed at a strategic level mainly using a rating scale of 1 to 3, whereby 3 represents optimal performance.

13.2.1 Performance against objectives

State Government objective to invest in an effective transport system to improve the orbital/ring road network in Greater Brisbane

The Western Orbital Strategy and Balanced Transport Strategy would meet this objective most effectively as they include new orbital links to the west and north of Brisbane, i.e. Inner Orbital, North West Transport Corridor and Northern Crosslink Corridor, as well as Northern Link which could also serve orbital travel demands west of the CBD. The Rail Strategy would partly satisfy this objective through the provision of Northern Link while the Public Transport Priority Strategy would not meet this objective as it does not contain new road infrastructure.

State Government objective to provide sustainable travel choices by investing in new public transport services and infrastructure

The Rail Strategy and the Balanced Transport Strategy would meet this objective most effectively as both strategies include a relatively high investment in public transport, which would provide a significantly greater level of service to existing and new public transport infrastructure compared to the other strategies. However, the Public Transport Priority Strategy also represents a significant investment in public transport services and infrastructure.

Table 13.1 Performance of each strategy against strategic fit indicators

SEQ REGIONAL PLAN TRANSPORT OBJECTIVES [1/]	Effect[2/]	Qualitative Description	Strategy Choice			
			Public Transport Priority	Rail	Western Orbital	Balanced Transport
STRATEGIC FIT						
Provide integrated networks for long-distance travel, linking regions together	Alignment with State Government objective 1 – Improve orbital/ ring road network	1=Low alignment 2=Medium alignment 3=High alignment	1	1	3	3
	Alignment with State Government objective 2 – Provide sustainable travel choices		2	3	1	3
	Alignment with State Government objective 3 – Provide an efficient and integrated freight transport system		1	1	3	3
	Network integration for north-south movements		Partly meets this objective	Partly meets this objective	Meets this objective	Meets this objective
	Network integration for east-west movements – cater for demand between western Brisbane and CBD		Could meet this objective – less likely than Rail and Balanced Transport Strategies	Could meet his objective – more likely then Public Transport Priority and the Western Orbital Strategies	Could meet this objective – less likely than Rail and Balanced Transport Strategies	Could meet this objective – more likely than Public Transport Priority and the Western Orbital Strategies
	Network integration for east-west movements – provide additional capacity on the inner western corridor adjacent to Coronation Drive/ Milton Road		Partly meets this objective	Meets this objective	Meets this objective	Meets this objective
	Network integration for east-west movements – cater for demand from west of Brisbane to Australia TradeCoast		Does not meet this objective	Meets this objective but not as well as the Western Orbital and Balanced Transport Strategies	Meets this objective better than Rail Strategy	Meets this objective better than Rail Strategy

Table 13.1 Performance of each strategy against strategic fit indicators cont'd

SEQ REGIONAL PLAN TRANSPORT OBJECTIVES [1/]	Effect[2/]	Qualitative Description	Strategy Choice			
			Public Transport Priority	Rail	Western Orbital	Balanced Transport
	Dependence on other initiatives	1=High dependence 2=Medium dependence 3=Low dependence	2	1	1	1
	Major risks 1 – Increased demand for travel between regional centres	1=High risk 2=Medium risk 3=Low risk	2	2	3	3
	Major risks 2 – Investment required in PT rather than road		2	3	2	3
	Major risks 3 – Investment in PT delays the need for highway investment		2	1	2	1
	Major risks 4 – Higher congestion from west into CBD		2	2	2	2
	Economic Development	1=Low benefit 2=Medium benefit 3=High benefit	1	2	2	3
	Staging	1=Low potential 2=Medium potential 3=High potential	1	1	2	2
	Private Sector Funding	1=Low potential 2=Medium potential 3=High potential	1	2	3	3

Notes:

1. Derived from Office of Urban Management, South East Queensland Regional Plan 2005–2026 Part F, Section 12.
2. All effects are measured/assessed incremental to the 2026 Base Case, i.e. in terms of their effect on the situation in the Base Case.

	Overall ranking	3=Best 1=Worst	1	2	2	3

State Government objective to provide an efficient and integrated freight transport system by managing and protecting strategic freight routes

The Western Orbital Strategy and the Balanced Transport Strategy would meet this objective most effectively through the combination of Northern Link and Inner Orbital/North West Transport Corridor/Northern Crosslink Corridor, each of which would help improve access to Australia TradeCoast and relieve congestion on existing freight routes such as the Gateway Motorway. The combination of Inner Orbital and North West Transport Corridor would also provide an additional north-south freight link (possibly as a priority 2 freight route) and relieve congestion on existing north-south freight links such as the Gateway Motorway. The Rail Strategy would meet this objective to a lesser extent through Northern Link. The Public Transport Priority Strategy would not meet this objective as it has no road infrastructure.

Network integration for east-west movements

The strategy needs to meet the following more specific network integration objectives:

Objective 1: To cater for strong demand between western Brisbane and the CBD;

Objective 2: To provide additional capacity on the inner-western corridor adjacent to Coronation Drive/Milton Road; and

Objective 3: To cater for demand from the west of Brisbane to the Australia TradeCoast.

All strategies would meet Objective 1 through the provision of improved public transport services in the major corridors. The Rail Strategy and the Balanced Transport Strategy would most likely meet this objective as both strategies include a high investment in public transport.

The Rail Strategy, the Western Orbital Strategy and the Balanced Transport Strategy meet Objective 2 as these strategies all include Northern Link and enhanced public transport capacity in the inner western corridors (e.g. Coronation Drive). The Public Transport Priority Strategy partly meets this objective as it includes improved bus services along Coronation Drive.

The Rail Strategy and the Balanced Transport Strategy would meet Objective 3 as they all include Northern Link. The Western Orbital Strategy and the Balanced Strategy would best meet Objective 3. In addition to the Northern Link, these strategies would provide better access to the Australia TradeCoast through the Inner Orbital, the North West Transport Corridor and the Northern Crosslink Corridor. The Public Transport Priority Strategy would not meet this objective.

Dependence on other initiatives

The Rail Strategy, the Western Orbital Strategy and the Balanced Transport Strategy score a low rating of one in relation to this objective, as all these strategies include Northern Link, which is part of the TransApex network of road developments.

Network integration for north-south movements

The future network will need to cater for strong demand between the north of Brisbane and the Brisbane CBD and frame. In the future, there will also be an increased demand between the south-western suburbs and northern suburbs of Brisbane. The Western Orbital Strategy and the Balanced Transport Strategy meet this objective, as both strategies include North West Transport Corridor, Northern Crosslink Corridor and Inner Orbital. The Public Transport Priority Strategy and the Rail Strategy contribute to, but only partly meet, this objective due to public transport investments included as part of these strategies which cater for CBD trips.

Major Risk 1 – Increased demand for travel between regional centres results in orbital/non-radial routes becoming increasingly important

The Western Orbital Strategy and the Balanced Transport Strategy would perform best in relation to reducing this risk due to the provision of significant improvements to the orbital road network as part of these strategies.

Major Risk 2 – Significant increase in PT mode share due to increase in road user costs requires investment in PT rather than highways

The Rail Strategy and the Balanced Transport Strategy would perform best in relation to reducing this risk as both strategies include high investment in bus and rail, which would provide a significantly greater level of service in existing and new public transport and infrastructure compared to the Public Transport Priority Strategy.

Major Risk 3 – Investment in PT could delay the need for highway investment which could yield higher economic benefits

As this risk entails greater risk with higher investment in public transport, the Rail Strategy and the Balanced Transport Strategy would not perform as well as the other strategies.

Major Risk 4 – Employment self-containment forecast in western Brisbane does not materialise resulting in higher congestion on routes into CBD

All strategies would perform at least moderately well in relation to reducing this risk, as a result of significant capacity upgrades to the Ipswich line and other public transport improvements between western Brisbane and the CBD. Rail and the Balanced Strategy would also capture much of the demand increase generated by employment self-containment not materialising in the Western Corridor. Refer to Chapter 15 for an analysis of the preferred strategy against this risk.

Economic development

The Western Orbital Strategy and the Balanced Transport Strategy would contribute most effectively to economic development, through the provision of Inner Orbital, North West Transport Corridor and Northern Crosslink Corridor; these road improvements together would significantly enhance network integration of the road system.

Staging of infrastructure

Inner Orbital, North West Transport Corridor and Northern Crosslink Corridor have the greatest potential to be staged over time, therefore the Western Orbital and Balanced Transport Strategies would meet this objective most effectively.

Attraction of private sector funding

The Western Orbital Strategy and Balanced Transport Strategy would meet this objective most effectively as these strategies include Inner Orbital and North West Transport Corridor which would provide competitive quality services, which would generate high levels of road use and, therefore, significant tollway opportunities for private sector finance.

13.2.2 Summary of strategic fit

The Balanced Transport Strategy would perform best in relation to strategic fit objectives because it would combine the Rail Strategy and the Western Orbital Strategy and, therefore, would have greater scope to meet a wider range of strategic objectives. The Rail Strategy is more effective than the Western Orbital Strategy in meeting public transport/sustainability goals. The Western Orbital Strategy is more effective than the Rail Strategy in meeting road improvement/integration goals and assisting in Brisbane's economic development.

13.3 Economic and financial effects

The following section provides a summary of the economic and financial performance of each strategy against a number of indicators. Some indicators have been measured qualitatively using a rating scale of 1 to 3, whereby 3 represents optimal performance. Other indicators have been measured quantitatively using spreadsheet analysis and the SEQSTM.

Table 13.2 summarises this assessment.

13.3.1 Performance against economics and finance

Public transport integration with land use

The Rail Strategy and the Balanced Transport Strategy provide the greatest potential to achieve this objective as both strategies include substantive development of rail stations and interaction with land use and integrated rail and bus services. Both strategies would provide for more extensive and frequent public transport services than in 'Low' PT, which forms a part of the Public Transport Priority Strategy and Western Orbital Strategy. The significant level of investment in walking and cycling infrastructure would provide a strong integration with land use associated with the major activity and economic centres in western Brisbane that they serve. This would apply to all strategies other than the 2026 Base Case.

Public transport passenger time

The Rail Strategy and Balanced Transport Strategy would provide the greatest travel time benefit for public transport users as both strategies include 'High' PT capacity, which provides greater investment in both existing services and new public transport infrastructure than the other strategies.

Public transport congestion/reliability

The Rail Strategy and the Balanced Transport Strategy would reduce congestion for public transport vehicles on the network and help to improve reliability as both strategies include significantly greater bus and rail capacity. The strategies based on 'High' PT would have a greater effect on reducing road congestion than the strategies based on 'Low' PT.

Private vehicle occupant time cost

The Rail Strategy and the Balanced Transport Strategy would provide the greatest time-saving benefit on the network, as both strategies would significantly benefit from less peak hour vehicles on the network as a result of the high modal shift to bus and rail. Public transport improvements generate travel time savings on the road network by causing a mode shift of trips from road to public transport and by reducing travel time for trips which remain on the road network due to lower congestion.

The Western Orbital Strategy would provide comparatively lower benefit, generated by the travel time savings accrued from the combination of 'Low' PT improvements and a number of road improvements, i.e. Northern Link, Inner Orbital, North West Transport Corridor and Northern Crosslink Corridor.

The differences between strategies are shown in Figure 13.1.

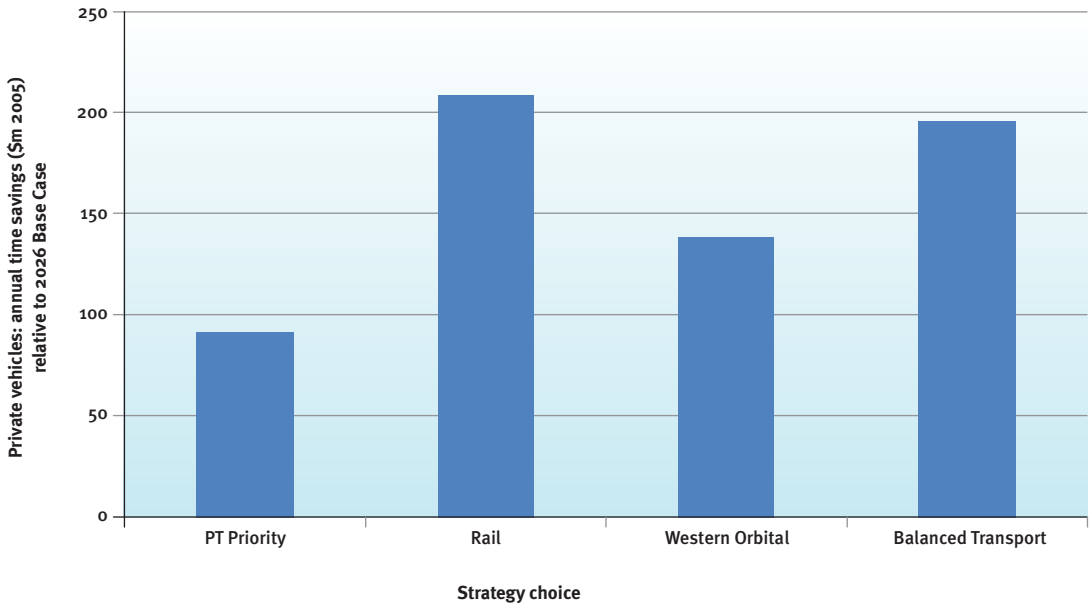


Figure 13.1 Private vehicle occupant time savings, 2026

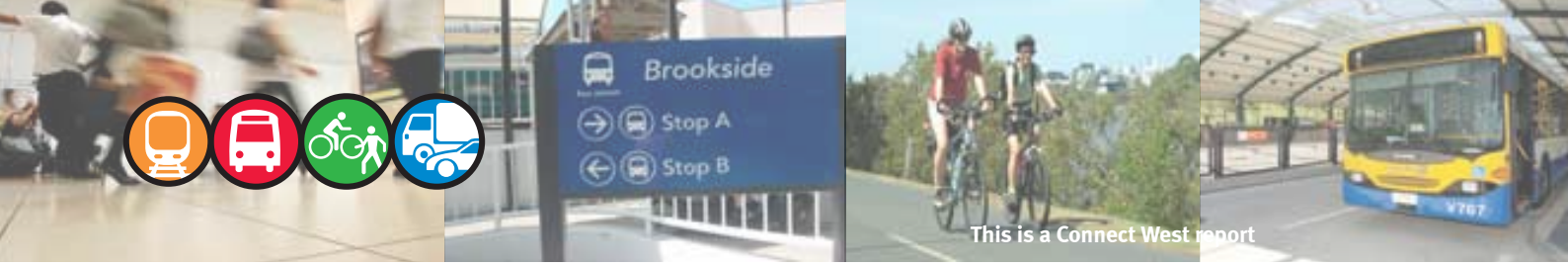


Table 13.2 Performance of each strategy against economic and financial indicators

SEQ REGIONAL PLAN TRANSPORT OBJECTIVES [2/]	Effect [2/]	Qualitative description	Quantitative description	Assessment	Strategy choices			
					Public Transport Priority	Rail	Western Orbital	Balanced Transport
ECONOMIC Maximise use of existing transport assets and services Invest in the transport system to maximise community benefit Provide an efficient and integrated freight transport system	PRIVATE PASSENGER TRANSPORT							
	Occupant time costs		Annual VHT by vehicle type [3/]	PVB ($m 2005)	100	200	100	200
	Vehicle operating costs		Annual VOC by vehicle type [3/]	PVB ($m 2005)	100	300	100	300
	Congestion/ reliability	1=Low Impact 2=Medium Impact 3=High Impact	–	Rating	2	3	2	3
	PUBLIC PASSENGER TRANSPORT							
	Integration with land use	1=Low Impact 2=Medium Impact 3=High Impact	–	Rating	2	3	2	3
	Passenger time costs		Annual VHT by mode [3/]	PVB ($m 2005)	200	300	200	300
	Vehicle operating costs		Annual VOC by mode [3/]	PVB ($m 2005)	100	150	100	150
	Congestion/ reliability	1=Low Impact 2=Medium Impact 3=High Impact	–	Rating	2	3	2	3
	FREIGHT TRANSPORT							
	Driver + freight time costs		Annual VHT by vehicle type [3/]	PVB ($m 2005)	100	300	200	300
	Vehicle operating costs		Annual VOC by vehicle type [3/]	PVB ($m 2005)	0	100	100	100
	Congestion/ reliability	1=Low Impact 2=Medium Impact 3=High Impact	–	Rating	2	3	2	3
	Access to freight intermodal/ facilities		–	Rating	2	2	3	3
	Use of Preserved Corridors	1=Low Utilisation 2=Medium Utilisation 3=High Utilisation	–	Rating	1	1	3	3

Table 13.2 Performance of each strategy against economic and financial indicators cont'd

SEQ REGIONAL PLAN TRANSPORT OBJECTIVES [2]	Effect [2]	Qualitative description	Quantitative description	Assessment	Strategy choices			
					Public Transport Priority	Rail	Western Orbital	Balanced Transport
FINANCIAL Provide travel solutions that minimise 'whole-of-life' asset costs	Infrastructure capital cost [4]	–	$	PVC ($ 2005)	7,100	10,400	14,800	17,700
	Road recurrent cost	–	Annual $	PVC ($m 2005)	5	20	60	60
	Rolling stock capital cost	–	$	PVC ($m 2005)	1,200	1,900	1,200	1,900
	PT operating dubsidy	–	Annual $	PVC ($m 2005)	50	100	50	100
BENEFIT COST ANALYSIS RESULTS: [5]					PVB=8,400 PVC=7,900 NPV=500 BCR=1.06 NPV/K=0.06	PVB=18,900 PVC=12,200 NPV=-4,900 BCR=1.55 NPV/K=0.55	PVB=11,000 PVC=15,900 NPV=4,900 BCR=0.69 NPV/K=0.31	PVB=19,200 PVC=19,700 NPV=-500 BCR=0.98 NPV/K=0.02

Notes:

1. Derived from Office of Urban Management, South East Queensland Regional Plan 2005–2026, Part F Section 12.
2. All effects are measured/assessed incremental to the 2026 Base Case, i.e. in terms of their effect on the situation in the Base Case.
3. Monetised using standard economic appraisal parameter unit values.
4. Includes savings on Road Network Improvement Program. Does not include rail level crossings. Rail, Western Orbital and Balanced Transport strategies include Northern Link which is not included in SEQIPP 2007.
5. PVB=present value of benefits; PVC=present value of costs; NPV=net present value; BCR=benefit–cost ratio; NPV/K=NPV per $ of capital cost.

Includes benefits and costs derived from social and environmental assessment.

Private vehicle operating cost

The Rail Strategy and the Balanced Transport Strategy would provide the greatest benefit, as both strategies would result in lower network congestion. (Public transport improvements under these two strategies would generate private vehicle operating cost savings on the road network as a result of the mode shift of trips from road to public transport and by reducing vehicle operating cost for trips which would remain on the road network due to lower congestion). In contrast, the Western Orbital Strategy by itself would generate less than half the benefits of the Rail Strategy and the Balanced Transport Strategy due to fewer public transport trips and more trips by road, which would result in higher network congestion. Figure 13.2 illustrates the differences between the strategies.

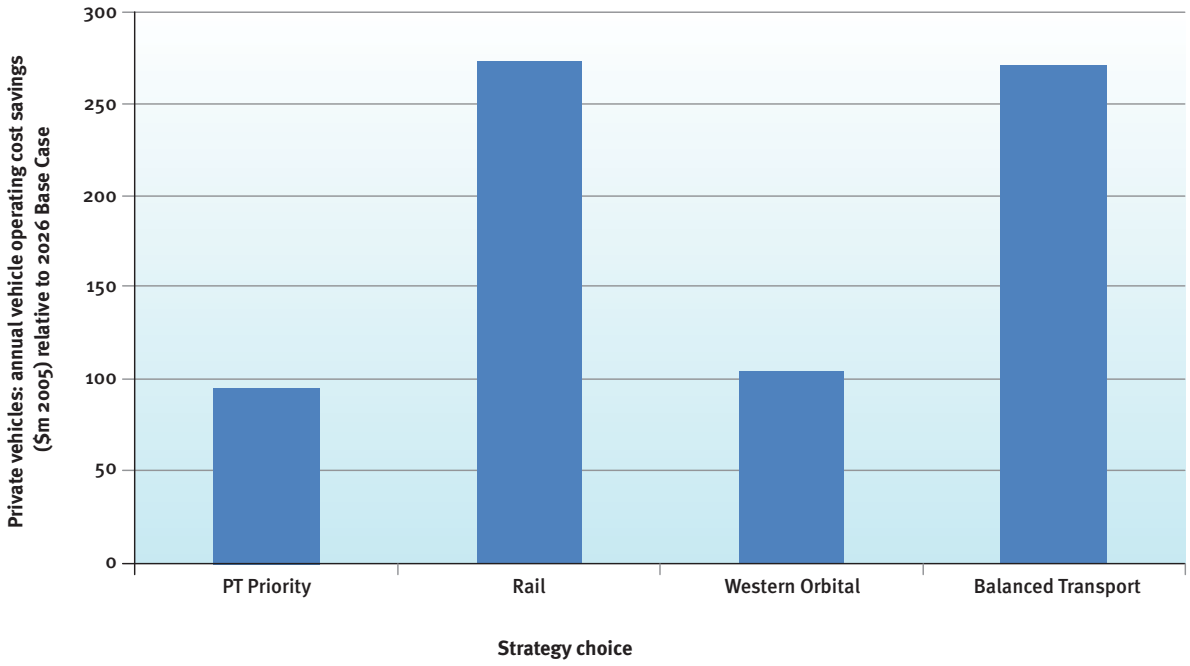


Figure 13.2 Private vehicle operating cost savings, 2026

Congestion

The Rail Strategy and the Balanced Transport Strategy would provide the greatest reduction in congestion due to fewer vehicles on the network as a result of higher public transport mode share in the strategies with high public transport investment. There would be more than a halving of time spent by vehicles in congested conditions compared to the 2026 Base Case (see Figure 13.3). The Public Transport Priority Strategy is shown to provide a significant benefit due to the effect of 'Low' PT and the widening of Centenary Motorway. The Western Orbital Strategy would provide marginally greater benefits compared to the Public Transport Priority Strategy, this being the combined effect of Inner Orbital, North West Transport Corridor and Northern Crosslink Corridor. Congested links are identified as operating at 90 per cent of their practical capacity or above.

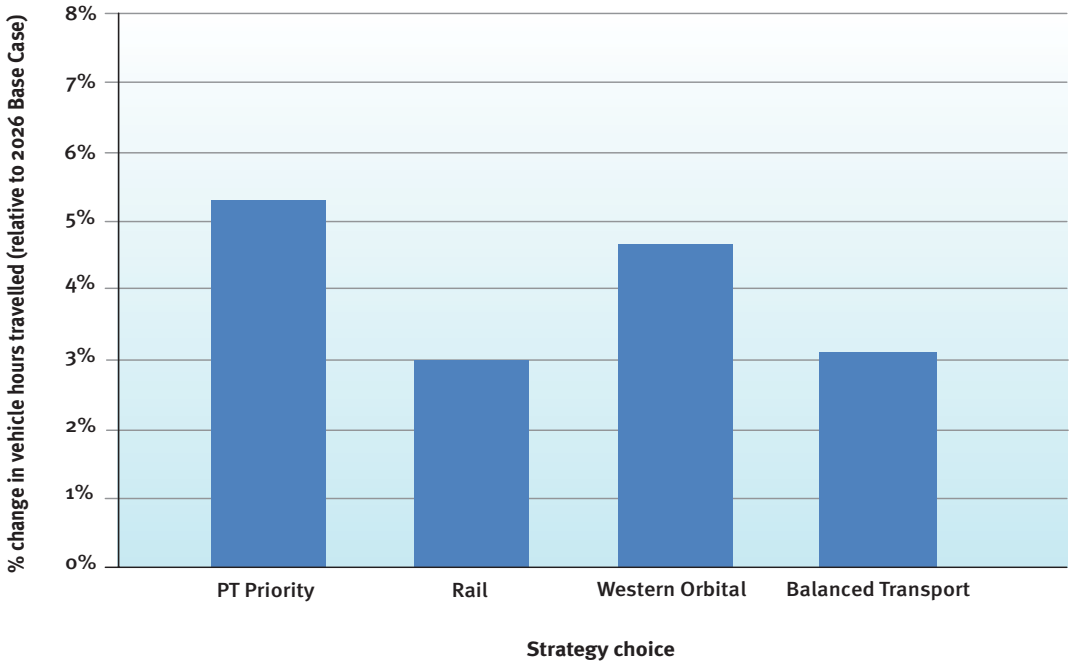


Figure 13.3 Vehicle hours travelled in congested conditions – AM peak, 2026

Freight vehicle occupant time/operating costs

The performance of each strategy would affect freight vehicles on the network in a similar way to private vehicles so that time savings, vehicle operating cost savings and effects from congestion would all be similar to those effects on general traffic. This is shown in Figure 13.4 and Figure 13.5.

The Rail and Balanced Transport Strategies would perform comparatively better in terms of operating costs suggesting that the road improvements in these strategies would have a significantly better effect on improvements on reducing freight vehicle operating costs.

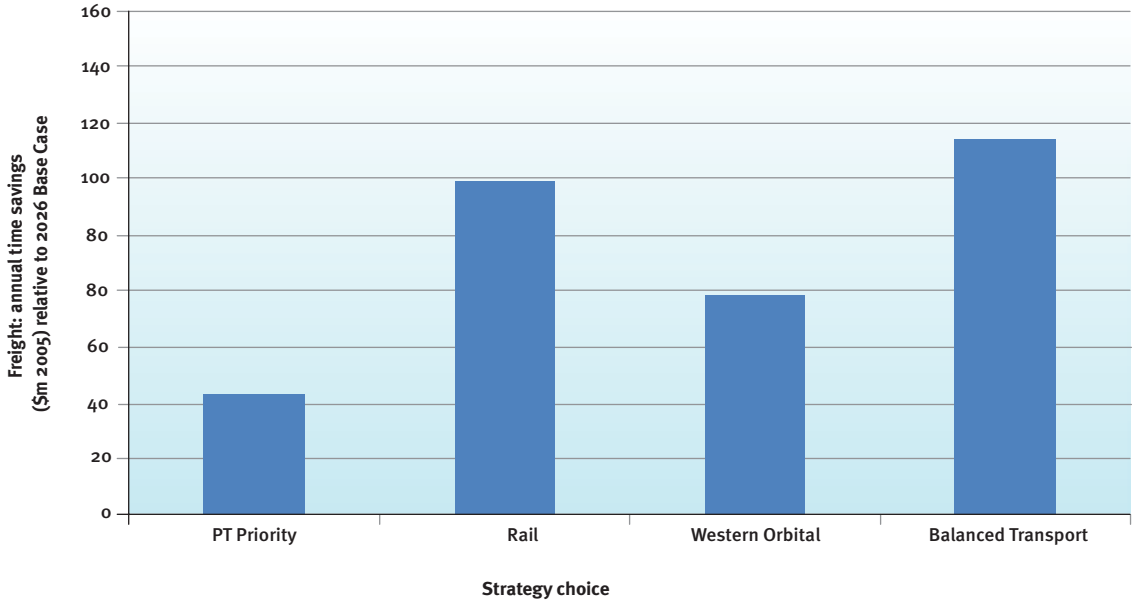


Figure 13.4 Annual freight occupant time savings, 2026

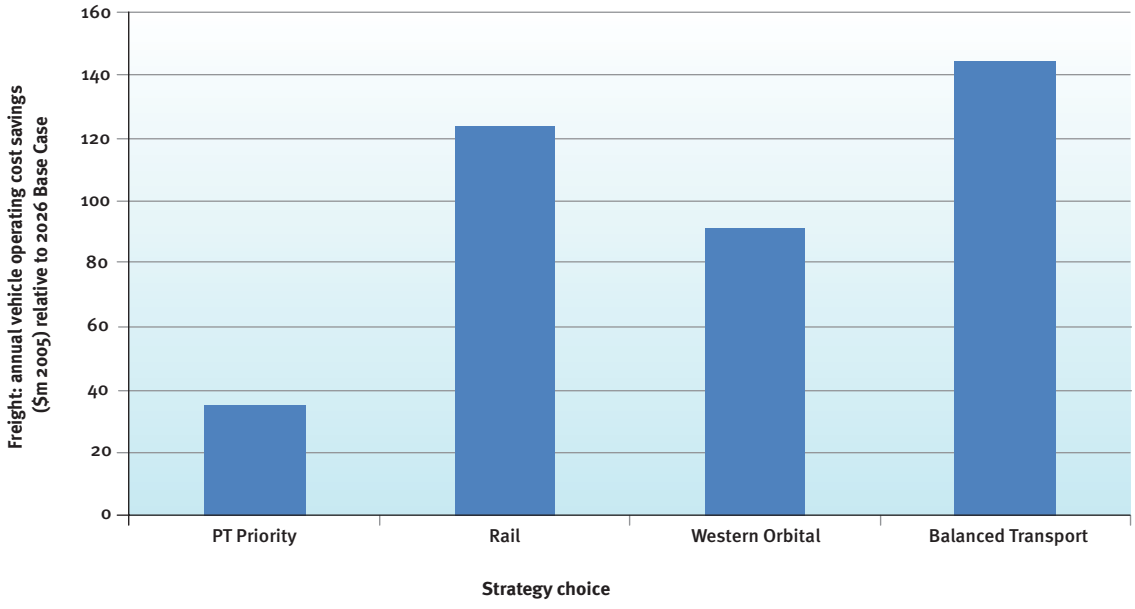


Figure 13.5 Annual freight operating cost savings, 2026

Transport strategy cost

Figure 13.6 to Figure 13.11 illustrate the total estimated cost of implementing the 2026 Base Case and each of the four strategy choices, as well as the proportion of costs for rail, bus, active transport and road. The assessment of strategies has been undertaken against the SEQIPP 2007 Base Case. However, the comparative strategy costs have been assessed incrementally to SEQIPP 2008, i.e. to SEQIPP 2008 for western Brisbane. The reason for this being that a new version of SEQIPP was published very recently and has a much greater emphasis on public transport as a proportion of total expenditure, although expenditure on roads has also increased significantly. This is partly a reflection of the influence of this investigation as some of the public transport options which are being investigated in this study have already been included as investigations in SEQIPP 2008.

It can be seen that the Public Transport Priority and Rail Strategies have an emphasis on public transport investment, whilst the Western Orbital Strategy has an emphasis on road investment and the Balanced Transport Strategy has a more 'balanced' approach between road and non-road investment.

SEQIPP 2008 is estimated to cost in the region of $29 billion (this includes the sum of $7.3 billion for a north-south inner city rail tunnel). The Balanced Transport Strategy is estimated to be the most expensive of the strategies at $21 billion. The Public Transport Priority, Rail and Western Orbital Strategies are estimated to cost $13, $16 and $19 billion respectively.

For details of the implementation process for these strategies refer to Chapter 17.

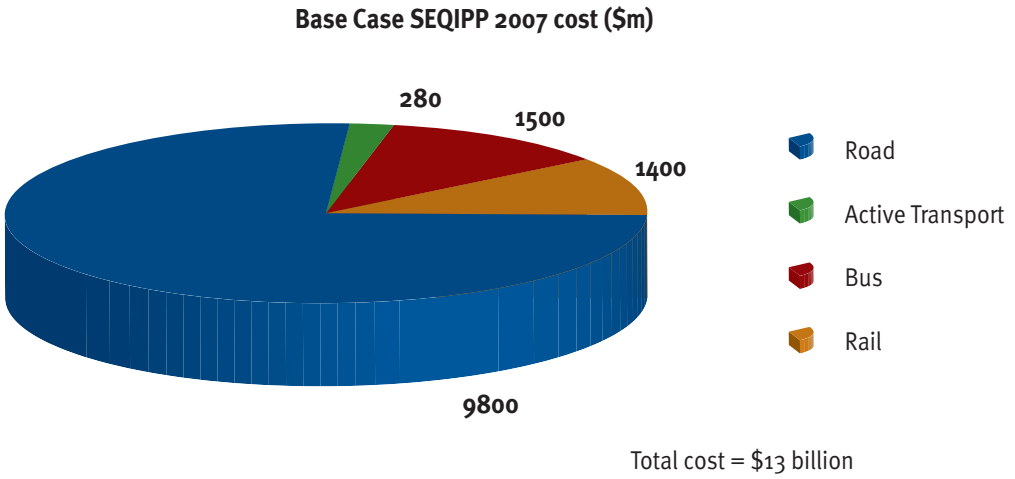


Figure 13.6 Estimated implementation cost of 2026 Base Case for western Brisbane (SEQIPP 2007)

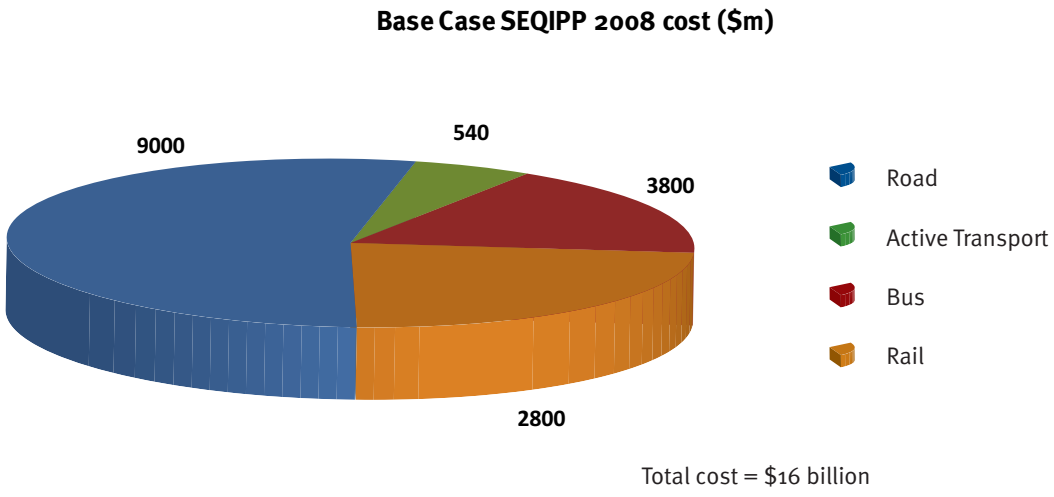


Figure 13.7 Estimated implementation cost of SEQIPP 2008 for western Brisbane

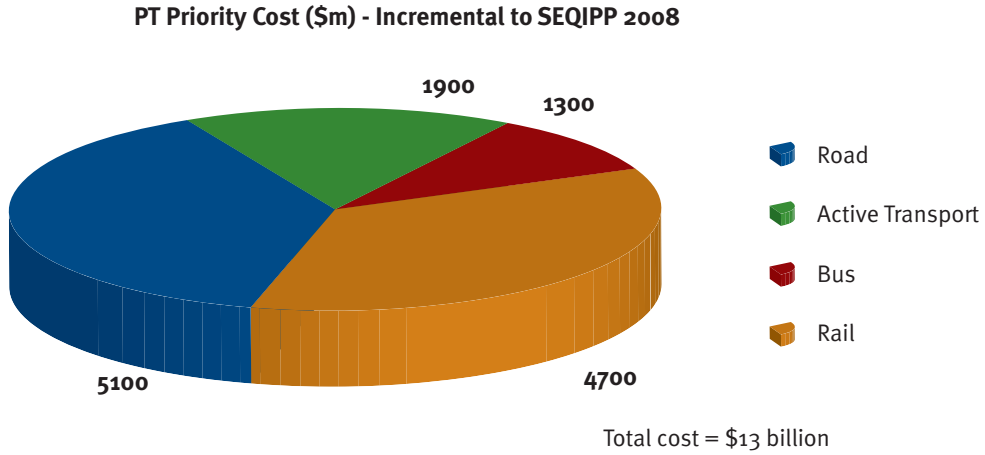


Figure 13.8 Estimated incremental cost of Public Transport Priority Strategy for western Brisbane

Note: Includes capital cost of rail level crossings. Includes cost of Road Network Improvement Program. Excludes Northern Link as included in SEQIPP 2008.

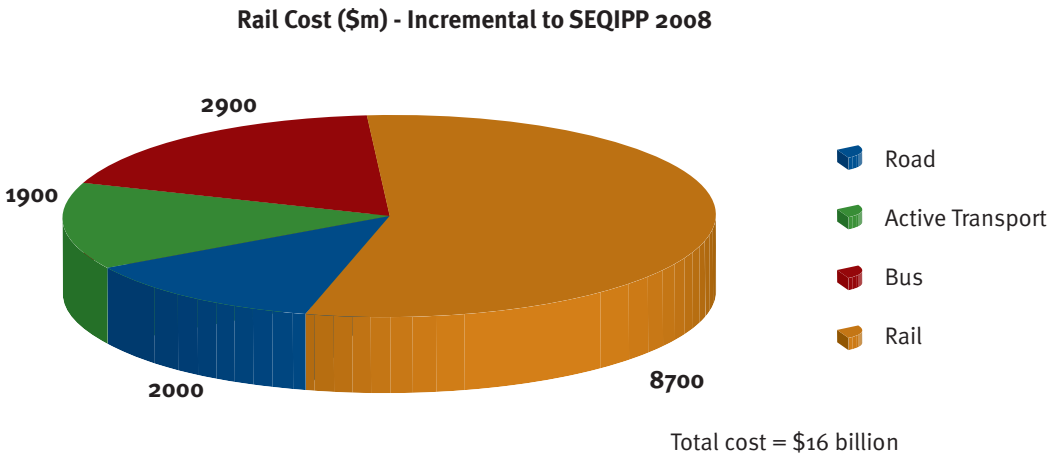


Figure 13.9 Estimated incremental cost of Rail Strategy for western Brisbane

Note: Includes capital cost of rail level crossings. Includes cost of Road Network Improvement Program. Excludes Northern Link as included in SEQIPP 2008.

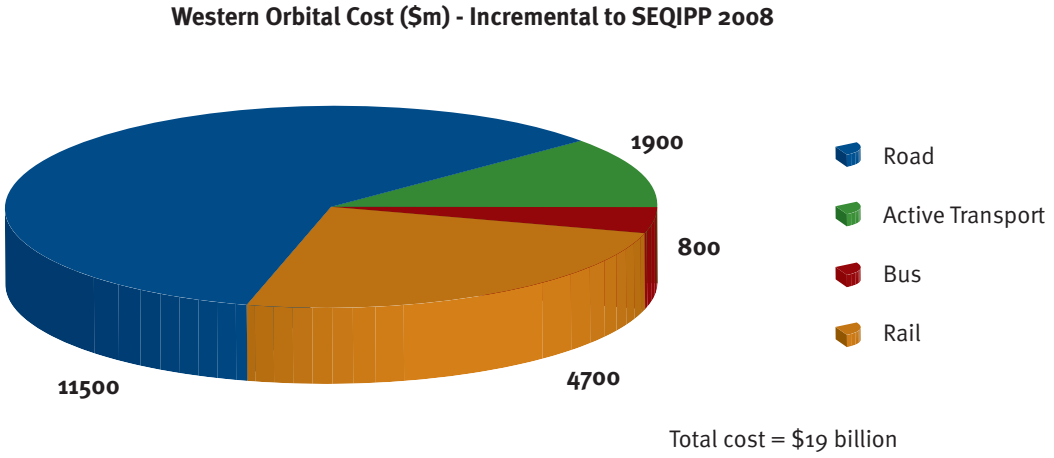


Figure 13.10 Estimated incremental cost of Western Orbital Strategy for western Brisbane

Note: Includes capital cost of rail level crossings. Includes cost of Road Network Improvement Program. Excludes Northern Link as included in SEQIPP 2008.

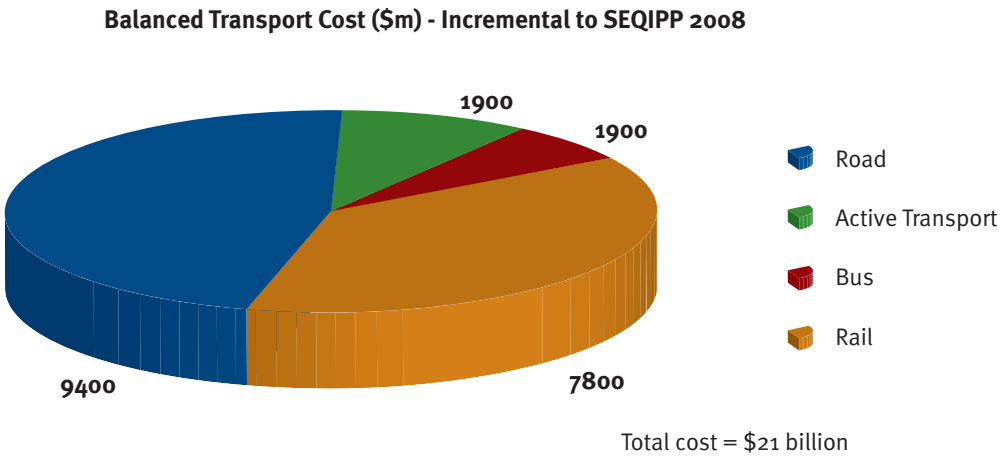


Figure 13.11 Estimated incremental cost of Balanced Transport Strategy for western Brisbane

Note: Includes capital cost of rail level crossings. Includes cost of Road Network Improvement Program. Excludes Northern Link as included in SEQIPP 2008.

Incremental benefit-cost analysis

An incremental benefit-cost ratio (BCR) was calculated to provide a comparative economic indicator of the alternative strategies when compared to the 2026 Base Case (Figure 13.12). The Rail Strategy yields the highest BCR of 1.5 indicating a relatively strong return to the economy from the potential expenditure. Both the Balanced Transport Strategy and the Public Transport Priority Strategy yield a BCR of around 1 (neutral) implying that the economic return for the potential expenditures is the same as the expenditure itself, based only on benefits that can be monetised.

Both the Rail and Balanced Transport Strategies would yield the greatest benefits from savings in vehicle operating costs and travel times due to the relative importance of public transport trips in the travel matrix.

The highest Net Present Value (see Figure 13.13) would be achieved by the Rail Strategy due to this strategy yielding significant net benefits for a relatively low capital cost compared to the Western Orbital and Balanced Transport Strategies.

Both the Public Transport Priority Strategy and the Balanced Transport Strategy would result in a neutral or slightly positive Net Present Value (NPV). In the case of the Public Transport Priority Strategy this is due to the relatively low capital costs, and in the case of the Balanced Transport Strategy it is due to the high benefits that would be realised.

13.3.2 Summary of economic and financial effects

A summary of the main economic and financial effects of the strategies was presented in Table 13.2.

The analysis showed that the Rail Strategy and Balanced Transport Strategy offer the greatest potential to achieve economic return on investment while at the same time providing congestion benefits across the transport network.

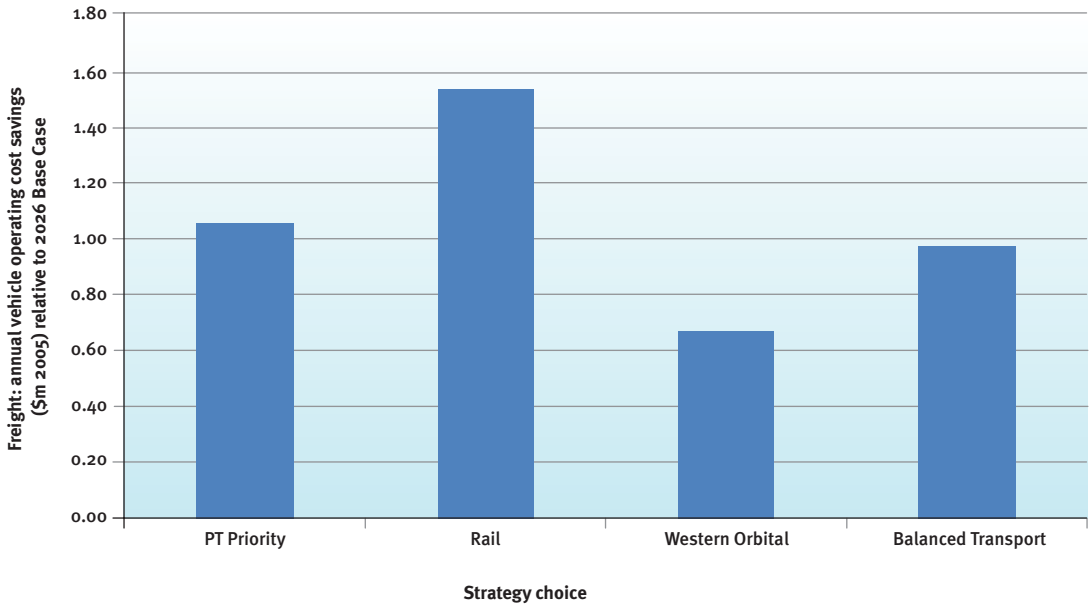


Figure 13.12 Strategy incremental Benefit-Cost Ratio relative to 2026 Base Case

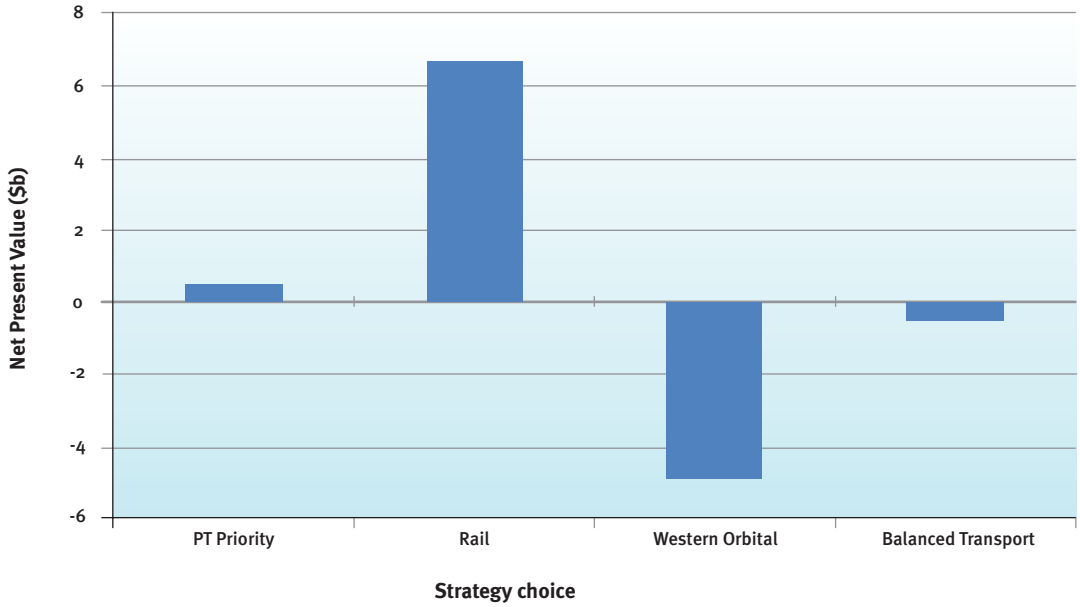


Figure 13.13 Strategy net economic gain relative to 2026 Base Case ($ billion)

13.4 Social effects

The following section provides a summary of the social performance of each strategy against a number of social indicators. Most indicators were assessed using a scale of 1 to 5 by undertaking an examination of the effect of each network improvement option contained within each strategy.

The assessment of the indicator for investment in existing and new pedestrian and cyclist facilities, and for public security of existing and new public transport facilities, has been undertaken at a strategic level, using a rating scale of 1 to 3, whereby 3 represents optimal performance. Impacts on accident costs have been assessed using the SEQSTM. Table 13.3 provides a summary of the monetised benefits, costs and ratings of each strategy against each social indicator.

Table 13.3 Performance of each strategy against social indicators

SEQ REGIONAL PLAN TRANSPORT OBJECTIVES [1]	Effect[2]	Qualitative Description	Quantitative Measure	Assessment	Strategy Choice			
					Public Transport Priority	Rail	Western Orbital	Balanced Transport
SOCIAL Improve accessibility – support the accessibility needs of all members of community including walking, cycling and public transport use Provide urban design opportunities to promote nonmotorised travel	Dislocation	1=Beneficial impact 2=Low negative impact 3=High negative impact	–	Rating	2	2	2	2
	Property acquisition		–	Rating	3	3	3	3
	Severance		–	Rating	2	3	2	2
	Access		–	Rating	2	2	2	2
	Mobility		–	Rating	2	2	2	2
	Amenity		–	Rating	3	3	3	3
	Social policy context		–	Rating	2	2	2	2
	Investment in existing and new pedestrian and cyclist facilities	1=Low impact 2=Medium impact 3=High impact	–	Rating	3	3	3	3
	Public security of existing and new public transport facilities	1=Low impact 2=Medium impact 3=High impact	–	Rating	2	3	2	3
	Accidents		Annual reduction in crashes by severity [3]	PVB ($m 2005)	20	70	20	60

Notes:

1. Derived from Office of Urban Management, South East Queensland Regional Plan 2005-2026, Part F Section 12.
2. All effects are measured/assessed incremental to the 2026 Base Case, i.e. In terms of their effect on the situation in the Base Case.
3. Monetised using standard economic appraisal parameter unit values.

13.4.1 Performance against criteria

Dislocation

The Balanced Transport Strategy would perform best as it would minimise severance impacts and utilise existing road corridors where possible, thereby minimising dislocation and property acquisition impacts. A key feature of the roads component of this strategy is the use of tunnels to minimise dislocation effects.

Property acquisition

The Western Orbital Strategy would perform best as it ensures that a minimal amount of property requires acquisition for transport corridors, particularly residential property.

Severance

The Balanced Transport Strategy would best minimise occurrences of roads severance and/or changes to access of facilities such as retail, commercial, public open space, and community services.

Access

This indicator would be best addressed through the Public Transport Priority and Balanced Transport Strategies. Both strategies would minimise negative effects on public transport access, vehicle access and access for the mobility impaired/people with disabilities.

Mobility and accessibility

Mobility and accessibility are closely linked. Mobility refers more to the ability of users to have a choice to physically access the network. Clearly those with access to a car or bus are more mobile than those who do not have this access. Whereas accessibility is more related to how easy it is for users to reach their destinations, it is more usual to address differences in accessibility in terms of the location and availability of services, the structure of the network and the route choices available on the network.

The Balanced Transport Strategy addresses this indicator most effectively as it would provide high levels of rail and bus services, as well as provide a much needed road structure with route choices to the west of the CBD. It would also minimise negative impacts on pedestrian and cycle facilities and improve pedestrian and cycle connectivity through strategic links.

Amenity

This indicator is best addressed through the Rail and Public Transport Priority Strategies, which would minimise negative impacts on visual amenity, increased ambient noise levels, light pollution at night and reduced air quality, by reducing overall road traffic levels. Both strategies would provide greater opportunities to improve people's perceptions of pleasantness of the local environment, especially around rail stations and TODs.

In terms of greater access to amenities, however, the Western Orbital Strategy and the Balanced Transport Strategy would provide greater benefits.

Social policy context

This would be best addressed through the Balanced Transport Strategy as it would provide the most consistent approach with regard to the social directions identified within the Regional Plan. It would also provide the best balance between social, environmental and economic objectives.

Investment in existing and new pedestrian and cyclist facilities

All strategies include the same significant level of improvement to walking and cycling infrastructure.

Public security of existing and new public transport facilities

The Rail Strategy and Balanced Transport Strategy would contribute most effectively in relation to this objective, as they would represent a significantly higher investment in public transport infrastructure than the other strategies.

Accident cost

Rail Strategy and Balanced Transport Strategy would contribute most effectively to reducing costs associated with road traffic accidents, due to the presence of 'High' PT in both strategies, which would significantly reduce the number of private vehicle trips undertaken on the network. The Public Transport Priority Strategy and the Western Orbital Strategy would provide significantly lower benefits due to fewer trips attracted to public transport in both strategies (see Figure 13.14).

13.4.2 Summary of social effects

The Balanced Transport Strategy would perform best by taking into account the effects on the full range of social indicators, as was shown in Table 13.3.

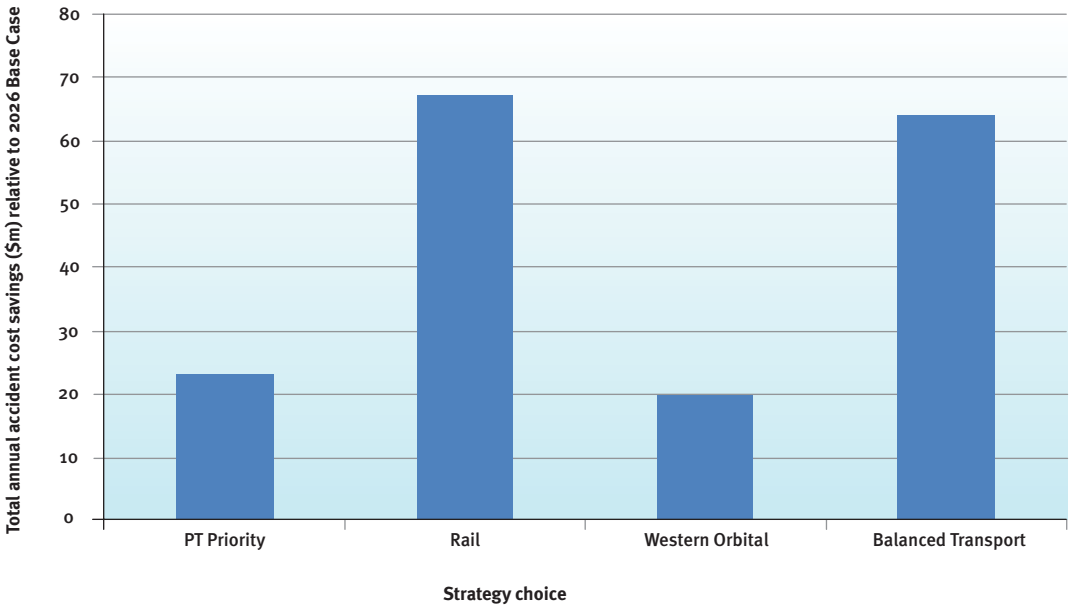


Figure 13.14 Annual accident cost savings, 2026

13.5 Environmental effects

Most environmental indicators were assessed using a scale of 1 to 5, by undertaking an examination of the impact of each transport scheme contained within each strategy.

Impacts on greenhouse gas emissions, air quality, landscape and water were assessed using the SEQSTM. Table 13.4 provides a summary of the assessment of all monetised benefits and strategies against each of the environmental indicators.

13.5.1 Performance against criteria

State Government regional planning context (land use)

This indicator is best addressed through the Public Transport Priority and Rail Strategies. They would not encourage development outside of the urban footprint, and development is projected to be generally consistent with the Regional Plan directions.

Community uses and spaces

This indicator is most effectively addressed through the Western Orbital Strategy as the impacts on the existing functions, amenity and access of community uses and open space areas would be minimal.

Urban character and amenity

The Balanced Transport Strategy would meet this indicator best as it would encourage urban renewal and minimise impacts on heritage buildings, locations and precincts.

Environmentally sensitive areas

This indicator is best addressed by the Public Transport Priority Strategy, which would minimise impacts on areas that are known to contain habitat for rare and threatened species of flora and fauna, essential habitat, or koala areas.

Impact on waterway crossings

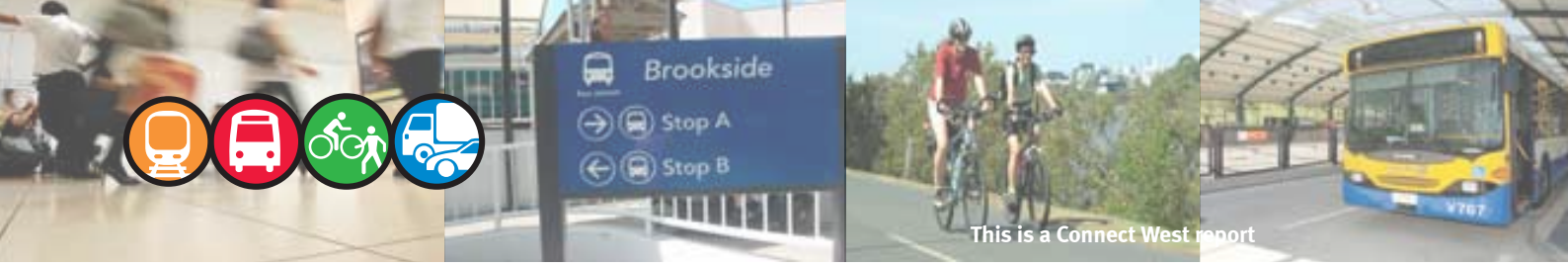
The Public Transport Priority Strategy would most effectively address this indicator, as there would be minimal impacts on waterway corridors with this strategy.

Table 13.4 Performance of each strategy against environmental indicators

SEQ REGIONAL PLAN TRANSPORT OBJECTIVES [1]	Effect[2]	Qualitative Description	Quantitative Measure	Assessment	Strategy Choice			
					Public Transport Priority	Rail	Western Orbital	Balanced Transport
ENVIRONMENTAL Provide sustainable travel solutions	State Government Regional Planning context (Land use)	1=Beneficial impact 2=Low negative impact 3=High negative impact	–	Rating	1	1	1	1
	Community uses and spaces		–	Rating	3	3	2	3
	Urban character and amenity		–	Rating	3	3	2	2
	Environmentally sensitive areas		–	Rating	2	2	2	2
	Impact on waterway crossings		–	Rating	2	2	2	2
	Greenhouse gases		Annual reduction in CO_2 tonnes [3]	PVB ($m 2005)	10	30	10	30
	Air quality		Annual reduction in VKT [3]	PVB ($m 2005)	20	60	20	50
	Landscape			PVB ($m 2005)	2	6	2	5
	Water			PVB ($m 2005)	0	0	0	0

Notes:

1. Derived from Office of Urban Management, South East Queensland Regional Plan 2005–2026, Part F Section 12.
2. All effects are measured/assessed incremental to the 2026 Base Case, i.e. In terms of their effect on the situation in the Base Case.
3. Monetised using standard economic appraisal parameter unit values.



Greenhouse gas emissions

The Rail Strategy and Balanced Transport Strategy would contribute most effectively to reducing emissions, as both would significantly reduce the number of private vehicle trips undertaken. The Public Transport Priority Strategy and the Western Orbital Strategy are forecast to provide significantly lower benefits, due to fewer trips attracted to public transport in both strategies. Figure 13.15 illustrates differences between strategies.

Impact on air quality, landscape and water

Rail Strategy and Balanced Transport Strategy would least affect air quality, landscape and water, as both would significantly reduce the number of private vehicle trips undertaken. The Public Transport Priority Strategy and the Western Orbital Strategy are forecast to provide significantly lower benefits, as a result of fewer trips attracted to public transport in both strategies. Figure 13.16 presents this analysis.

13.5.2 Summary of environmental effects

Overall, all four strategies would perform similarly to one another in terms of qualitative assessment, although it is noticeable that the Balanced Transport Strategy would perform better than the other strategies in terms of impact on urban character and amenity. In terms of impacts on greenhouse gas emissions, air quality, landscape and water, the Rail and Balanced Transport Strategies would generate two to three times the benefits of the Public Transport Priority and Western Orbital Strategies.

13.6 Operational analysis of network strategy choices

This section provides a summary of the performance of each strategy against a number of network operational indicators, extracted from the SEQSTM.

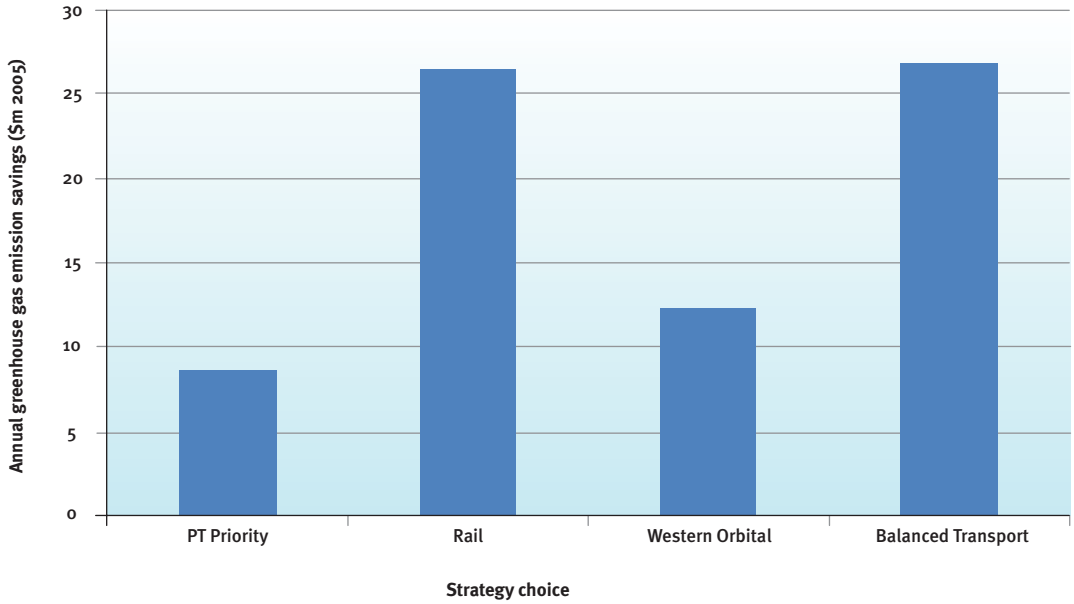


Figure 13.15 Annual greenhouse gas emission savings, 2026

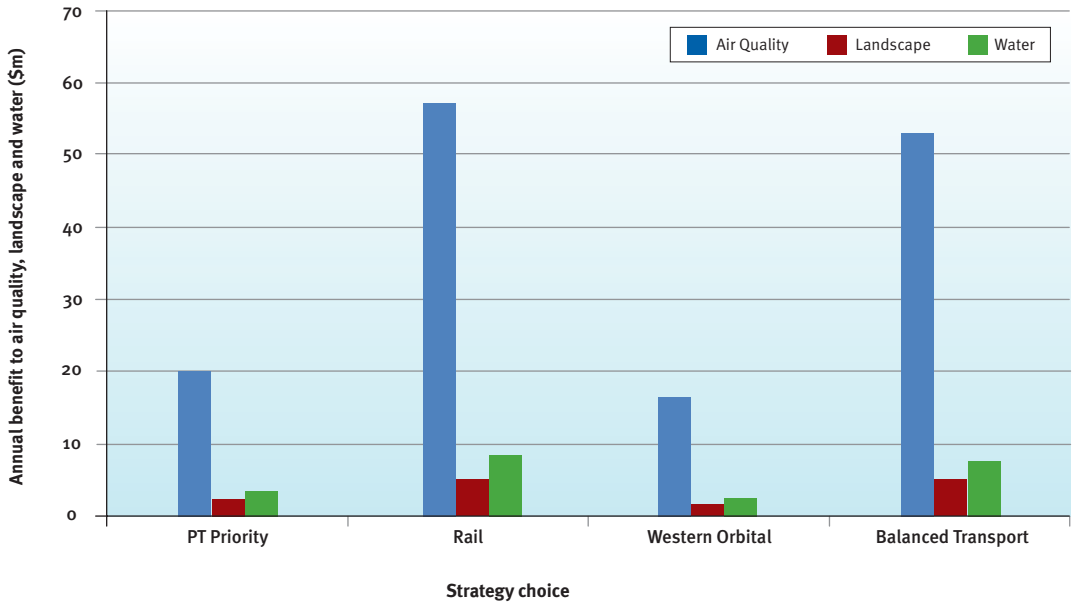


Figure 13.16 Impact on air quality, landscape and water, 2026

13.6.1 Distance travelled on the road network

Distance travelled on the road network would be significantly reduced in the Rail Strategy and Balanced Transport Strategy. There are significantly lower reductions in the Public Transport Priority Strategy and Western Orbital Strategy, as shown in Figure 13.17. While overall travel time would be reduced, the effect of road improvements in the Western Orbital Strategy would be to decrease distance travelled on the road network.

13.6.2 Time travelled on the road network

The Balanced Transport Strategy would have the greatest effect on reducing time travelled on the road network. This is closely followed by the Rail Strategy, which indicates that 'High' PT would have a significantly greater reduction in time travelled on the road network than the combination of road options included in the Western Orbital Strategy. This is shown in Figure 13.18.

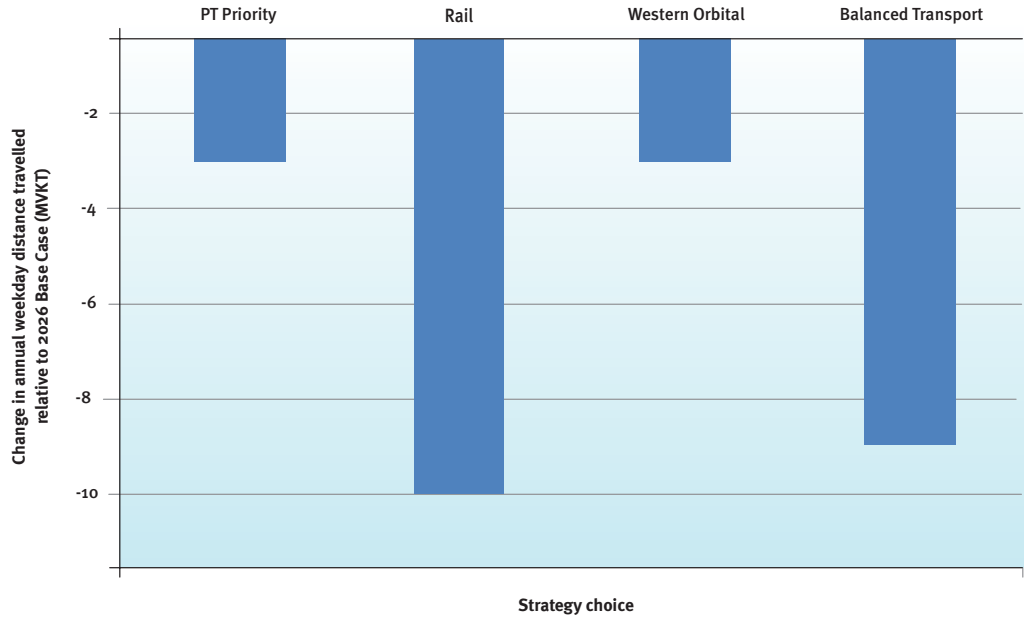


Figure 13.17 Reduction in distance travelled on the Brisbane road network, 2026

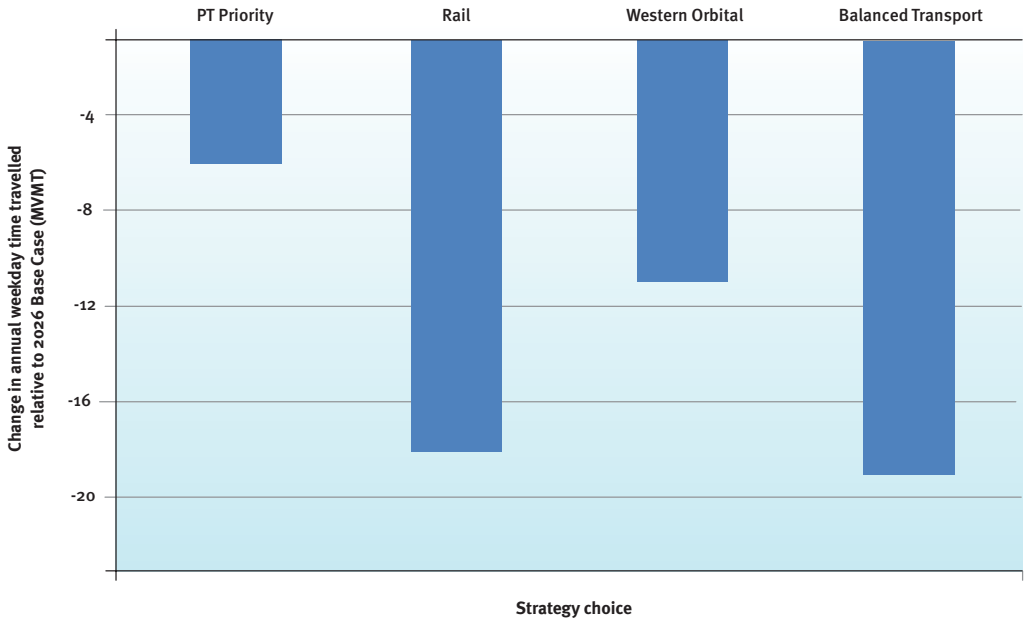


Figure 13.18 Reduction in time travelled on the Brisbane road network, 2026

13.6.3 Average speed on the road network

The Balanced Transport Strategy would have the greatest impact on improving average travel speeds on the road network in the AM peak, as it would benefit from the combination of the Rail Strategy and the Western Orbital Strategy, which are each shown to have a similar effect. This is shown in Figure 13.19.

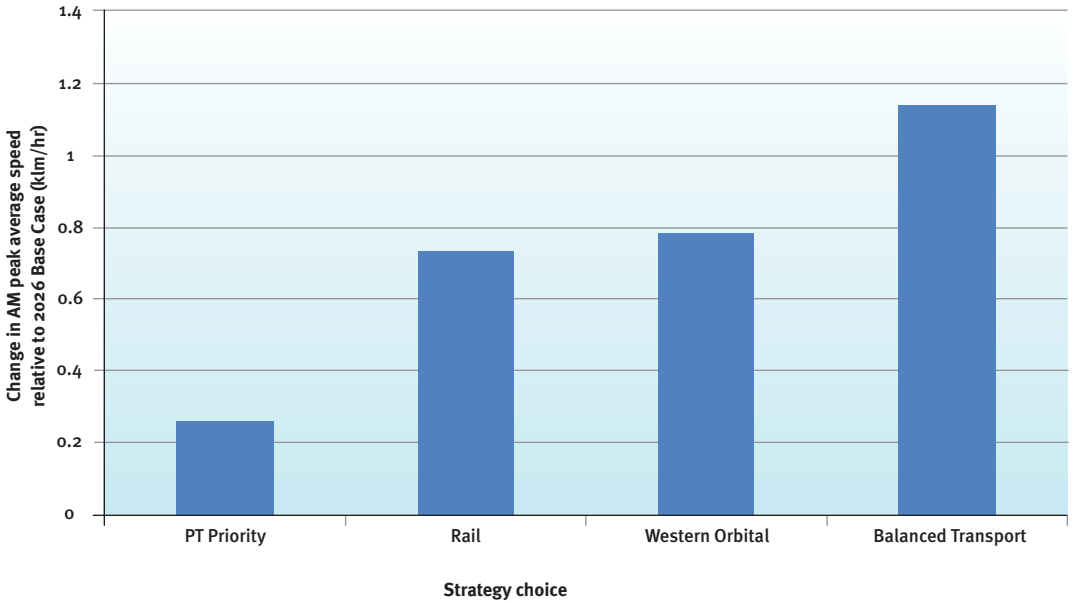


Figure 13.19 Change in average speed on the Brisbane road network, 2026

13.7 Corridor assessment

This section provides a summary of the performance of each strategy at a road corridor level, based on the regional network model SEQSTM. Individual corridors within the strategy will need more detailed assessment to determine project effects.

13.7.1 Road safety

In general the estimated number of reported accidents would remain much the same across the network for all strategies. The most substantial change would occur on Gympie Road, as the Western Orbital Strategy and the Balanced Transport Strategy would bring about a significant reduction in accidents due to the traffic effect of the North West Transport Corridor/Northern Crosslink Corridor implementation. The analysis is summarised in Figure 13.20.

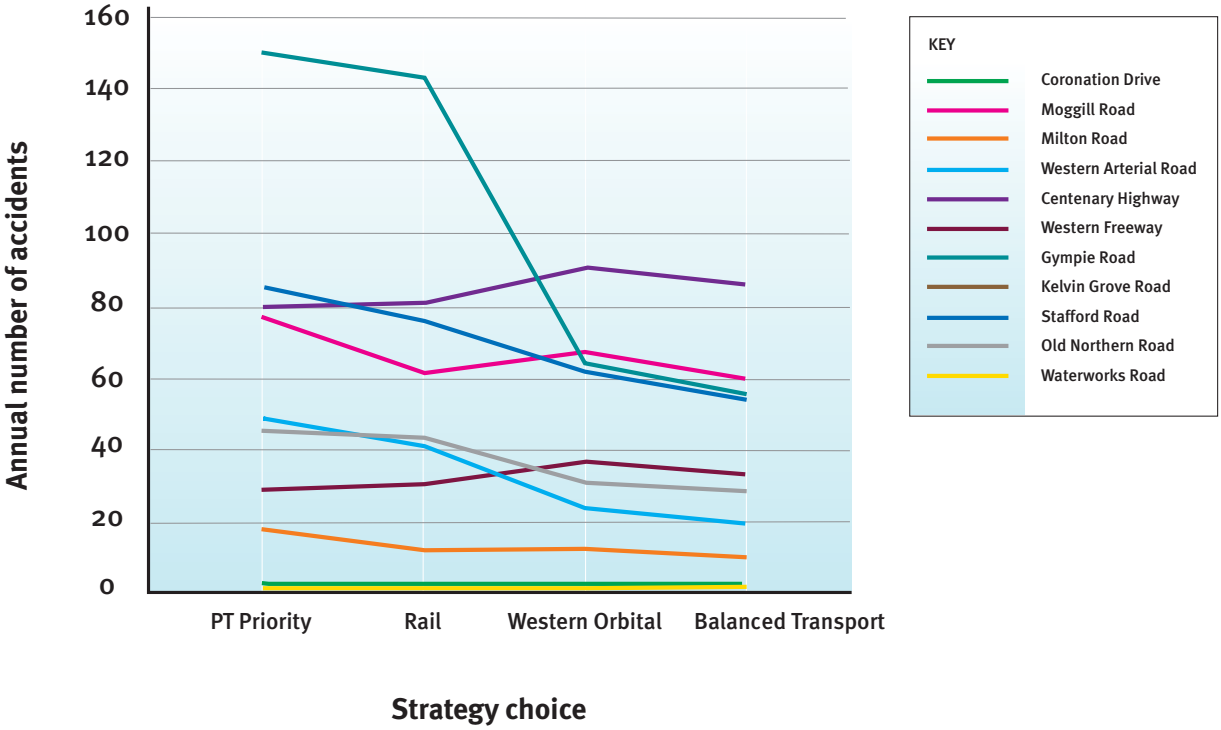


Figure 13.20 Estimated number of accidents per corridor, 2026

13.7.2 Bus reliability

Bus reliability is best investigated at a project level. To assess this indicator, the effect of each strategy on road travel conditions for buses was rated, using both the SEQSTM and qualitative judgment.

This is shown in Table 13.5.

A rating scale of 1 to 3 was used, whereby 3 represents the greatest improvement in reliability. In general the impact on bus reliability along the key corridors remains much the same across all strategies. Due to the effect of Inner Orbital/North West Transport Corridor, the Western Orbital and Balanced Transport Strategies would be most effective along Gympie Road. The Rail, Western Orbital and Balanced Transport Strategies would be most effective along Milton Road due to the combined effect of Northern Link, Inner Orbital and 'High' PT.

There are a number of corridors on which every strategy is shown to have a high positive effect on reliability as these corridors are planned to have significant bus priority measures as part of 'Low' PT. The Rail and Balanced Transport Strategies are shown to have a high impact along Stafford Road, as this corridor is planned to have bus priority measures as part of 'High' PT.

Table 13.5 Ratings of bus reliability on key corridors, 2026

	PT Priority	Rail	Western Orbital	Balanced Transport
Coronation Drive	3	3	3	3
Moggill Road	1	1	1	1
Milton Road	1	3	3	3
Metroad 5	1	2	2	2
Centenary Motorway	1	2	2	2
Western Freeway	1	1	1	1
Gympie Road	1	1	2	2
Gateway Motorway	1	1	1	1
Inner City Bypass	1	1	1	1
Kelvin Grove Road	3	3	3	3
Stafford Road	1	3	1	3
Old Northern Road	1	1	1	1
Waterworks Road	3	3	3	3
Samford Road	1	1	1	1
Brisbane Valley Highway	1	1	1	1
Rating – Low improvement (1), Medium improvement (2), High improvement (3).				

13.7.3 Impact on walking and cycling

The impact of each strategy choice on walking and cycling movement is shown in Table 13.6. A rating scale of 1 to 3, whereby three represents the greatest improvement in quality of walking and cycling, has been used.

All strategies are forecast to significantly improve conditions for walking and cycling along Coronation Drive and Kelvin Grove Road. The Rail, Western Orbital and Balanced Transport Strategies would significantly improve conditions for walking and cycling along Milton Road, Metroad 5, Stafford Road and Old Northern Road. The Western Orbital and Balanced Transport Strategies would significantly improve walking and cycling conditions along Gympie Road.

13.7.4 Impact on road travel conditions

Assessment has been made of the impact of each strategy on road travel conditions for private vehicles, using the SEQSTM. This assessment is summarised in Table 13.7.

Coronation Drive

The Rail, Western Orbital and Balanced Transport Strategies would have the most significant effects, with almost a halving of traffic in the Balanced Transport Strategy. This reduction in traffic is mirrored by improvements in travel time and speed in all three strategies. The Public Transport Priority Strategy, while also reducing traffic levels, would not have a noticeable impact on travel conditions compared with the committed 2026 Base Case (SEQIPP). The corridor is likely to be operating under congested conditions in peak periods.

Moggill Road

The Rail, Western Orbital and Balanced Transport strategies would have the most positive effect on traffic levels. There would be no major improvement in travel conditions under any of the strategies when compared with the 2026 Base Case. This can only be because the model does not show Moggill Road as operating well in the 2026 Base Case.

Milton Road

There would be major improvements in travel conditions in the Rail, Western Orbital and Balanced Transport Strategies, including more than a halving of travel time and doubling of travel speeds as a result of the Northern Link. The Public Transport Priority Strategy is characterised by a marginal worsening of travel conditions and the continuance of congested conditions along this corridor.

Table 13.6 Ratings of impact on walking and cycling on key corridors, 2026

	PT Priority	Rail	Western Orbital	Balanced Transport
Coronation Drive	3	3	3	3
Moggill Road	3	3	2	3
Milton Road	1	3	3	3
Metroad 5	1	3	3	3
Gympie Road	2	2	3	3
Kelvin Grove Road	3	3	3	3
Stafford Road	2	3	3	3
Old Northern Road	1	3	3	3
Waterworks Road	2	3	2	3
Samford Road	2	2	1	2
Brisbane Valley Highway	1	1	2	2
Rating – Low improvement (1), Medium improvement (2), High improvement (3).				

Table 13.7 Impact on road travel conditions on key corridors 2026

		Total Daily Traffic Volumes (no of vehicles)					Daily Average Travel Time (minutes)						Daily Average Travel Speed (km/hr)						AM Peak Congestion					
Road	Direction	2026 Base Case	Public Transport Priority	Rail	Western Orbital	Balanced	Critical direction	2026 Base Case	Public Transport Priority	Rail	Western Orbital	Balanced	Critical direction	2026 Base Case	Public Transport Priority	Rail	Western Orbital	Balanced	Critical direction	2026 Base Case	Public Transport Priority	Rail	Western Orbital	Balanced Transport
Coronation Dr	Total 2-way	93,000	76,000	57,000	62,000	49,000	Outbound	4.50	4.20	2.30	2.50	2.30	Outbound	20.01	21.19	35.96	33.84	37.16	Inbound	C	C	U	U	U
Moggill Rd East	Total 2-way	49,000	43,000	32,000	36,000	32,000	Outbound	8.00	7.80	7.70	7.80	7.60	Inbound	39.39	39.21	40.55	40.44	40.80	Inbound	C	C	U	U	U
Moggill Rd West	Total 2-way	18,000	16,000	14,000	14,000	14,000	Outbound	8.10	8.10	8.10	8.10	8.10	Inbound	38.56	38.60	38.62	38.63	38.64	Inbound	U	U	U	U	U
Milton Rd	Total 2-way	42,000	42,000	28,000	31,000	25,000	Inbound	9.80	10.00	4.50	4.50	4.50	Inbound	16.58	16.30	34.69	34.58	36.09	Inbound	C	C	U	U	U
Metroad 5 Sth	Total 2-way	28,000	28,000	26,000	11,000	10,000	Southbound	10.00	9.70	7.80	6.80	6.70	Southbound	27.79	28.21	33.15	38.46	38.68	Southbound	U	U	U	U	U
Metroad 5 Nth	Total 2-way	42,000	42,000	34,000	22,000	19,000	Northbound	6.80	6.80	6.20	5.90	5.90	Northbound	36.35	37.48	39.82	42.23	42.51	Southbound	U	U	U	U	U
Centenary Hwy	Total 2-way	135,000	135,000	134,000	150,000	141,000	Outbound	5.00	4340	3.50	3.80	3.60	Outbound	72.87	78.66	89.25	85.41	88.80	Inbound	C	C	U	U	U
Western Fwy	Total 2-way	109,000	109,000	112,000	137,000	125,000	Outbound	4.30	4.00	3.80	4.00	3.80	Inbound	75.25	77.37	81.41	77.77	81.28	Inbound	U	U	U	U	U
Lutwyche Rd	Total 2-way	39,000	39,000	25,000	26,000	21,000	Inbound	6.10	5.40	5.40	5.40	5.40	Outbound	38.99	39.50	39.58	39.56	39.60	Inbound	U	U	U	U	U
Gympie Rd Nth	Total 2-way	98,000	98,000	92,000	39,000	36,000	Outbound	8.00	7.70	7.50	6.90	6.90	Outbound	42.69	43.98	44.72	49.51	49.64	Inbound	U	U	U	U	U
Gympie Rd Sth	Total 2-way	97,000	97,000	84,000	39,000	32,000	Outbound	4.70	4.50	4.50	4.30	4.30	Outbound	40.07	41.20	42.10	43.06	43.09	Inbound	U	U	U	U	U
Gateway Motorway Sth	Total 2-way	89,000	89,000	84,000	80,000	78,000	Southbound	22.10	22.10	21.10	22.40	21.40	Southbound	73.13	75.06	77.53	75.33	77.25	Northbound	U	U	U	U	U
Gateway Motorway Nth	Total 2-way	96,000	96,000	92,000	83,000	82,000	Northbound	12.00	11.20	10.90	10.60	10.40	Northbound	78.56	84.22	86.53	88.21	87.70	Southbound	U	U	U	U	U
Inner City Bypass West	Total 2-way	100,000	100,000	91,000	62,000	50,000	Eastbound	1.60	1.60	1.60	1.60	1.60	Eastbound	71.84	71.90	71.84	71.90	71.94	Eastbound	U	U	U	U	U
Inner City Bypass East	Total 2-way	45,000	45,000	41,000	40,000	36,000	Westbound	2.20	2.20	2.20	2.20	2.20	Eastbound	60.62	60.60	60.62	60.60	60.65	Westbound	U	U	U	U	U
Kelvin Grove Rd	Total 2-way	57,000	57,000	42,000	44,000	37,000	Outbound	5.80	5.80	5.60	5.60	5.50	Outbound	39.88	39.77	40.15	39.77	40.05	Inbound	U	U	U	U	U
Stafford Rd	Total 2-way	37,000	37,000	31,000	25,000	22,000	Outbound	6.30	6.20	6.10	6.40	6.20	Outbound	40.79	41.73	41.96	41.62	41.80	Inbound	U	U	U	U	U
Old Northern Rd	Total 2-way	36,000	36,000	32,000	23,000	21,000	Outbound	11.40	10.80	10.30	10.00	9.90	Outbound	43.32	44.87	46.06	47.88	48.23	Inbound	U	U	U	U	U
Waterworks Rd East	Total 2-way	36,000	36,000	27,000	30,000	25,000	Outbound	4.20	4.50	4.30	4.20	4.20	Outbound	37.37	36.92	37.84	37.44	38.25	Inbound	U	U	U	U	U
Waterworks Rd West	Total 2-way	26,000	26,000	22,000	24,000	22,000	Outbound	7.20	7.20	7.20	8.70	8.00	Inbound	42.77	42.38	42.78	38.45	39.66	Inbound	U	U	U	U	U
Brisbane Valley Hwy Sth	Total 2-way	11,000	11,000	11,000	11,000	11,000	Inbound	12.80	12.80	12.80	12.80	12.80	Inbound	77.59	77.56	77.56	77.61	77.62	Inbound	U	U	U	U	U
Brisbane Valley Hwy Nth	Total 2-way	5,000	5,000	5,000	5,000	5,000	Southbound	48.30	48.30	48.30	48.20	48.10	Southbound	84.66	84.62	84.62	84.66	84.66	Northbound	U	U	U	U	U
Samford Rd	Total 2-way	23,000	23,000	22,000	22,000	22,000	Outbound	19.90	19.10	18.80	19.70	19.40	Outbound	47.03	47.77	48.43	47.41	47.92	Inbound	U	U	U	U	U

Key: C = Congested conditions U = Uncongested conditions

Metroad 5

The Western Orbital and Balanced Transport Strategies would be most effective in improving travel conditions along this corridor, as they would both include the Western Orbital road schemes which would relieve traffic along this existing orbital route.

Centenary Motorway

Despite large increases in traffic volumes along this corridor under the Rail, Western Orbital and Balanced Transport Strategies, there would be noticeable improvements in travel conditions due to the upgrade of this corridor combined with improvements to public transport. Although there would be marginal improvements in the Public Transport Priority Strategy, this corridor would remain congested at peak periods under this strategy.

Western Freeway

There would be noticeable improvements in travel conditions along this corridor in all strategies when compared with the 2026 Base Case (SEQIPP).

Gympie Road

Traffic volumes would be reduced by as much as two-thirds on this corridor (when compared with the 2026 Base Case) in the Western Orbital and Balanced Transport Strategies due to the effect of the North West Transport Corridor.

Gateway Motorway

There would be marginal improvements in travel conditions on this corridor in all strategies.

Inner City Bypass

There would be major reductions in traffic volumes along this corridor in the Western Orbital and Balanced Transport Strategies, including up to a halving of peak traffic volumes in the Balanced Transport Strategy. However, changes in travel conditions along this corridor would be unlikely, mainly due to the uncongested conditions that would be likely along this corridor in the 2026 Base Case.

Kelvin Grove Road

Despite significant reductions in peak traffic volumes in all strategies, there would be small improvements in travel conditions along this corridor, mainly due to the uncongested conditions that would be likely along this corridor in the 2026 Base Case.

Stafford Road

Reductions in peak traffic volumes are likely in all strategies. Small changes in travel conditions along this corridor would be expected, due to the uncongested conditions that would be likely along this corridor in the 2026 Base Case.

Old Northern Road

The Western Orbital and Balanced Transport Strategies would be most effective in improving travel conditions along this corridor, mainly due to the effect of the North West Transport Corridor.

Waterworks Road

There would be a marginal worsening of travel conditions on this corridor in all strategies, mainly due to the effect of reduced road space for private vehicles caused by the bus lane in this corridor.

Brisbane Valley Highway

There would be little change to travel conditions along this corridor in all strategies.

Samford Road

There would be little change to travel conditions along this corridor in all strategies.

13.7.5 Summary of corridor effects

Coronation Drive, Milton Road and Gympie Road are forecast to benefit most in terms of improvements to travel conditions across all modes. The Rail, Western Orbital and Balanced Transport Strategies would improve travel conditions along Coronation Drive and Milton Road for private vehicles, buses, pedestrians and cyclists. The Western Orbital and Balanced Transport Strategies would improve travel conditions along Gympie Road for private vehicles, buses, pedestrians and cyclists, including a significant improvement in road safety.

13.8 Pair-wise assessment of strategies

A pair-wise comparison of key effects to identify the major differences between strategies was undertaken to inform discussions on the preferred strategy. The two strategies which include a 'Low' PT level of investment (Public Transport Priority and Western Orbital) were firstly compared to determine whether a Western Orbital strategy would be required as part of the preferred strategy in addition to implementing the Public Transport Priority Strategy, which is considered as a first step in strategy development.

13.8.1 Public Transport Priority and Western Orbital Strategies

The following key findings are made in relation to the pair-wise assessment of the Public Transport Priority Strategy and Western Orbital Strategy:

- The Western Orbital Strategy would meet strategic fit objectives more effectively;
- Western Orbital Strategy would provide greater travel time benefits than the Public Transport Priority Strategy;
- Western Orbital Strategy however would incur a significantly greater cost than the Public Transport Priority Strategy;
- The Public Transport Priority Strategy would perform better in economic terms;
- Western Orbital Strategy would improve road safety and conditions for all modes along Gympie Road, as well as improving conditions for all modes along Coronation Drive and Milton Road. The Public Transport Priority Strategy would not provide these benefits; and
- Western Orbital Strategy is also forecast to improve road travel conditions along Metroad 5 and Centenary Motorway and conditions for pedestrians and cyclists along Metroad 5, Stafford Road and Old Northern Road. The Public Transport Priority Strategy would not provide these benefits.

Based on these findings, it is considered that the Western Orbital Strategy meets strategic objectives and generates greater user benefits than the Public Transport Priority Strategy. While the Public Transport Priority Strategy provides a better economic return the preference would be to include an Inner Orbital (Western Orbital Strategy) in the preferred strategy rather than the Public Transport Priority Strategy due to the strategic benefits of enhancing the orbital road network.

13.8.2 Western Orbital and Rail Strategies

While a Western Orbital Strategy might be preferred in a straight choice with the Public Transport Priority Strategy, its economic case is less certain. Therefore, this pair-wise assessment compares the Western Orbital Strategy with the Rail Strategy.

The following key findings are made in relation to the pair-wise assessment of the Western Orbital Strategy and the Rail Strategy:

- Western Orbital Strategy would meet some strategic fit objectives, relating to the development of the orbital road network and network integration, more effectively. The Rail Strategy would meet other strategic fit objectives, relating to the development of the public transport system, more effectively;
- The Rail Strategy would meet economic and financial objectives more effectively than Western Orbital Strategy. This is due to higher public transport user benefits, greater reduction in public transport congestion, greater private and freight vehicle user benefits, greater impact on reducing road congestion and significantly lower cost. The combination of these factors means that the Rail Strategy has a stronger economic case than the Western Orbital Strategy;
- Due to a greater emphasis on public transport and its impact on reducing road accidents through lower private vehicle usage, the Rail Strategy would meet social objectives more effectively;
- Due to its impact on reducing environmental externalities, the Rail Strategy would meet environmental objectives more effectively;
- Western Orbital Strategy would improve road safety and conditions for all modes along Gympie Road and road travel conditions along Metroad 5;
- Both strategies are forecast to improve conditions for all modes along Coronation Drive and Milton Road and road travel conditions along Centenary Motorway; and
- The Western Orbital Strategy would improve conditions for buses along Stafford Road.

Based on these findings, the Rail Strategy meets a wider range of objectives and would perform better in economic terms than the Western Orbital Strategy. In a choice between these two strategies, the preference would be to include a Rail Strategy in the preferred strategy rather than a Western Orbital Strategy.

13.8.3 Rail and Balanced Transport Strategies

While it is established that the Rail Strategy should be included as part of a preferred strategy, it remains to be assessed whether this would be best provided on its own or in combination with the Western Orbital Strategy to create a Balanced Transport Strategy.

The following key findings are made in relation to the pair-wise assessment of the Rail and Balanced Transport Strategies:

- Both strategies include the Rail Strategy, therefore both strategies meet the strategic objectives relating to the development of the public transport system equally. The Balanced Transport Strategy would meet with strategic objectives relating to the development of the orbital road network and network integration more effectively;
- Both strategies would generate similar levels of user benefit;
- The Rail Strategy has a stronger economic case than the Balanced Transport Strategy;
- Both strategies would generate similar social and environmental benefits;
- The Balanced Transport Strategy would improve road safety and conditions for all modes along Gympie Road and road travel conditions along Metroad 5;
- Both strategies are forecast to improve conditions for all modes along Coronation Drive and Milton Road and road travel conditions along Centenary Motorway; and
- The Balanced Transport Strategy would improve conditions for buses along Stafford Road.

To conclude, although the Balanced Transport Strategy presents an inferior economic case in comparison to the Rail Strategy, it is forecast to effectively break even in economic terms. The Balanced Transport Strategy also would meet a wider range of objectives including strategic objectives relating to the development of the Western Orbital and network integration. Therefore, in a choice between the two strategies, the preference would be to implement a Balanced Transport Strategy.

Based on the data and analysis presented in this chapter, it is concluded that the preferred strategy is the Balanced Transport Strategy.

13.9 Conclusion – Why the Balanced Transport Strategy?

This chapter has used a wide range of performance data to undertake a number of assessments in order to follow a logical path to identifying a preferred strategy. It has identified where the Balanced Transport Strategy would perform better than other strategies on account of its own merits. It is reasonable to ask, however, whether alternative, less costly strategies adequately meet the transport demands of western Brisbane, regardless of the better performance of the Balanced Transport Strategy. In particular, the Rail Strategy has been shown to be both less expensive and more cost-effective than the Balanced Transport Strategy thus prompting the question 'Does the Rail Strategy adequately meet the transport demands of western Brisbane?'

To answer this question, it is necessary to identify shortcomings in the Rail Strategy by itself when compared with the study objectives. Specifically, the Rail Strategy:

- Only partly meets the State Government objective to improve the orbital/ring road network, as Northern Link may also serve radial traffic (Northern Link is included in both the Rail and Balanced Transport Strategies);
- Only partly meets the State Government objective to improve road freight operations (and reduce freight costs), as north-south freight movements around Brisbane are not addressed;
- Would not cater for strong road use demand between north of Brisbane and the CBD;
- Would not relieve traffic congestion along Coronation Drive, Milton Road, Metroad 5 and Gympie Road to as great an extent as the Balanced Strategy;
- Would not compare well in terms of enhancing economic development; and
- Would have a 'low negative impact' on property acquisition, amenity, community uses and spaces and urban character and amenity.

The Balanced Transport Strategy, in contrast, would address all these short-comings except the impact on property acquisition, amenity and community uses and spaces. Of particular importance is the role of the Balanced Transport Strategy in catering for strong demand between north of Brisbane and the CBD; while it could be argued that greater congestion is a necessary price to pay for implementing the Rail Strategy, such an outcome would be a risky approach when taking into account Brisbane's low land use densities. Such densities do not result in high public transport usage even taking into account significant investment in public transport as proposed as part of the Rail strategy (the overall public transport mode share target for public transport under 'High' PT is around 12 per cent). Therefore, there is a greater risk attached to the Rail Strategy by itself that if public transport mode share targets are not achieved, the road network would not be able to cater for the additional road use demand. Furthermore, high investment in rail by itself would not significantly change behaviour of using the private car for non-commuter, non-peak trips, bearing in mind that the majority of daily trips will still be made by car in 2026 as they are today, even with increasing transport costs. The whole purpose of the Balanced Transport Strategy is a recognition of the limited scope for public transport to meet growth in travel demand on its own and a lower risk that the transport system as a whole would not be able to meet daily travel demands in 2026.

14.0 How do we see the future?

14.1 Introduction

A necessary requirement for the western Brisbane transport network and the preferred strategy network is to fit into a longer-term land use and transport vision.

The vision for the future contains key outcomes gleaned from stakeholder and community feedback which would require some important changes to the way we go about planning for the region as defined in the current Regional Plan. These outcomes are described in this chapter and are fundamental to meeting the vision for western Brisbane:

- Denser land use;
- Transit oriented development;
- More walk/cycle;
- Higher public transport use;
- Strategic road network hierarchy;
- Rail as the backbone of the public transport network;
- Shorter average trip lengths;
- More affordable housing;
- More affordable transport;
- Lower congestion;
- Protected natural resources;
- Improved accessibility; and
- Reduced freight costs.

A 'Beyond 2026' workshop was held with key government stakeholders to develop a shared vision for potential prospective development patterns beyond the forecast year of 2026 of the Regional Plan. The Mt. Lindesay Beaudesert Strategic Transport Network Investigation (MLBSTNI) was identified as a projected 2056 demographic profile for the western Brisbane area. It is recognised that such a basis will change over time.

The land use scenarios used for the MLBSTNI built upon the medium series trend 2026 demographics contained in the Regional Plan. The continuation of the medium series trend projections (i.e. based on an annual growth of 1.26 per cent) was used to develop the 2056 demographic data. The chosen data set represented a consolidated compact urban settlement pattern.

The population is projected to grow by approximately 25 per cent to 2056 with an additional 1.34 million people to be accommodated within the region to reach a total of 5.3 million residents. In terms of employment, it was projected that total employment numbers would grow by approximately 31 per cent by 2056 which would equate to an additional 635,000 jobs (growing to a total employment pool of 2 million).

According to the 2056 demographic data set, western Brisbane would need to accommodate a total population of approximately 543,000 people, which is a growth of about 120,000 people (22 per cent) over 2026 population. With regards to employment, western Brisbane would accommodate an additional 33,000 jobs, with an employment growth of 21 per cent.

In light of the rapid growth within SEQ, these population projections were considered to be very conservative. A 2056 demographic vision of an additional 500,000 residents across western Brisbane was therefore also explored, i.e. a total potential population of 1 million west and north-west of the Brisbane CBD between Moggill and Strathpine.

14.2 Land use vision beyond 2026

The strategic development opportunities of western Brisbane have been largely overlooked and neglected over the past 20 years or so, as development has been taking place at the metropolitan fringe spurred on by planned low density land development, relatively lower cost housing and lower transport costs.

The region has spread considerably over the last 20 years at the expense of development opportunities closer to the Brisbane CBD. At the same time the population of the SEQ region has reached 2.6 million people. The resulting low density development pattern and trend in increasing average trip lengths on the regional transport network is not sustainable, particularly as we are certain to now have to live in a future of increasing transport costs, including the increasing costs of road congestion and peak oil.

By 2056 the region's population is expected to reach over 5 million which would mean at least a doubling over the next 40 years. Western Brisbane offers major opportunities for growth and closer access to the CBD for many more people to live and work.

The land use vision for 'Beyond 2026' projects that the western Brisbane area would develop through a network of integrated, mixed use, high density transport nodes and activity centres that facilitate land use and transport integration. The environmental values of the region are recognised, protecting the areas of environmental significance.

In developing this vision, consideration has been given to the 2056 demographics which project significant growth within SEQ and the western Brisbane area. Whilst the demographic data identifies that population growth to 2056 would be significant, it is considered that this data is conservative and has underestimated the potential growth. As a result, future planning needs to consider a higher population growth which would work towards a future proofing of the current planning provisions.

The Urban Footprint, defined within the Regional Plan, delineates the areas that are to be utilised for urban development and the areas that are to be conserved to 2026. The 2026 urban footprint has been considered for the 2056 vision and through densification the footprint can be maintained. There are areas of growth potential in fringe areas of the footprint that could provide opportunities for future urban development, but these would be exceptions. One such exception would be the potential for expansion of the urban footprint in the area to the south of Mt. Crosby Road, utilising the existing University of Queensland Moggill Farm site and greenfield areas in this location.

The vision recognises that to accommodate the projected population for the western Brisbane area, densification across the existing urban area would need to occur. Land use density would be consistently increased across the urban footprint area with intensification and development concentrated around key transport nodes and activity centres, forming a polycentric urban land use pattern.

Transport nodes and activity centres would be integral as high density, mixed use developments that support employment and residential land uses. These nodes and centres would be located next to, or incorporate, high quality, high frequency public transport connections. Transport nodes and activity centres would form a network of interconnected hubs that would provide a focus for residential and employment land use whilst also catering for day-to-day services.

There are development opportunities in western Brisbane far beyond the Regional Plan which would be supported by new planning principles in line with current thinking in respect to:

- Denser living;
- Affordable urban housing;
- Greater use of passenger rail and development of new activity centres; and
- Transit oriented developments (TODs) around major rail and busway stations.

Market-driven employment would continue to grow in the Brisbane CBD and surrounding areas such as Fortitude Valley, Bowen Hills, Milton, South Bank and Woolloongabba and would need to be supplied with improved inner city rail and bus transport to support the distribution of trips across the CBD and frame. This is outside the scope of the study.

There are environmental constraints to developing western Brisbane because of the topography (D'Aguilar Ranges), natural resources (Brisbane State Forest, water catchment management) and the Brisbane River. Looking beyond 2026 provides some real opportunities for new activity centres in western Brisbane such as Kenmore, Ferny Grove, Enoggera, Aspley, Albany Creek and Strathpine. Key areas with opportunities for land use change include Pinjarra Hills, Moggill and Warner.

Key activity centres that are projected to develop beyond 2026 include Chermside, Mitchelton, Toowong, Indooroopilly and Goodna. The activity centres identified are consistent with the Principal and Major Activity Centres proposed for western Brisbane within the SEQ Regional Plan. These centres are anticipated to develop further to the year 2056 and would be supported by high quality public transport connections.

In addition to the activity centres, there are also a number of transport nodes that would be developed along high frequency, reliable, public transport corridors. Aspley and Strathpine would form important transport nodes to the north, supported by rail and bus linkages. Key strategies that would support the development and viability of these centres could be a new rail line connecting Caboolture and Ferny Grove lines (possibly along the preserved North West Transport Corridor). Land use surrounding these nodes would form a dense concentration of mixed use development aimed at increasing the accessibility and patronage of public transport services.

Ferny Grove and Alderley would also develop as transport nodes to 2056. These nodes would be integrated with high frequency rail linkages along the Ferny Grove rail line and support the Activity Centre at Mitchelton. Alderley would also be supported by bus links along Kelvin Grove Road and South Pine Road – Old Northern Road which will further promote the junction as a vibrant transport hub.

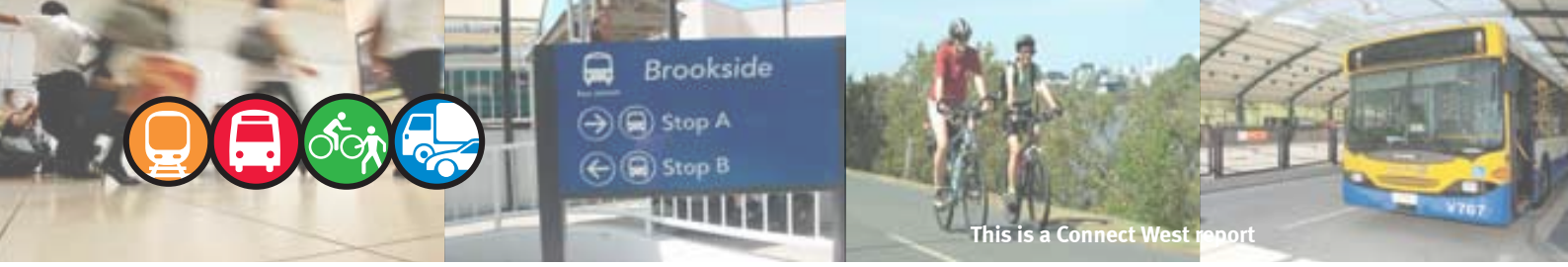
Along the Ipswich rail line, Milton, Wacol, Redbank and North Ipswich would be identified as transport nodes. Land use development at these locations would be facilitated through the provision of increased capacity along the Ipswich rail line. The transport node at Darra would be located at an important rail interchange where the Springfield rail connection will branch off the Ipswich line. Darra station would become a key transport junction for commuters travelling to Ipswich, Springfield and Brisbane centres.

Brisbane City would remain a key employment centre for SEQ, although decentralisation of employment is encouraged beyond 2026. A key direction of the beyond 2026 vision is that employment generating land uses would be located at centres, transport nodes and key employment locations (employment centres), locating employment closer to residential areas. The beyond 2026 vision identified a number of employment centres including Strathpine, Australia TradeCoast, Darra-Oxley-Wacol area, Dinmore and Ipswich.

The northern employment centre would integrate with the Strathpine transport node. By integrating the employment centre and the transport node, greater accessibility to this node would be facilitated.

Employment centre development would also be located within the Western Corridor along the Ipswich Motorway. Locations for employment centre development are projected to include the Oxley Wedge (encompassing Pallara, Heathwood and Larapinta) through to Darra and Wacol. Within Ipswich, the Ipswich City Centre and an area south of the Ipswich Motorway in Dinmore are indicated as Employment Centres.

The Australia TradeCoast, whilst not within western Brisbane, would become one of the most important Employment Centres for SEQ prior to and beyond 2026. This would develop as a major employment focus for the region, incorporating development at the Port of Brisbane and Brisbane Airport.



14.3 Transport vision beyond 2026

Looking beyond 2026, western Brisbane could accommodate an additional 500,000 people and 300,000 jobs compared with 2026. This would enable the region to achieve shorter average trip lengths and use of more sustainable transport modes. This would require:

- A much higher capacity public transport network;
- A complete road network without missing links;
- An extensive cycleway network; and
- Ongoing use of private and freight vehicles, albeit running on fuel other than oil.

It is reasonable to assume that in 20 to 50 years time higher transport costs would be the norm which could result in less trip-making for some trip purposes, shorter trip lengths, and very high public transport and active transport mode share.

New transport links would need to be built to serve a more efficient western Brisbane and SEQ region which could include consideration of:

- A rail spur line between Alderley and Strathpine;
- A busway to Albany Creek from Everton Park;
- New inner city distribution line (bus or light rail) serving the much larger CBD and frame;
- New CBD rail tunnels under, or bridges across the Brisbane River from the south to the CBD; and
- Additional north-south road capacity west of CBD.

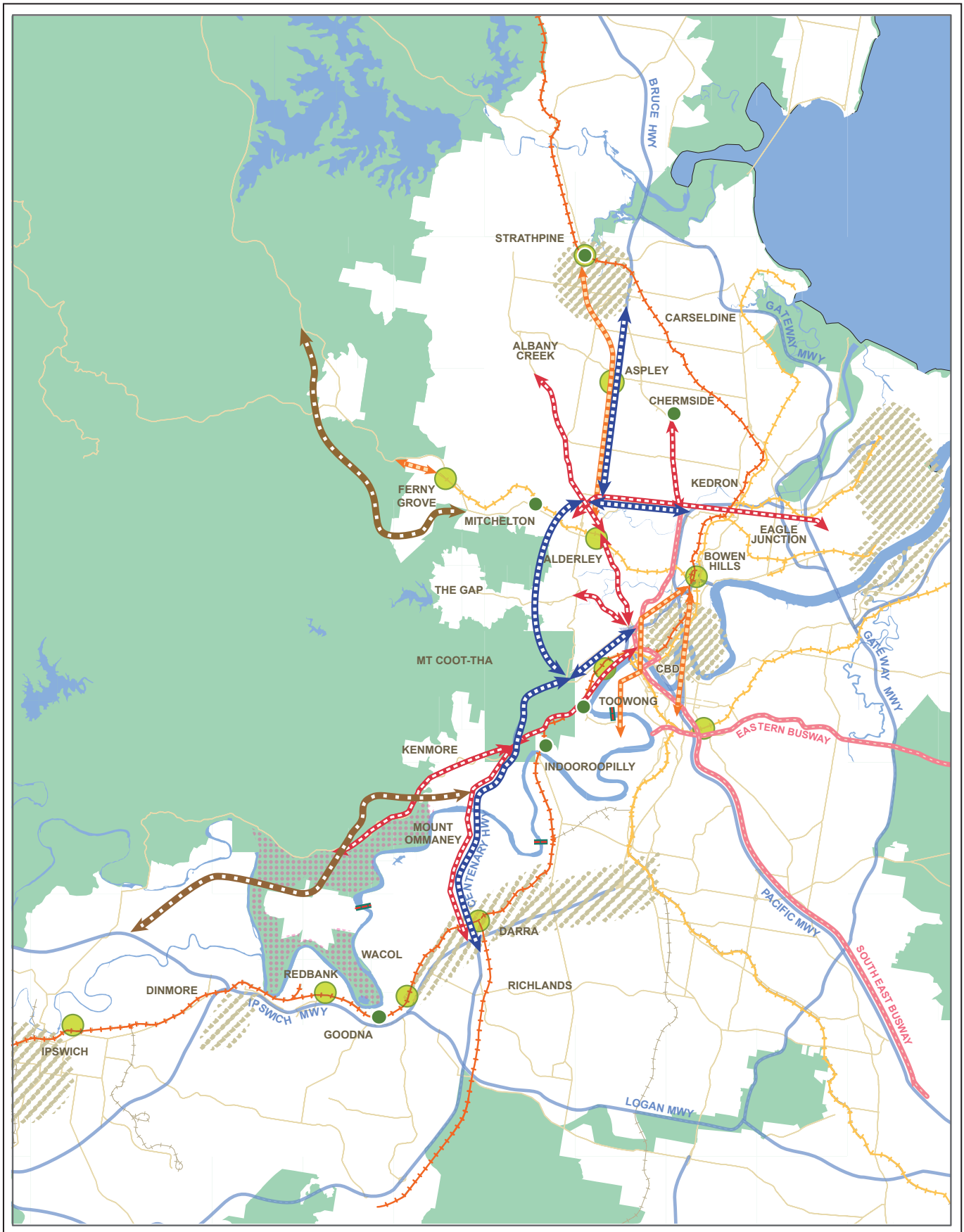
The rail spur between the Ferny Grove and Caboolture lines could potentially use part of the existing preserved North West Transport Corridor and support a population increase and land use vision for 2056.

With an expected regional population of over 5 million beyond 2026, the performance of the 2026 western Brisbane road network could decline and the demand for travel between the Western Corridor and the north could significantly increase. This would necessitate looking at alternative transport solutions. Before investigating a new corridor west of Mt. Coot-tha, more efficient use of the existing corridor through application of new communications and vehicle technology, and demand management along the Centenary Motorway and Milton Road would be warranted. While the latter would be very difficult due to topographic and land use constraints, the former would in turn instigate land use changes and possible expansion of the urban footprint, if that was desired. A west of Mt. Coot-tha Bypass would also require access routes from the south-west and the north-west, with the opportunity to utilise the preserved corridors of Moggill Pocket and Samford Valley Sub-Arterials.

The link would not be required unless there were major land use changes to the south of Brisbane.

Figure 14.1 presents one possible vision for western Brisbane capturing sustainable, effective and efficient urban development principles with a high capacity transport network.

The intention of the 2056 vision for western Brisbane is to move the SEQ region towards a more sustainable and compact urban form, one which public transport could support at an affordable cost to users and government.



WESTERN BRISBANE TRANSPORT NETWORK INVESTIGATION

LEGEND

- 2026 Urban Footprint
- Waterbodies
- Existing Motorway and Highway
- Existing or Committed Busway
- Existing Rail
- Metro Rail
- Road Option
- Bus Option
- Rail Option
- Pedestrian/Cycle River Link
- Preserved Corridor
- Activity Centre
- TOD
- Urban Footprint Expansion
- Employment Centres

Figure 14.1

Beyond 2026 land use and transport vision for western Brisbane

Queensland Government

connect west consortium

N

0 2 4 Km

1:200,000 on A4

Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

15.0 Treatment of uncertainty

15.1 Introduction

The network investigation addressed those aspects of the development and assessment of strategy which were considered to give rise to uncertainty. The treatment of uncertainty is presented in this chapter under the following headings:

- Analytical basis;
- Uncertainty of key assumptions; and
- How robust is the preferred strategy to key uncertainties.

15.2 Comprehensiveness of modelling basis

The preferred strategy was developed from a process of assessment of qualitative and quantitative investigation and community consultation on specific network development options that address social, environmental and economic issues of the existing and future network in western Brisbane.

A regional strategic network mathematical model was developed, SEQSTM, to assist in the quantitative assessment of network development options and strategic choices in the period to 2026.

The SEQSTM is a traditional strategic road based network model, suitable for forecasting differences of demand based network performance for a range of options and strategy choices. Some of the input assumptions to SEQSTM in themselves are uncertain, and these are discussed below. There are, however, limitations to the use of SEQSTM in respect to the demand forecasting and assessment of public transport network strategy. For the SEQSTM, sectorised mode share targets were used which were derived from TransLink's 'Low' and 'High' public transport growth scenarios (as discussed in Chapter 4.4). In order to reflect the effects of generalised costs on mode choice, Brisbane Strategic Transport Model (BSTM Version 6) was used. The BSTM was updated for the purpose of verifying both the public transport demand on the network and for testing key public transport modal effects of the more uncertain model inputs, such as the increasing costs of transport fuel.

Furthermore, comparisons were made between the two model outputs of the preferred strategy to provide a measure of confidence in the quantitative basis of strategy. The summary results of this comparison are presented below.

The two network models used in this investigation (SEQSTM and BSTM) were developed for different purposes using the same planning base (population and employment forecasts and networks):

- SEQSTM for investigation of general traffic demand on the road network; and
- BSTM for investigation and verification of public transport demand on the network.

This section summarises key model output comparators from the two models and the assumed public transport demand on the network based on the broad strategic public transport planning assumptions.

15.2.1 Comparison of modelled road based outputs

Figure 15.1 shows a generally good correlation between SEQSTM and BSTM in terms of traffic volume and effects of the Balanced Transport Strategy (the preferred strategy) in both models in selected corridors on the network.

There are differences shown between the two models on most corridors as can be seen by Figure 15.1. This is a reflection that, whilst input assumptions to both models are consistent, there are fundamental differences in model structure. In SEQSTM, future mode share targets developed outside the model have been applied at a strategic level whereas in BSTM changes in mode shares are calculated as part of the incremental model, taking into account local improvements to the public transport network. Unlike the BSTM, the SEQSTM cannot model public transport network improvements. Therefore, there are a number of public transport improvements which occur in the 2026 Base Case which are reflected in the BSTM but the mode share effects of which are only reflected in SEQSTM as part of the Balanced Transport Strategy (the input mode shares adopted in the 2026 Base Case in both models is equivalent to 2005 mode share, i.e. reflecting the 'Low' public transport growth scenario).

Therefore, the assumed incremental public transport improvements of the Balanced Transport Strategy are lower in BSTM than in SEQSTM. These differences in model structure can explain the discrepancy in effects between the two models whereby the SEQSTM consistently forecasts a higher reduction in traffic volume that the BSTM resulting from the Balanced Transport Strategy.

For example, the difference shown between the two models in terms of the impact of the Balanced Transport Strategy on traffic volume along Lutwyche Road can be explained by the differences (a) in the methodology for applying mode split in both models and (b) differences in the public transport network improvements which are assumed in the base cases in both models. In the BSTM 2026 Base Case, bus transit lanes along Gympie Road are included. They are only included as part of the Balanced Transport Strategy in the SEQSTM 2026 Base Case.

The Balanced Transport Strategy is forecast to have a positive effect in terms of reducing traffic volumes.

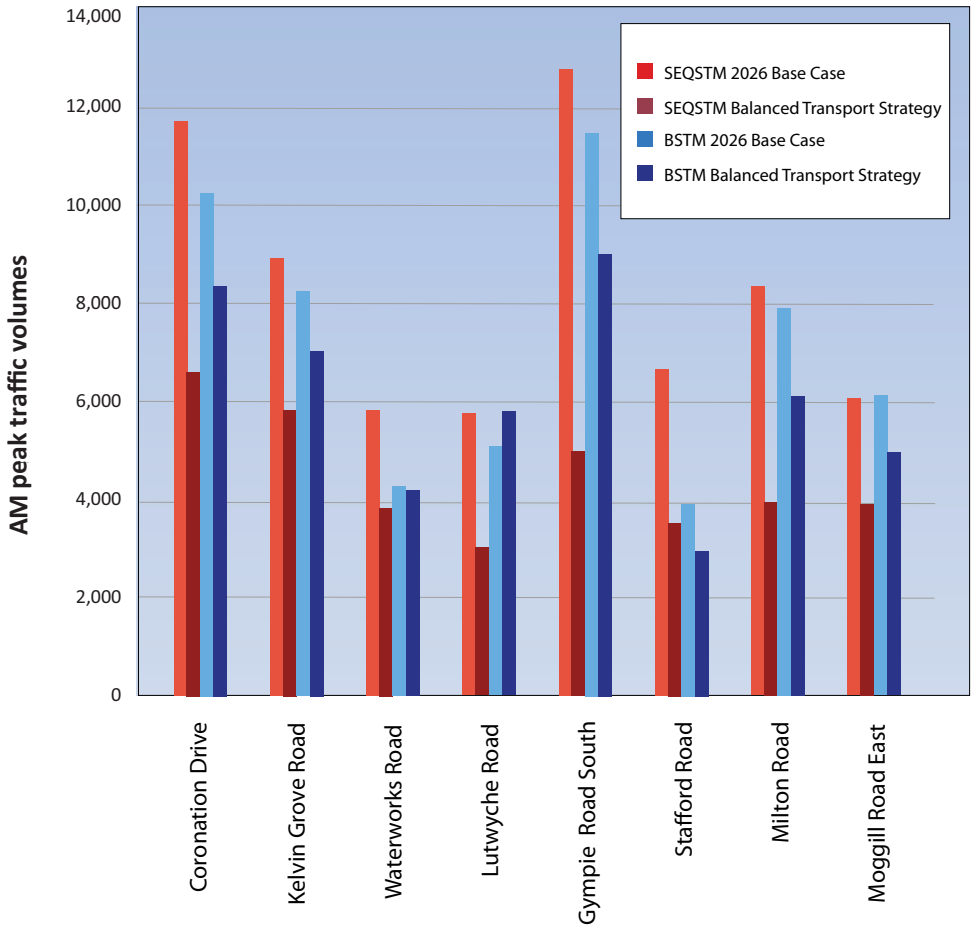


Figure 15.1 Forecast AM peak period road traffic volumes, 2026

15.2.2 BSTM public transport forecasts demand on the network

Figure 15.2 shows significant increases in bus patronage forecast in the Balanced Transport Strategy compared to the 2026 Base Case, along some key road corridors as modelled with the BSTM. In particular, there is more than doubling of bus patronage along Coronation Drive/ Moggill Road and more than a doubling of bus patronage along Gympie Road/Lutwyche Road.

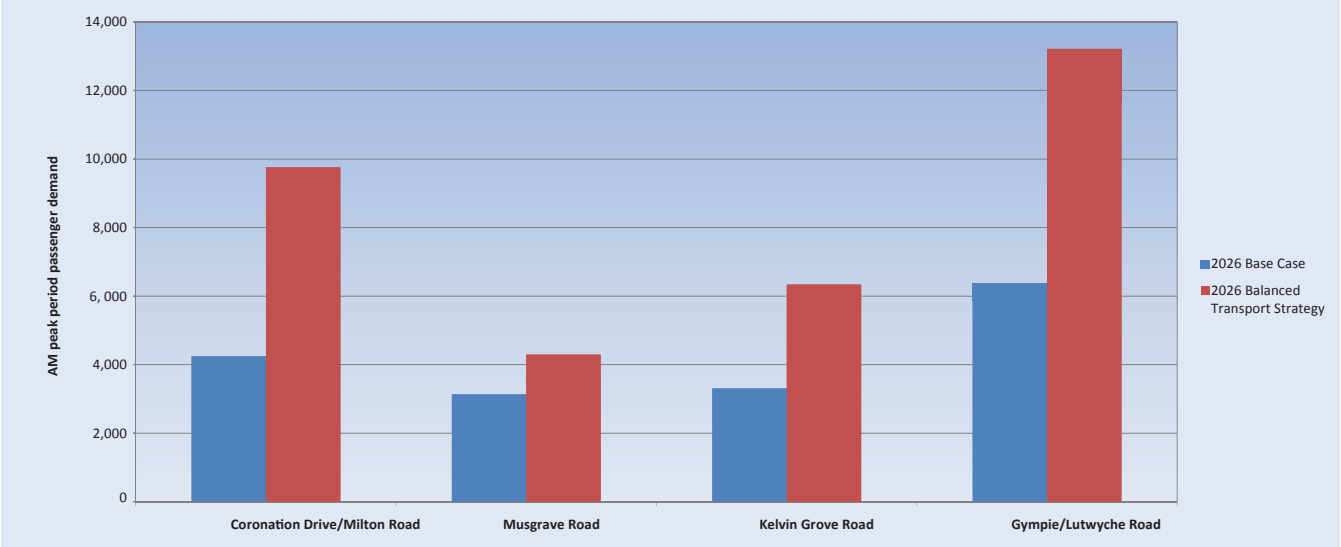


Figure 15.2 BSTM forecast AM peak bus passenger boardings, 2026

Figure 15.3 shows significant increases in rail patronage forecast in the Balanced Transport Strategy compared to the 2026 Base Case, on various sections of the western Brisbane rail network.

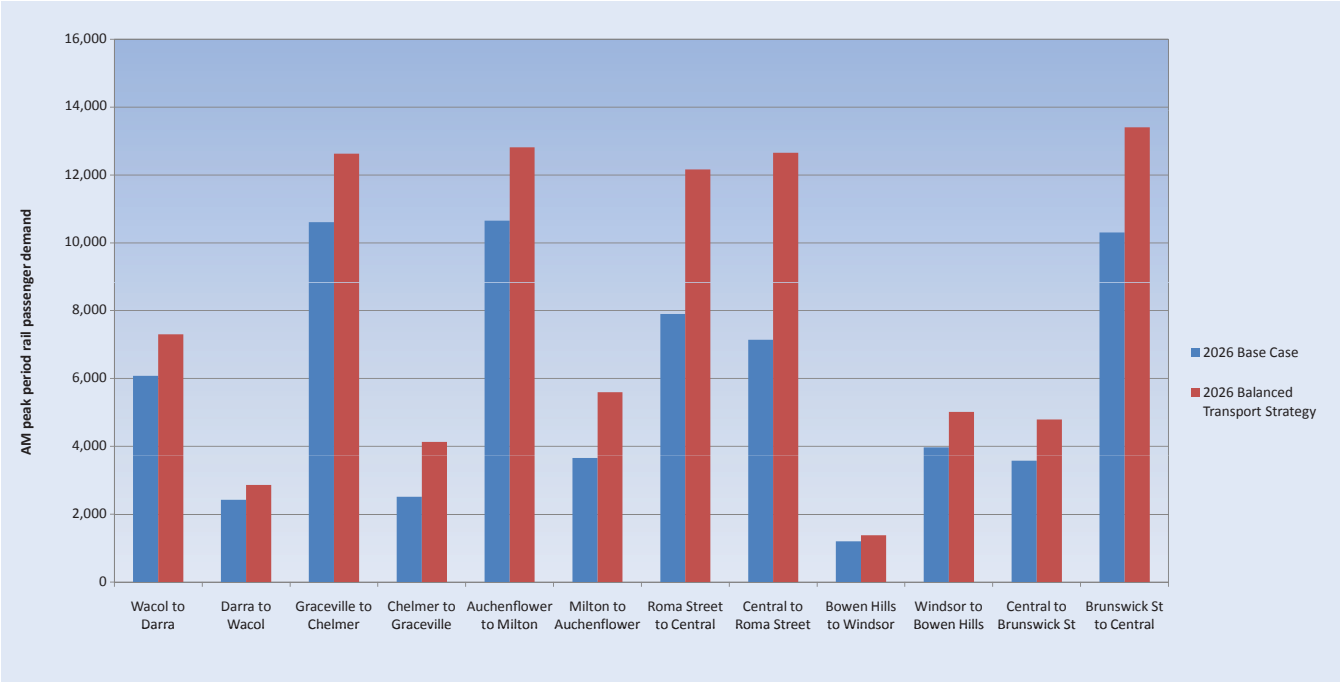


Figure 15.3 BSTM forecast AM peak rail passenger volumes, 2026

Table 15.1 (bus) and Table 15.2 (rail) compare the assumed 2026 Balanced Transport Strategy public transport demand in SEQSTM and the forecast demand in BSTM for key sections of the transport network.

It can be seen that forecast demand is significantly lower than assumed demand. In the case of bus volumes, this can be partly explained by the different calculation applied in each instance; whereas BSTM bus volumes have been calculated based on total boardings along each corridor, SEQSTM bus volumes have been calculated based on total volume on each bus route along each corridor. This means that bus volumes are artificially low in BSTM and conversely, artificially high in SEQSTM. In the case of both bus and rail volumes, the difference can also be explained by the different methodology used in calculating network public transport trip levels; in BSTM this is calculated as part of the incremental mode choice model whereas it has been applied to SEQSTM outside the model using TransLink's public transport mode share targets.

Table 15.1 Forecast BSTM and projected SEQSTM corridor bus volumes in AM peak, 2026

	2026 Balanced Transport Strategy – BSTM Forecast Corridor Bus Demand	2026 Balanced Transport Strategy – SEQSTM 'High' Growth Scenario
Coronation Drive/Milton Road	9,800	17,200
Musgrave Road	4,300	5,200
Kelvin Grove Road	6,300	5,400
Gympie Road/Lutwyche Road	13,200	9,400

Table 15.2 Forecast BSTM and projected SEQSTM rail volumes in AM peak, 2026

	2026 Balanced Transport Strategy – BSTM Forecast Rail Volume	2026 Balanced Transport Strategy – SEQSTM 'High' Growth Scenario
Ipswich Rail	12,800	22,500
Ferny Grove Rail	5,000	12,800
Caboolture Rail	8,600	27,400
Other Rail	12,000	29,200

15.2.3 Comparison of network mode share

Table 15.3 shows that private transport dominates mode share during all time periods on the metropolitan road network, although public transport sustains a significantly higher mode share during the peaks compared to the non-peaks. The investments in public transport made as part of the Balanced Transport Strategy are forecast to generate an increase in daily public transport mode share of about 1.4% in BSTM. This does not include investment in public transport outside western Brisbane.

The calculation of mode share within BSTM is internalised within the model via the incremental interaction of the separate highway and public transport model components. Within BSTM, public transport gains a higher mode share in western Brisbane than the whole metropolitan area. The investments in public transport made as part of the Balanced Strategy generate a higher increase in daily public transport mode share of about 2.2% compared to the whole metropolitan area.

Table 15.4 shows that the SEQSTM assumes a higher public transport mode share than BSTM on the western Brisbane network. This is due to the different methodology for applying mode split in SEQSTM which has utilised a mode share target approach based on TransLink growth forecasts calculated outside the model.

Table 15.3 Forecast public transport mode shares (BSTM), metropolitan network, 2026

	2026 Base Case – PT[1] Mode Share	2026 Balanced Transport Strategy – PT[1] Mode Share
AM peak (7am–9am)	13.0%	14.5%
Daytime (9am–4pm)	6.8%	8.3%
PM peak (4pm–6pm)	14.2%	15.7%
Night time (6pm–7am)	5.3%	6.6%
24-hour	8.7%	10.1%

[1]Public transport combined rail and bus

Table 15.4 Forecast public transport mode shares (SEQSTM/BSTM), western Brisbane network, 2026

	2026 Base Case – PT Mode Share		2026 Balanced Transport Strategy – PT Mode Share	
	SEQSTM	BSTM	SEQSTM	BSTM
AM Peak (7am–9am)	11.0%	15.0%	24.5%	17.0%
Daytime (9am–4pm)	–	8.0%	–	10.3%
PM Peak (4pm–6pm)	–	17.1%	–	19.1%
Night time (6pm–7am)	–	6.6%	–	8.5%
24-hour	7.7%	10.3%	18.5%	12.5%

15.2.4 Overall findings and confidence in the quality of the analytical basis

While some differences were found in some corridors as would be expected, overall the comparison was favourable and demonstrated that public transport model volumes and public transport mode shares (from BSTM) are forecast to be at a lower level than the assumed public transport outcomes (SEQSTM) in 2026. This provides some confidence that the network improvements in the preferred strategy based on SEQSTM would meet the 2026 demand under the Base Case assumptions.

15.3 Uncertainty of key assumptions and sensitivity test results

An investigation of this kind, which places importance on quantitative analysis to underpin the strategy, must begin with a set of basic assumptions. Assumptions, in this case, are based on known behaviours and current knowledge to compare different future scenarios. This does not mean to say that the set of basic assumptions, which are a starting point in the analysis, will be taken for granted and used as the only basis of strategy. They provide a benchmark to compare the effects of different assumptions against a range of scenario outputs. It is important to note that the preferred strategy must reasonably be expected to be flexible enough to accommodate a range of uncertainties under all scenarios, at the same time balancing competing social, environmental and economic objectives.

The three key assumptions that are considered most influential in determining network demand and, therefore, strategy, and which were the subject of more investigation were:

1. Transport costs, particularly private vehicle operating costs and the increasing cost of oil based fuels;
2. Land use assumptions, particularly those related to future employment location and distribution, bearing in mind that the population and employment assumptions in the current Regional Plan were a given base assumption; and
3. Efficiency gains from future technology advances, particularly in respect to the effective increase in spare capacity of the existing network as a result of vehicle and infrastructure information technology. SEQSTM was not developed to investigate the effects on public transport mode shares on the network from the effects of transport price changes. Price effects (increasing private vehicle operating costs, VOC) were investigated using BSTM. The major findings are presented below.

15.3.1 Changing transport costs

For the purpose of measuring the effect of changes to modal demands, the network VOC values in 2026 were increased by 300%. This equates to a four fold increase in the fuel price (cents per litre) between now and 2026. Increasing fuel prices and private vehicle operating costs will:

1. Reduce car trip making;
2. Change some destinations to be closer to home and redistribute trips on the network; and
3. Shift some trips to public transport where it is available.

Current modelling techniques exclude the measurement of this effect on the network and therefore this has not been assumed. Reduced car trips are more likely to apply to non-commuter trips in non-peak periods. No attempt has been made to include the trip reduction effect in this investigation.

Two variations of this sensitivity test were run:

1. Assuming that such a change would affect both mode share and trip distribution; and
2. Assuming that such a change would affect mode share only.

Table 15.5 shows how public transport mode share differs between the two versions. It shows that by including the effect of changes in trip redistribution, public transport mode shares are significantly lower than if changes in trip redistribution are not included. This is because distributional changes, i.e. changes in the location of trip origin or destination under such a scenario would involve reductions in trip distance, thus offsetting the additional vehicle operating cost and therefore discouraging trips from switching to public transport. Furthermore, any decentralisation of travel patterns which would occur under such a scenario would tend to favour private vehicle use due to the more limited coverage of the public transport network away from central areas.

Table 15.5 Forecast public transport mode shares (BSTM) due to 300% increase in private vehicle operating costs, western Brisbane network, 2026

	2026 Balanced Strategy	2026 Balanced Strategy plus VOC effect including redistribution	2026 Balanced Strategy plus VOC effect not including redistribution
AM Peak (7am–9am)	17.0%	16.2%	22.0%
Daytime (9am–4pm)	10.3%	10.3%	11.9%
PM Peak (4pm–6pm)	19.1%	20.2%	24.9%
Night-time (6pm–7am)	8.5%	9.2%	10.7%
24-hour	12.5%	12.7%	15.4%

Figure 15.4 shows the effect of the increase in vehicle operating costs on bus boarding along a number of key public transport corridors from the BSTM model. The only significant impact is along the Gympie Road/Lutwyche Road corridor where there is an increase in bus patronage along this corridor of 50% when taking into account mode shift effects only. There is a decrease when taking into account trip redistribution effects.

Figure 15.5 shows the effect of the increase in vehicle operating costs on rail patronage on various sections of the western Brisbane rail network. It shows a consistent reduction in rail patronage when taking into account changes in trip distribution, whereas by taking into account mode shift effects only, there is generally a significant increase in rail patronage of up to 60%.

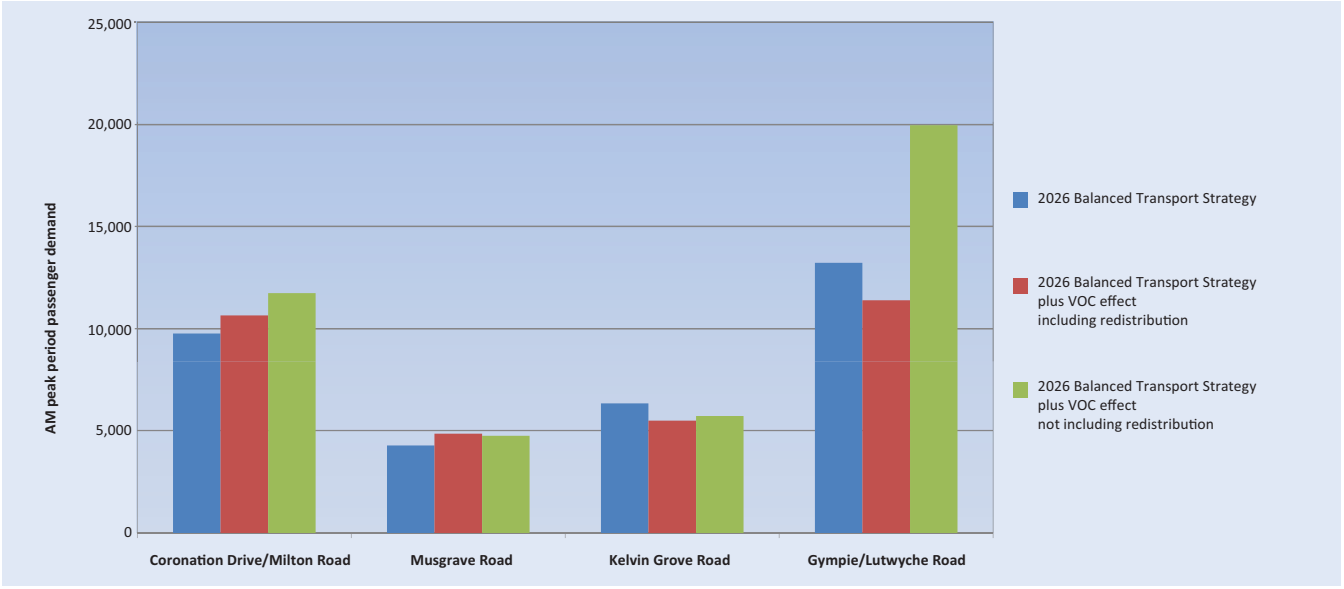


Figure 15.4 BSTM forecast AM peak bus passenger boardings due to 300% increase in private vehicle operating costs, western Brisbane network, 2026

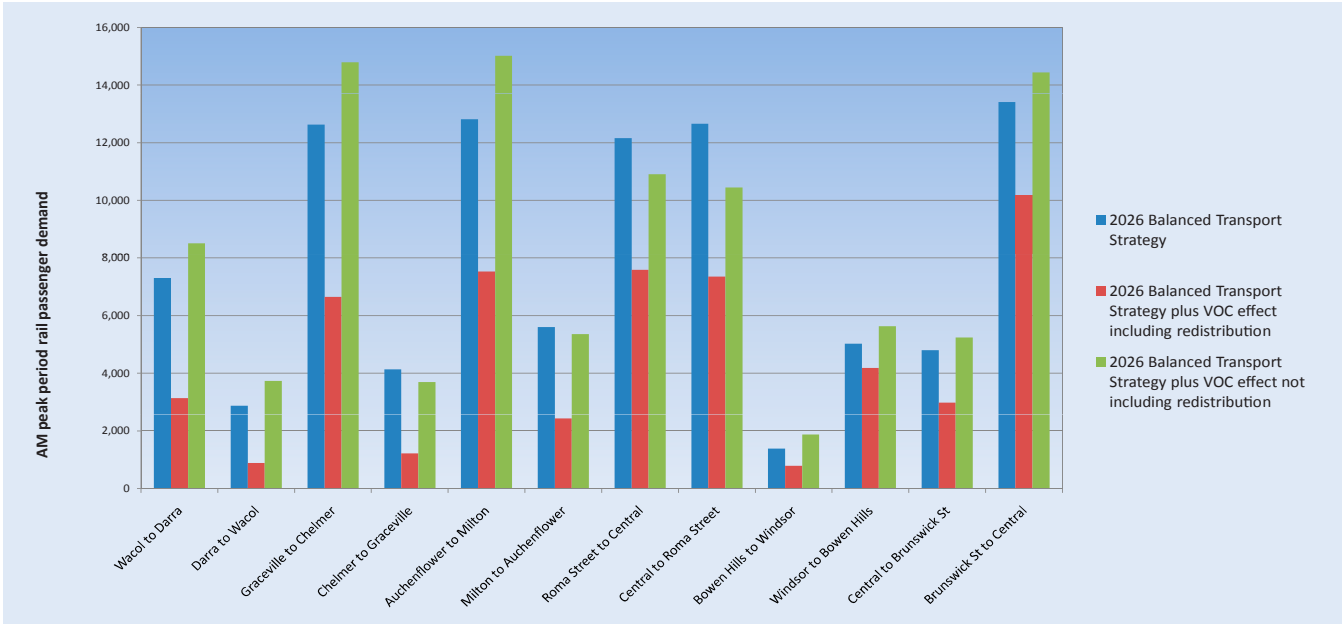


Figure 15.5 BSTM forecast AM peak rail passenger volumes due to 300% increase in private vehicle operating costs, western Brisbane network, 2026

Both variations of this sensitivity are unlikely to reflect reality. The mode choice only version is an extreme case where change in travel behaviour is met entirely through mode switch to public transport. It is effectively the short term response to a one off 300% rise in private vehicle operating cost. In reality, such a rise in vehicle operating cost would not be a one off occurrence and would in fact occur over the long term thus enabling distributional effects to take place. The version including redistribution effects is forecast to redistribute trips to such an extent that public transport mode share in this scenario is similar to that of the Balanced Transport Strategy and average network private vehicle speeds are lower than those in the Balanced Transport Strategy. In reality, it is unlikely that the proposed land use pattern in Brisbane in 2026 could sustain such a redistribution of trips, as the main trip attractors would still be the CBD and Australia TradeCoast.

The effect of the 300% increase in vehicle operating cost is likely to be between the two variations of this sensitivity, i.e. there would be an overall increase in public transport mode share but not to the extent shown in the mode choice only sensitivity, thus allowing for some redistributional effects to occur.

Even in the extreme case of the mode choice only version of the sensitivity, analysis of public transport volumes against capacity indicates that in general the Balanced Strategy would supply sufficient capacity on public transport services to cater for demand under such a scenario.

15.3.2 Employment self-containment

A major determinant on network efficiency during peak commuting periods is the attraction of the Brisbane CBD in terms of the number of jobs contained therein. The Regional Plan assumes significant growth in employment in the Western Corridor, to the detriment of job numbers in the Brisbane CBD. A more market driven employment outcome would see less jobs in the Western Corridor and more jobs (effectively a doubling from 115,000 to 220,000) in the Brisbane CBD.

Figure 15.6 reveals that such a scenario is forecast to have a significant impact on patronage of rail into and out of the CBD as would be expected. A market-driven employment distribution, as compared to the assumptions in the Regional Plan, would increase rail patronage on the Ipswich line by as much as 20% according to the BSTM model.

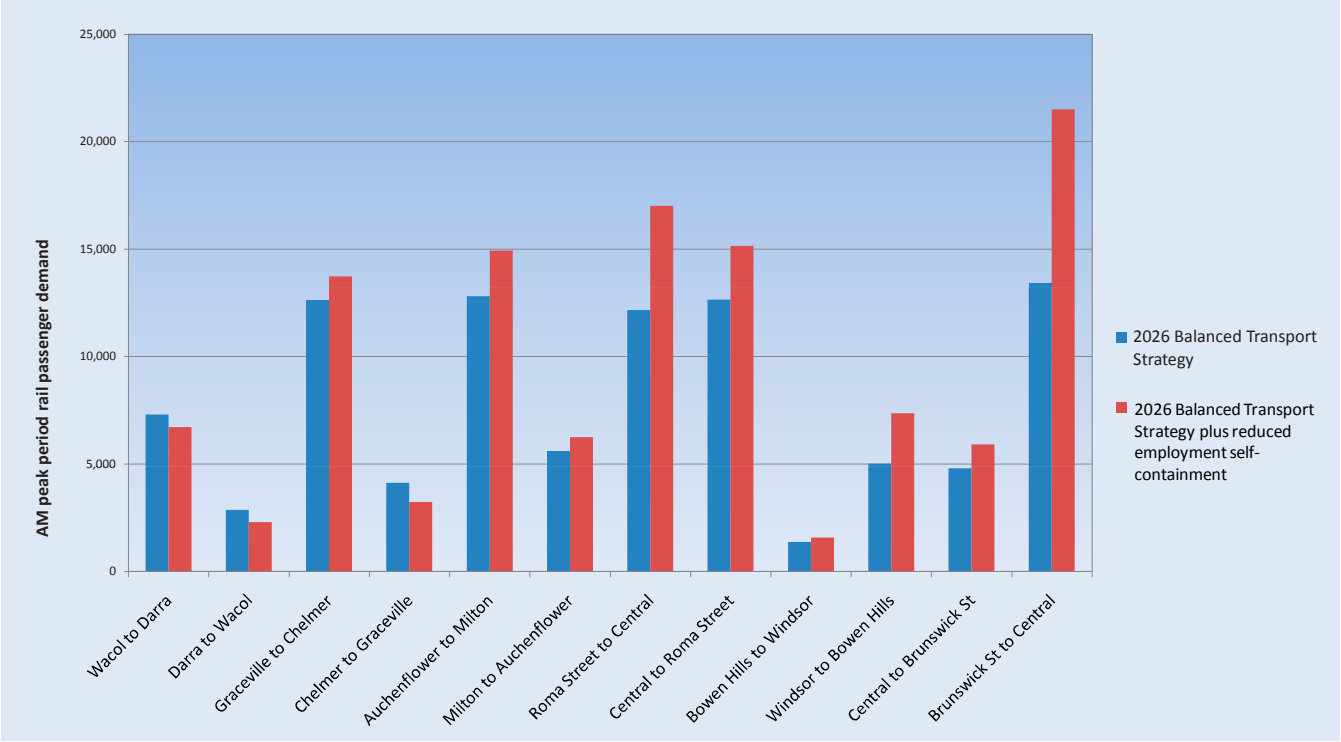


Figure 15.6 BSTM forecast AM peak rail passenger volumes due to reduced employment self-containment, 2026

SEQSTM forecasts a similar effect on the road network as growth in private vehicle trips into and out of the CBD is reflected in an overall growth in time travelled on the highway network. This is shown in Figure 15.7.

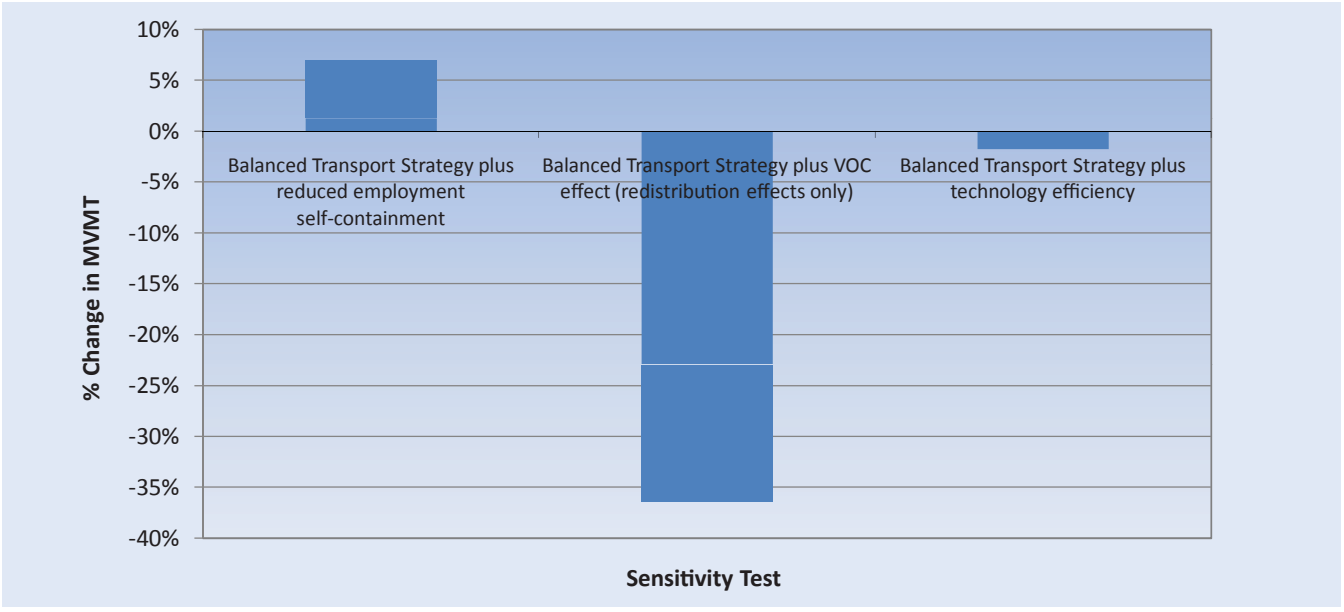


Figure 15.7 SEQSTM forecast change in Million Vehicle Minutes Travelled (MVMT) during AM peak on the metropolitan road network, relative to the Balanced Transport Strategy, 2026

For this scenario, Table 15.6 shows overall public transport mode share is forecast to increase by 4.4% during the AM peak and 2.7% during the PM peak from the 2026 Base Case, which is higher than the increase under the Balanced Transport Strategy scenario. It should be noted that there is also an increase in private vehicle trips in this scenario as a result of greater employment levels in the Brisbane CBD.

15.3.3 Technology efficiency

To allow for the effects of improved communications technology, effectively increasing network capacity in the future and to determine the likely effects on congestion, network capacity was increased by 10% in SEQSTM.

Figure 15.7 shows that such a scenario is forecast to have some network wide benefits on the metropolitan road network compared to the Balanced Transport Strategy in the AM peak.

Within SEQSTM, technology efficiency is also forecast to provide the following significant network benefits in the AM peak:

- reduced travel times (-2%);
- higher travel speeds (+0.5%); and
- reduced traffic congestion (-1%).

Table 15.6 Forecast public transport mode shares (BSTM) due to employment self-containment, western Brisbane network, 2026

	2026 Base Case – PT Mode Share	2026 Balanced Transport Strategy – PT Mode Share	2026 Balanced Transport Strategy plus reduced employment self-containment – PT Mode Share
AM peak (7am–9am)	15.0%	17.0%	19.4%
Daytime (9am–4pm)	8.0%	10.3%	10.9%
PM peak (4pm–6pm)	17.1%	19.1%	19.8%
Night time (6pm–7am)	6.6%	8.5%	9.1%
24-hour	10.3%	12.5%	13.4%

15.4 How robust is the preferred network strategy to key uncertainties?

The results of the sensitivity tests indicate whether or not the preferred strategy and its implementation will be future proof against the effects of a range of uncertainty including increasing transport cost, market driven employment futures and the effects of changing technology.

In general, any efficiency gains from technology would lessen the need for some network improvements and defer the timing of others by several years. Reliance on technology by itself however, would not provide sufficient certainty to manage the expected growth from changes in the Regional Plan or from the effects of changes in transport cost.

15.4.1 Rail

Increased passenger throughput on rail, with up to an estimated 30,000 passengers per hour per line into the Brisbane CBD and frame by 2026, would service a CBD twice its present size and best manage the likely increase in rail and bus trips to the CBD and on the network from the effects of increasing price of oil based fuel and a market-driven CBD employment future. It is doubtful that the current rail operational standards would meet such an increase in demand. The rail strategy is a least risk strategic direction to take.

15.4.2 Bus priority

Bus priority across the network is a key policy component of the preferred network strategy. Specific corridors which will see an increase in capacity for general traffic by 2026, such as Northern Link, Stafford Road and the North West Transport Corridor, would provide the opportunity to introduce bus priority along these and other corridors thereby maximising passenger and commuter throughput during peak periods.

Utilising existing and planned corridors to maximise the efficiency of these assets, as well as introducing new feeder bus services to assist rail, would enable the network as a whole to better manage increasing demand from land use and transport cost changes. Bus priority in corridors therefore supports improved services and minimises the risks of not having bus capacity in the corridors for more bus services that would be needed as a result of increasing private vehicle costs.

15.4.3 Active transport

The uncertainty of the effects of land use and transport cost changes on walk and cycle trip demand cannot be measured at a strategic level of investigation. Clearly with denser land use around transit oriented developments (TODs) and increasing public transport mode shares across the network with rail and bus priority, active transport, which generates a more sustainable trip choice to motorised modes at the local level for short trips, will become a key component of the network in its own right and a significant part of all major schemes. Active transport is a means to reducing car dependency, supporting public transport and improving liveability of neighbourhoods. It is therefore a direction which with rail and bus priority, manages uncertainty and reduces the risks to government from uncertain future travel demands in the knowledge that active transport has major social and health advantages as well as transport benefits.

15.4.4 Western Orbital

The Western Orbital will complete the western strategic road network to 2026 and complement the non-rail needs of the network in the north-south corridor, bypassing the Brisbane CBD. It will support a denser land use compared with the population and employment base assumptions by providing the necessary additional capacity for growth at the peak, and improve accessibility on the network for off-peak and weekend trips. The implementation of the Western Orbital could be deferred, possibly beyond 2026, depending on the effects of either increasing vehicle costs (resulting in a fall in travel on the network) or from the effects of greater effective network capacity from technology efficiency gains or from both.

15.4.5 24-hour analysis

A basis of the road network capacity analysis, which has formed an important input to the strategy, has been the modelled (SEQSTM) estimates of peak period traffic on the major corridors in western Brisbane. Where future (2026) peak hour traffic lane volumes are predicted to exceed corridor lane capacities under each of the network strategy scenarios, including the Balanced Strategy, a feasible improvement has been developed as part of the network strategy. The estimated future (2026) volumes over a 24-hour period were also checked to indicate those sections of the network which are likely to exceed corridor capacities outside peak periods.

Under the preferred strategy, this analysis did not reveal any significant issues, as daily off-peak volumes in the major corridors fell within their capacities, with the exception of traffic in the some of the main east-west corridors including Stafford Road. It is suggested that further planning in these east-west corridors be based on 24-hour traffic modelling and integrated with adjacent land use changes over time.

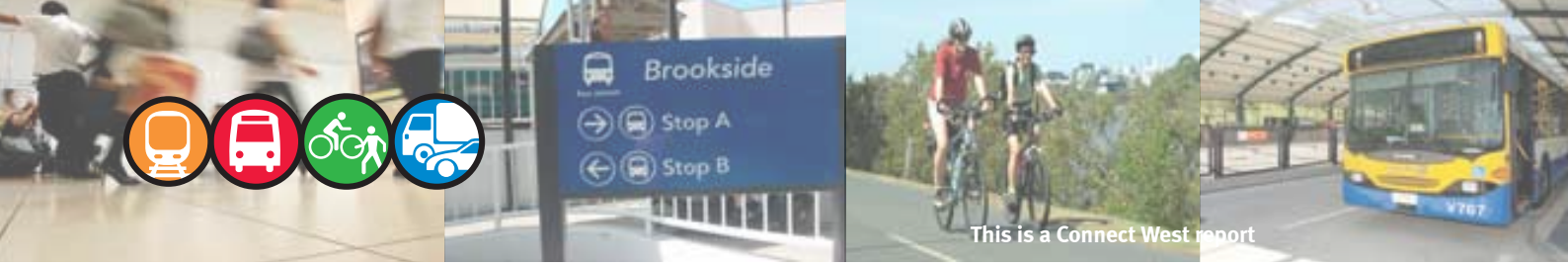
Good transport planning needs to consider, as part of integrated land use/transport and multi-modal corridor planning, what measures can be justified to manage traffic operations out of peak periods, including weekends. The SEQSTM model is not designed to measure weekend traffic on the network, therefore the analysis has excluded weekend operations on the future network. This is not likely to conflict with the preferred strategy or the justification of the network improvements as part of the preferred strategy which are based on peak commuter travel period demands. However, there is likely to be a growing need to introduce parking bans and 12-hour clearway status on the major east-west corridors, including on Saturdays, as the non-peak traffic volumes increase over time in these corridors.

15.4.6 Conclusions

Three of the key and early implementation components of the preferred strategy to 2026, rail, bus priority and active transport will help manage future demand uncertainty on the western Brisbane network and provide government with an opportunity to build confidently on SEQIPP 2008.

The large funding requirement of the strategic Western Orbital provides further opportunities to involve the private sector financing and reduce government's level of incremental capital spend to more manageable proportions.

This investigation has demonstrated that key uncertainties are most likely to put increasing pressure on rail services to manage an increasing demand over and above that generated by the Regional Plan. In the case of a 300% increase in vehicle operating cost, there is up to a 5–6% forecast reduction in car trips which in turn would generate up to a 50–60% forecast increase in public transport patrons in comparison to the Balanced Transport Strategy. This would represent an increase in daily public transport mode share in western Brisbane from 12.5% to 18%. In the context of the overall preferred strategy, priority of implementation should rest squarely in funding rail improvements first to reduce congestion and best manage uncertainty.



16.0 The preferred strategy and its implementation

The analysis and assessment undertaken in this investigation and presented in the previous chapters provides a sound basis for the recommendation of the Balanced Transport Strategy as the preferred integrated transport network strategy for western Brisbane (Figure 16.1).

The Balanced Transport Strategy fulfils the broad objectives identified in earlier chapters. These are:

- Provide integrated networks for longer distance travel, linking regions together;
- Maximise the use of existing transport assets and services;
- Invest in the transport system to maximise community benefit;
- Provide an efficient and integrated freight transport system;
- Provide travel solutions that minimise 'whole-of-life' asset costs;
- Improve accessibility – support the accessibility needs of all members of the community including walking, cycling and public transport use;
- Provide urban design opportunities to promote nonmotorised travel; and
- Provide sustainable travel solutions.

Each mode is described in potential implementation phases. Staging of the network strategy components or projects must be consistent with current planning and ongoing decisions implementing SEQIPP. There is opportunity to revise the proposed implementation outlined in this chapter as further planning is undertaken.

The proposed implementation phases take into consideration the existing commitments of the Queensland Government and Brisbane City Council, including Airport Link, Northern Link and the Northern Busway, as well as those projects planned in SEQIPP which would see the building of a completed western Brisbane network over a three phase program.

The staged implementation also takes into account specific road project opportunities that can be financed by the private sector or arranged as a PPP to encourage the private sector to participate, share revenue generating risks with government and enable the Queensland Government to fund the transformation of the rail network.

The phasing has been developed on the basis of linkages and interdependencies between projects and on the basis of timing of projects already being planned. Timing of the key building blocks is partly driven by projects already in the planning stage, such as Airport Link, Northern Link and the Northern Busway.

Current planning to implement the first stage of the Northern Busway to Kedron and the planning to improve the capacity of the Gateway North, together with the likely effects of Airport Link on levels of service along Stafford Road, would significantly benefit from the early implementation of the North West Transport Corridor and complementary improvements to Stafford Road, to relieve traffic congestion on the Gateway Motorway, Gympie Road and Stafford Road, and to allow the extension of the Northern Busway to Chermside.

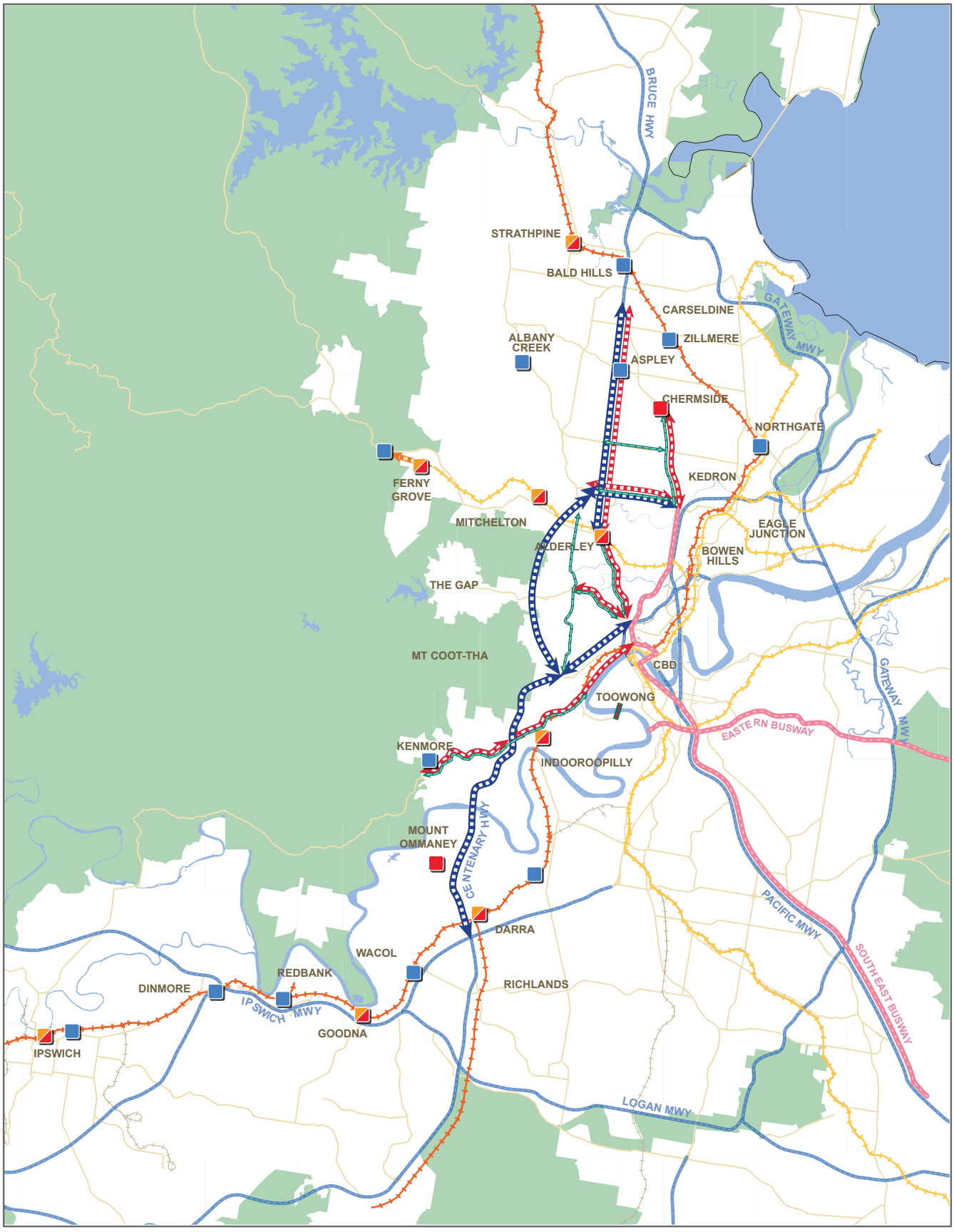
Northern Link would allow opportunities to prioritise road space for public transport in the Moggill Road/Coronation Drive corridor, thus facilitating the implementation of a western bus corridor to Kenmore.

The staged transformation of the existing rail network is a critical element. Road and tunnel options provide opportunities for reducing traffic on existing roads, enabling prioritisation of road space for buses and active transport. This can be the catalyst for urban regeneration, leading to a more sustainable and liveable city.

It should be noted that this strategy implementation principally sets direction and that further analysis and assessment of the individual projects will be required to determine both justification and timing within an extended SEQIPP program.

Where major non-transport benefits have been identified, such as the land use opportunity to revitalise sections of upgraded corridors or where the early timing of a road improvement project would generate an opportunity to implement a bus based improvement that much earlier, such projects, for example North West Transport Corridor, have been included in earlier phases of the implementation plan. Their timing, therefore, must be seen as part of an integrated planning approach.

For ease of reading, the following sections describe each modal strategy. Ultimately, the network strategy for western Brisbane is an integrated strategy and the different modes and strategy components are dependent on each other.



WESTERN BRISBANE TRANSPORT NETWORK INVESTIGATION

LEGEND

- 2026 Urban Footprint
- Waterbodies
- Existing Motorway and Highway
- Road and Tunnel Option
- Existing Rail
- Metro Rail
- Existing or Committed Busway
- Rail Extension
- Bus Lanes
- Veloway
- Pedestrian/Cycle River Link
- Bus-Rail Interchange Upgrade
- Bus Interchange Upgrade
- Park 'n' Ride Upgrade

Figure 16.1
Proposed integrated transport network strategy for western Brisbane

Queensland Government
connect west consortium

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Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

16.1 Public transport strategy

The proposed public transport strategy is illustrated in Figure 16.2.

16.1.1 Rail

High capacity, metro-style rail is the centrepiece of the strategy, delivering fast and reliable services.

This revitalised surface rail system also delivers safety benefits, including best practice signalling and removing level crossings.

Brisbane has an extensive and established rail network. However, with a growing population and a strong economy, the suburban railway is under pressure.

The rail strategy capitalises on past investments and transforms CityTrain into a metro-style surface railway network. The vision is for a system similar to many aboveground metro railways in European and Asian cities which run with 'turn-up-and-go' timetables at 2-minute to 4-minute intervals and serve a largely suburban population.

Opportunities generated by the rail strategy

Investing in the rail network would improve the radial links to the Brisbane CBD and other activity centres.

Significant redevelopment of Central station and a refurbishment of Brunswick Street station to modernise and expand them to be transit oriented, mixed use centres will rejuvenate these Brisbane CBD stations and give Brisbane iconic, landmark buildings for the 21st century.

The transformation of rail would mean faster and more frequent trains, faster alighting and loading at stations, with the potential for a threefold increase in passenger capacity. The opportunities presented will allow a reassessment of the timing and priority of other rail projects including new Brisbane CBD capacity. The opportunities identified in the strategic rail operations review and the results of the BSTM modeling and sensitivity tests show that the rail strategy would provide sufficient capacity to accommodate future rail demand. The full implementation of the rail strategy could defer the need for new inner city rail capacity well beyond 2016. This could change, however, if growth in the Gold Coast area and other areas is allowed beyond the limits specified in the Regional Plan. It would then require more 'no standing' trains and long distance commuting into the Brisbane CBD. As this is a strategic investigation, a detailed analysis of the rail strategy would be required to determine the preferred timing and priority of any improvements to the rail network operations and infrastructure.

VISION

- Transform CityTrain's suburban style services into modern, world standard 'turn-up-and-go', metro-style, citywide services;
- A network of attractive and leading transit oriented, mixed use station centres, supporting a denser and sustainable world city; and
- A trusted backbone of the region's daily social activity.

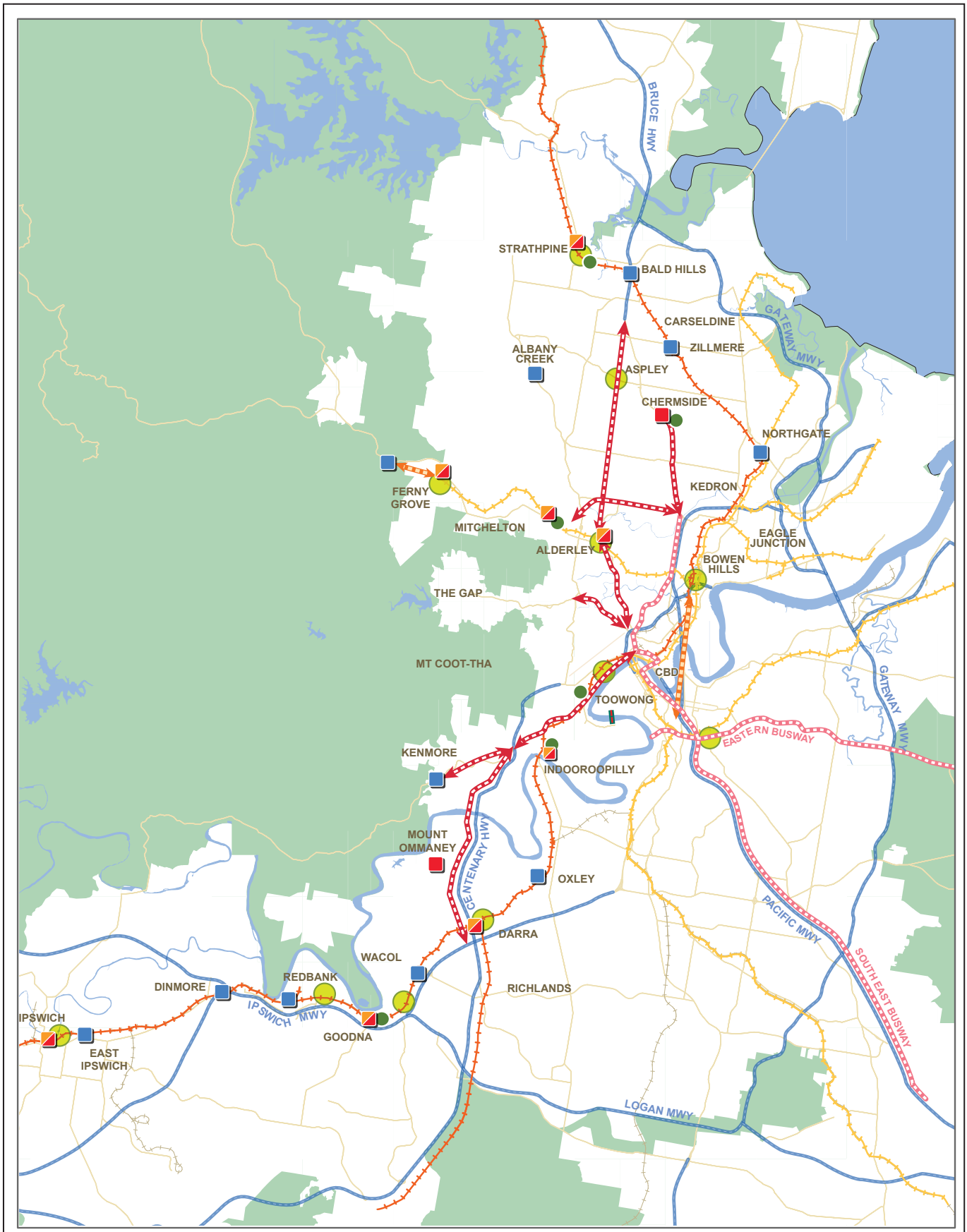
PRINCIPLES

- Maximise existing rail infrastructure before investing in new facilities;
- Invest in rail to form the backbone of the transit network;
- New modern trains;
- Integrating public transport facilities across the network;
- Create easier, more attractive modal transfers;
- Operate 'no timetable' services; and
- Provide frequent and reliable services for public transport users.

Phase 1:

Phase 1 of the rail strategy starts the staged conversion of the existing rail network to a metro-style surface rail system. The Ferny Grove and Ipswich lines would operate independently. The outcome would be the ability to operate better services, with frequencies of up to five minutes between trains during peak hours. Works would include:

- Implementing SEQIPP projects:
  1. Mitchelton to Keperra track duplication
  2. Corinda to Darra rail upgrade
  3. Darra to Springfield rail corridor
- Rail station upgrades, including:
  1. Bowen Hills (TOD)
  2. Central (redevelopment)
  3. Darra (TOD)
  4. Ferny Grove Park 'n' Ride
  5. Milton (TOD)
- Indooroopilly bus-rail interchange;
- New timetables;
- Increased trunk services; and
- Independent operation (full sectorisation) of the Ferny Grove and Ipswich lines.



WESTERN BRISBANE TRANSPORT NETWORK INVESTIGATION

LEGEND

- 2026 Urban Footprint
- Waterbodies
- Existing or Committed Motorway and Highway
- Existing Rail
- Metro Rail
- Existing or Committed Busway
- Rail Extension
- Bus Lanes
- Pedestrian/Cycle River Link
- Bus-Rail Interchange Upgrade
- Bus Interchange Upgrade
- Park 'n' Ride Upgrade
- Activity Centre
- TOD

Figure 16.2 Proposed public transport network strategy for western Brisbane

Queensland Government

connect west consortium

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Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

Phase 2:

Phase 2 of the rail strategy would continue the conversion of the existing system. The outcome would be an increase in services to 2 to 4 minutes between trains during peak hours and improved safety from removing level crossings. Works would include:

- Implementing committed SEQIPP projects:
  1. Keperra to Ferny Grove track duplication
  2. Darra to Redbank track upgrade
- New, modern rolling stock including the purchase of seven car sets;
- More station upgrades;
- New, citywide signaling upgrades; and
- Grade separation of level crossings.

Phase 3:

Major signalling and rolling stock improvements would enable a potential threefold increase in rail capacity. Completion of station redevelopments, bus feeder systems and replacing the remaining at grade rail crossings with grade separation would complete the rail transformation.

The Ferny Grove rail extension to cater for Park 'n' Ride users would provide the opportunity for the redevelopment of Ferny Grove station into a TOD.

To implement the rail strategy across metropolitan Brisbane, the Caboolture and Beenleigh lines would also need to operate independently for maximum system efficiency.

Benefits

The transformation of rail would deliver a number of benefits:

- Allowing the east and west lines to operate independently on the network to reduce conflict points and to manage incidents efficiently;
- Frequent rail services at up to 3 to 6-minute headways;
- Implementing regular, simple and consistent services and stopping patterns;
- Introducing high capacity trains;
- Operating the peak period over two hours, with more doorways and vestibules for quicker dwell times and more standing room;
- Introducing new signalling to allow 2-minute headways on trunk sections;
- Creating a peak hour capacity of up to 30,000 passengers in each direction;
- Less overcrowding, less delay, transit oriented, mixed use station experience; and
- 'Turn-up-and-go' timetables.

16.1.2 Bus

Worsening peak hour congestion is driving a need for improved radial services into the Brisbane CBD, as well as supporting access to new employment centres such as the Australia TradeCoast.

Bus priority on selected corridors

Bus priority on selected corridors would provide direct services to the Brisbane CBD in corridors not served by rail, and will support high capacity rail corridors via bus feeder services.

VISION

- World class bus services;
- Quality buses and service choices to compete with cars and reduce car dependency; and
- Seamless service integration with rail to extend public transport citywide reach.

PRINCIPLES

- Prioritise road space to maximise public transport;
- Integrate bus services with rail network and make transfers easier;
- Provide effective interchanges to make transfers easier;
- Develop simple fare systems and continue implementing integrated ticketing;
- Safe, comfortable access and services;
- Bus priority on selected corridors is essential for the future;
- Busways delivering rail-like services;
- Connecting the transit system by filling the gaps with feeder buses;
- Future road programs to prioritise buses; and
- Support radial and circumferential bus connections to activity centres.

Phase 1:

Northern Link would allow opportunities to provide reliable and frequent bus services in the corridor between Indooroopilly to the CBD. The Coronation Drive and Moggill Road bus lanes would evolve into a western bus corridor and could cater for an increase in public transport demand of up to 250 per cent.

The Northern Busway (Herston to Kedron) would provide fast and frequent bus services to the Brisbane CBD and the South East Busway.

Feeder services into rail stations would extend station walk-in catchment and support rail and encourage walking to bus stops with good and direct pedestrian facilities.

Upgrading of existing rail-bus interchanges would occur to improve access, convenience, comfort, safety and security for users.

Phase 2:

Bus priority along major radial corridors is proposed in Phase 2 to deliver greater reliability, shorter routing times, and travel time advantages.

The Northern Busway extension (Kedron to Chermside to Aspley) would enable land use integration and urban revitalisation with improved cycleway and pedestrian access and mobility. Initially, bus lanes would be extended to Aspley and upgraded towards busway standard as demand increases.

- The Kelvin Grove Road–Enoggera Road bus lane complements the Ferny Grove rail line by providing additional radial capacity in the inner north-western sector;
- Musgrave Road–Waterworks Road bus lane; and
- Improved interchanges, such as upgrading Chermside as a major bus interchange.

Phase 3:

- Orbital links, such as Stafford Road bus lane to the Australia TradeCoast;
- North West Transport corridor bus lane; and
- Extension of the western bus corridor (Coronation Drive/Moggill Road) to Kenmore and construction of a Kenmore Park 'n' Ride station. Timing could be sooner if the Kenmore Bypass resolves local traffic issues.

Benefits of the bus strategy

- High quality public transport links between Kenmore, Ashgrove/the Gap, Everton Park, Aspley and Chermside to the Brisbane CBD;
- Reprioritisation of road space for public transport on strategic corridors;
- A new bus-rail hub at Alderley or Enoggera; and
- A good quality east-west public transport link to the Northern Busway and Australia TradeCoast.

16.2 Active transport strategy

The proposed active transport strategy is illustrated in Figure 16.3.

For western Brisbane, active transport can be a viable option to increase modal choice. Walking and cycling have the potential to significantly reduce car dependency, especially for local, school and commuter trips. Active transport also contributes to the reduction of congestion, air pollution and greenhouse emissions, helps to reduce social isolation and contributes to positive community, health and personal wellbeing outcomes.

The introduction of a network of innovative, world class active transport infrastructure and facilities would bring radical changes to travel behaviours, plus improvements to western Brisbane's commuter and community environments.

The preferred network strategy would generate a continuous network of high standard, easy to follow walking and cycling routes in major corridors through a combination of dedicated cycleways, pedestrian and cycle river crossings, active transport neighbourhoods and supported access to public transport.

Changing travel behaviour and reducing the carbon footprint

The preferred network strategy would deliver a package of innovative measures and strategic actions to increase walking and cycling, influence travel behaviour and allow people to reduce their carbon footprint.

More walking and cycling

Cycling is an underutilised transport mode, and walking and cycle trips contribute to less than 10 per cent of the total trips made on the network. The active transport strategy aims to double this utilisation.

VISION:

- To contribute to reducing car dependency and sustainability;
- To contribute to a healthier community; and
- Together with good urban design, improve lifestyles.

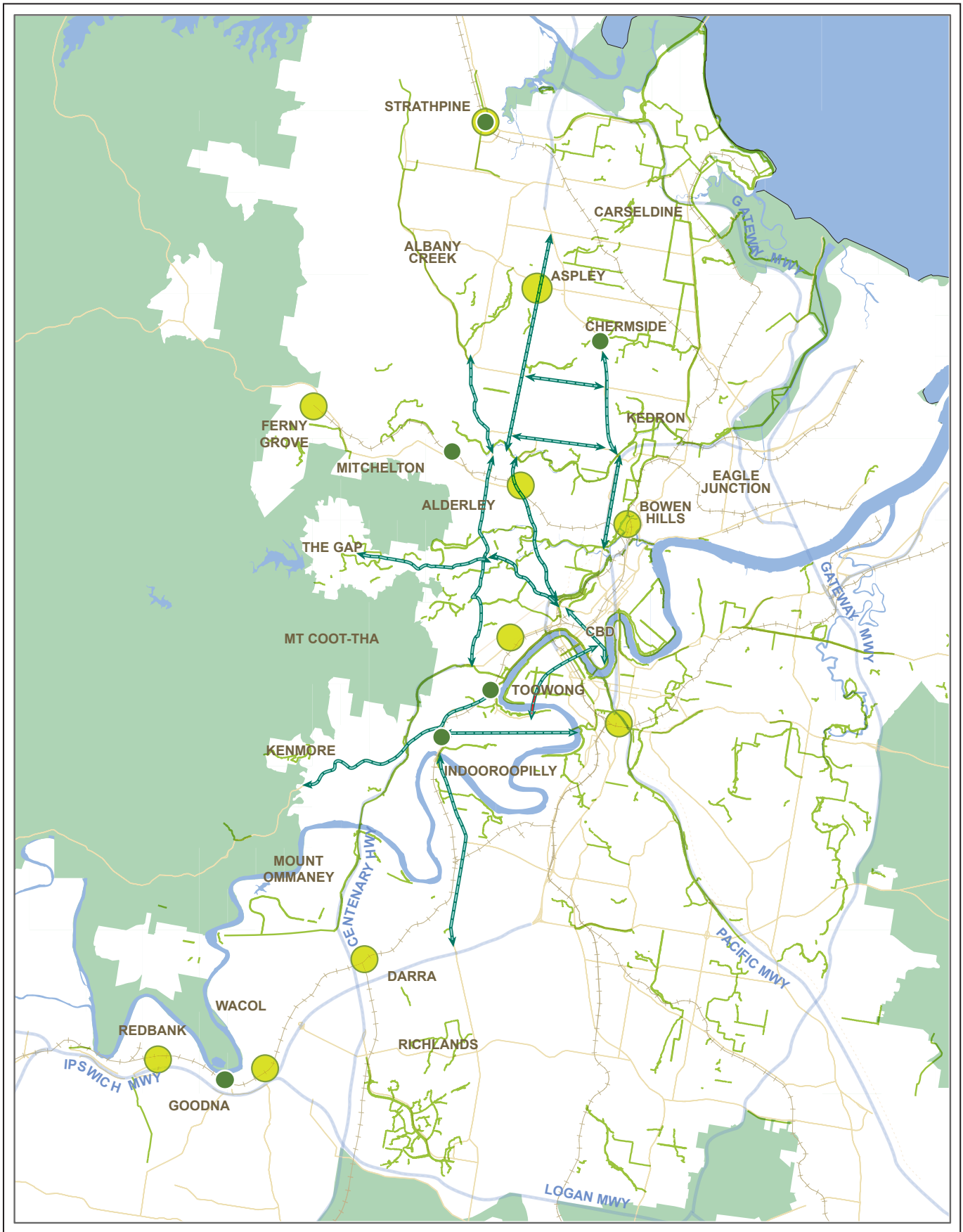
PRINCIPLES:

- Provide safe opportunities to reduce individual carbon footprints;
- Direct connections to public transport networks;
- Active street fronts creating a sense of place;
- A network of safe, direct easy to follow and accessible commuter cycle and pedestrian routes;
- Walking/cycling facilities in neighbourhoods to support local and short trips;
- Facilities and initiatives to promote walking/cycling to school;
- Local and area wide schemes to reduce car dependency; and
- Plan and encourage urban design and new developments to follow Active Transport guidelines.

Phase 1:

Phase 1 of the active transport strategy proposes a number of strategic cycle programs, which will transform Brisbane's western suburbs and Brisbane CBD.

- 'Veloways' are innovative, wide and high quality cycleways, providing a network of safe, dedicated and direct routes between key locations. These comprise veloways between Kedron and the CBD, Kenmore and the CBD and The Gap and the CBD.
- 'Active Transport Neighbourhoods' would also be encouraged, comprising high quality, user friendly pedestrian and cycle infrastructure and facilities to support local utility and recreational trips.
- Neighbourhoods to be transformed would include: Kedron, Darra, Indooroopilly, the University of Queensland and Milton.
- The 'Connect Two' programs connect and integrate public and active transport. New pedestrian and cycle routes would be created to connect rail and public transport stations and interchanges and will include cycle facilities.



WESTERN BRISBANE TRANSPORT NETWORK INVESTIGATION

LEGEND

- 2026 Urban Footprint
- Waterbodies
- Existing Motorway and Highway
- Existing Rail
- Existing Cycle Routes
- Cycle Infrastructure
- Pedestrian/Cycle River Link
- Activity Centre
- TOD

Figure 16.3

Proposed active transport network strategy for western Brisbane

Queensland Government

connect west consortium

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Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

Phase 2:

Phase 2 introduces a 'River Link' and school safety zones, together with the rollout of more 'Veloways' and 'Active Transport Neighbourhoods'.

- 'Active Transport Neighbourhoods' could be developed at Chermside, Enoggera and Alderley.
- The creation of a River Link' between St. Lucia and West End as a pedestrian and bicycle bridge is designed to encourage even more people to walk and cycle in the suburbs surrounding the Brisbane CBD, by increasing the number of locations to cross the Brisbane River and by increasing access to the public transport network.
- High quality pedestrian and cycle infrastructure between Carseldine, Everton Park, Chermside and the Brisbane CBD.
- School safety zones are a package of traffic engineering, enforcement and awareness raising measures, such as road narrowing, electronic messaging/signage, and traffic calming, to encourage and help more children to walk and cycle to school. In addition, safe, off road and dedicated cycle paths will be designed and introduced through a 'Links to School' program, in partnership with students, parents and community groups.

Phase 3:

Continuation of the network strategy through extension of:

- Improved pedestrian and cycle access to public transport stations;
- Rollout of remaining 'Veloways'; and
- Expansion of 'Active Transport Neighbourhoods' to the western and north-western suburbs such as Kenmore, Chapel Hill, Ferny Grove and Aspley.

16.3 Road network strategy

The proposed road network strategy is illustrated in Figure 16.4.

Road corridors connect communities and enable economic growth. They support bus and active transport, and are essential for effective freight movement and goods distribution.

The network strategy builds on currently planned projects and meets the demands of private, commercial and bus transport.

A new road structure for western Brisbane would improve accessibility, reduce travel times and make local and regional trips easier over all periods of the day.

The road strategy builds on the already announced road schemes including Airport Link and Brisbane City Council's planned Northern Link. Its focus is on providing a modern structure and hierarchy to the western Brisbane road network based upon the development of a western motorway between Gateway North and the Ipswich Motorway. Such a north-south link west of the Brisbane CBD would be supported by road network improvements in major corridors to improve road safety and bus priority.

Western Orbital

The Western Orbital would create significant travel time savings of up to 45 minutes for intra-regional trips, reduce congestion on the other major north-south links and avoid up to 54 sets of traffic lights.

The Western Orbital is a key opportunity for a Public Private Partnership (PPP). Partnering with the private sector and using tools such as pricing mechanisms makes more effective use of existing capacity and generates revenue that could be channeled into other areas of transport. It also reduces costs to the state to provide funding for other transport modes.

The Western Orbital consists of the following sections:

1. Centenary Motorway

Improving the Centenary Motorway to six general purpose lanes and two transit or bus lanes is the first stage of the Western Orbital. In conjunction with Northern Link and Airport Link it would form a motorway standard access from the west to key growth areas such as the Australia TradeCoast, thus avoiding the Brisbane CBD and providing an alternative to the Gateway Motorway.

2. Inner Orbital

The Inner Orbital, a tunnel from Toowong to Everton Park, completes the Western Orbital and the new western Brisbane strategic road network.

The Western Orbital would provide flexibility and an alternative route for long distance trips, including freight, at times of incident and maintenance on the Gateway and Ipswich Motorways.

Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

3. North West Transport Corridor

Providing a multi-modal link (road and bus and, in the longer term, rail) in the preserved North West Transport Corridor, together with east-west improvements along the Stafford Road corridor would provide an alternative route to the Gateway Motorway and improve access to the Australia TradeCoast. The new orbital link would reduce traffic volumes on Gympie Road, allowing construction of the Northern Busway within the existing corridor.

Phase 1:

Phase 1 builds on currently planned projects, including:

- North South Bypass Tunnel;
- Airport Link; and
- Northern Link.

In addition to:

- Centenary Motorway upgrade; and
- Road network improvements.

Together with the public transport and active transport strategy, Phase 1 would help revitalise activity centres such as Kenmore, Indooroopilly, Taringa and Toowong by reducing traffic congestion and better integrating with public transport. These centres would, in turn, encourage sustainable growth along existing transport corridors and create more liveable communities.

Phase 2:

Phase 2 involves the construction of:

- Northern Crosslink Corridor (Stafford Road tunnel) to connect into Airport Link and reallocation of surface road space to bus priority and active transport to connect to the Northern Busway;
- North West Transport Corridor motorway standard road with bus lanes; and
- Road network improvements, including Moggill Road upgrade.

This phase would create an alternative western motorway access between the north and the Brisbane CBD and between the north-western suburbs and the Australia TradeCoast. A new northern route and improved access to the Australia TradeCoast would create a more robust network, with alternative freight routes and better traffic distribution.

Supporting east-west bus access would further revitalise activity centres such as Chermside, Everton Park and Stafford, allowing the Northern Busway to Chermside to be built within the Gympie Road reserve.

Phase 3:

Phase 3 would involve the construction of the last link of the Western Orbital, the Inner Orbital tunnel between Toowong and Everton Park. This would complete the western motorway network. With a new north-south higher order road system west of the Brisbane CBD, travel time and reliability could significantly be improved. The completed Western Orbital would provide a secondary freight route to the west of the city. By reducing congestion on local roads it enables the efficient operation of public transport services on radial corridors.

16.4 Freight strategy

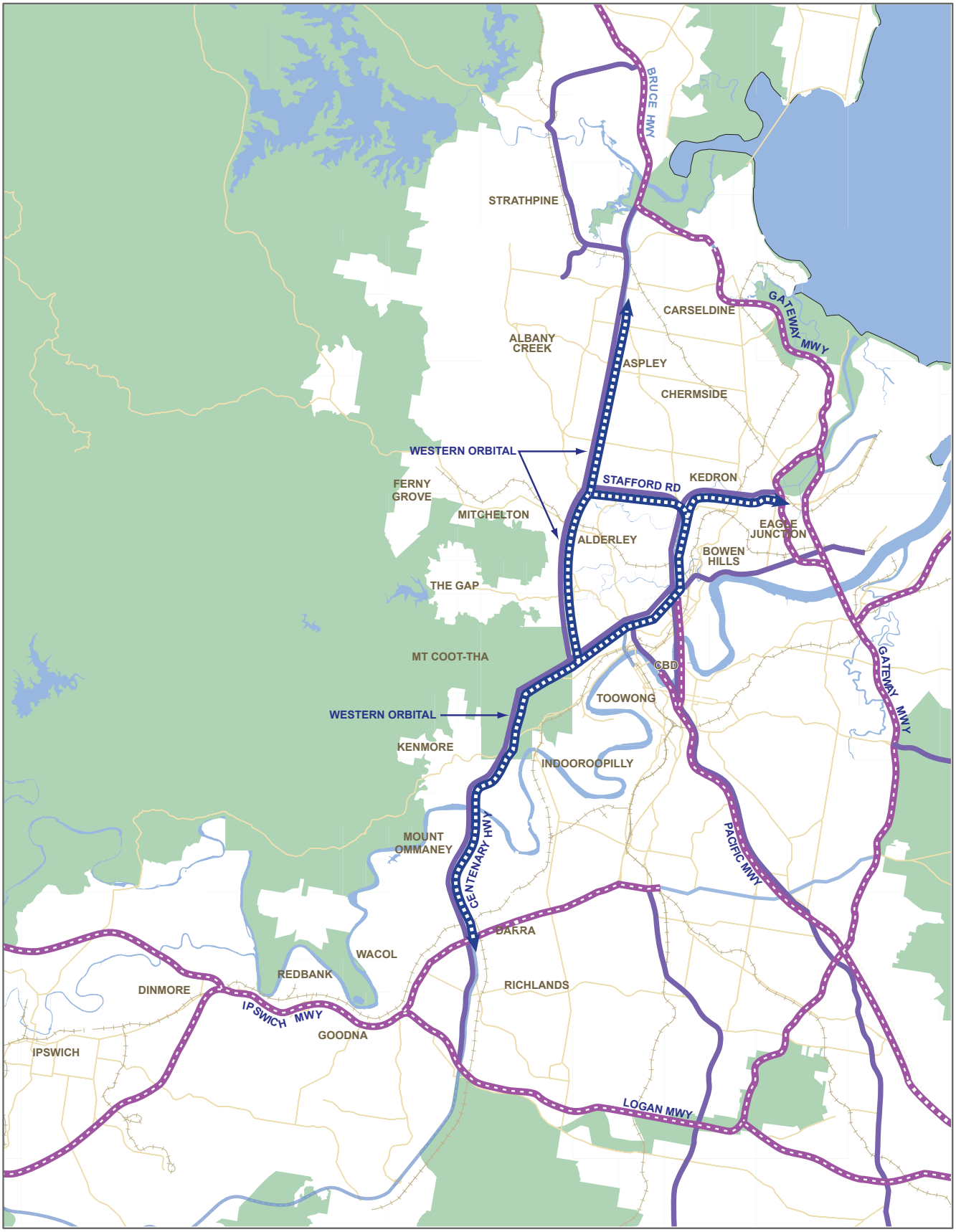
Most freight movement on the western Brisbane network will remain local distribution to major commercial centres, shops and warehouses.

There are no major freight centres planned in western Brisbane and next to no opportunities to move road freight to rail freight on the western Brisbane network. Based on SEQRP, there will remain little need for designated freight routes, given there will be few major freight centres in western Brisbane. However, there is a need for a sub-regional link connecting the freight generating areas in the Western Corridor with the emerging freight generating centres in Strathpine and Caboolture.

The western rail line through Ipswich would continue to serve the Port of Brisbane as a dedicated through-line and the expected growth in rail freight through the Brisbane CBD could continue to be moved outside of peak periods.

The existing primary road freight route, comprising the Logan, Ipswich and Gateway Motorways, would continue to cater for the majority of Brisbane's road freight task.

The Western Orbital, as shown in Figure 16.5, and the Stafford Road east-west route would be a secondary freight route west and north of the Brisbane CBD for local distribution movement and an alternative freight route at times of incident on the existing primary freight routes.



WESTERN BRISBANE TRANSPORT NETWORK INVESTIGATION

LEGEND

- 2026 Urban Footprint
- Waterbodies
- Existing Roads
- Existing Rail
- Road Infrastructure
- Priority One Freight Route
- Priority Two Freight Route

Figure 16.5

Proposed freight routes for metropolitan Brisbane

Queensland Government

connect west consortium

N

0 2 4 Km

1:200,000 on A4

Department of Transport and Main Roads, *Basis of Strategy Report*, 2009

This is a Queensland Government study

16.5 What are the long term investments and costs to government?

The Queensland Government is making a substantial investment in South East Queensland's transport network. In 2006–2007, almost $1 billion was invested in the region's rail and bus services, including operating subsidies. In the same period, more than $1 billion was invested in metropolitan roads.

SEQIPP's capital investment in transport is expected to average up to $3 billion per year over the next 18 years, excluding major investment in western Brisbane networks.

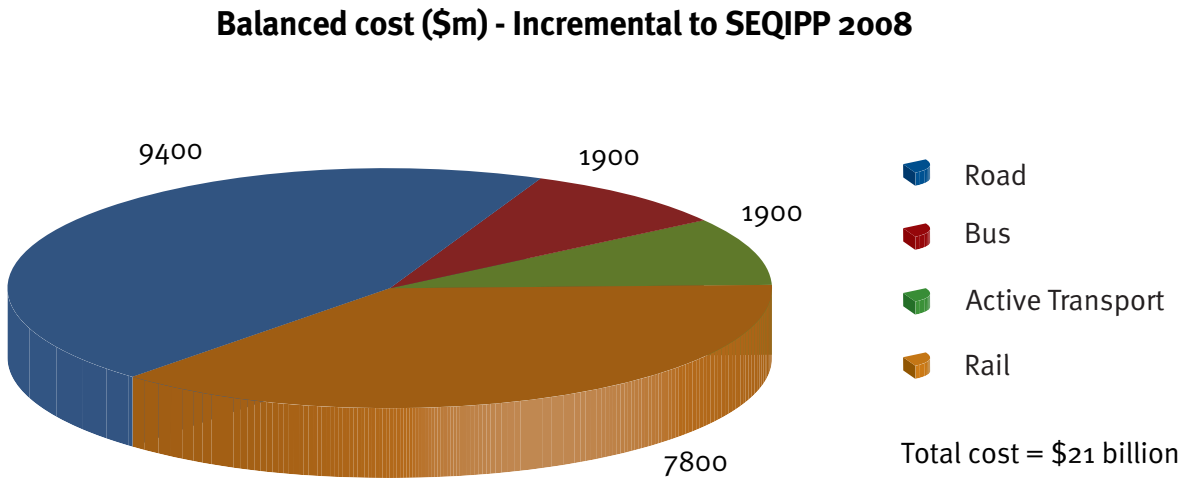


Figure 16.6 Western Brisbane network investment ($2008)

16.5.1 Western Brisbane network investment

The total capital investment for the network strategy is estimated at $21 billion ($2008). This is incremental to SEQIPP 2008 committed projects, and therefore excludes Northern Link and Airport Link.

The investment distribution between modes is shown in Figure 16.6. A substantial component of the roads investment provides for bus priority on existing road corridors, in addition to the $1,900 million for dedicated bus facilities.

Table 16.1 lists individual projects by mode and phase. In summary, the breakdown is:

Phase 1	$7 billion
Phase 2	$6 billion
Phase 3	$8 billion
Total investment	**$21 billion incremental to SEQIPP 2008**

Table 16.1 Indicative program for network strategy for western Brisbane

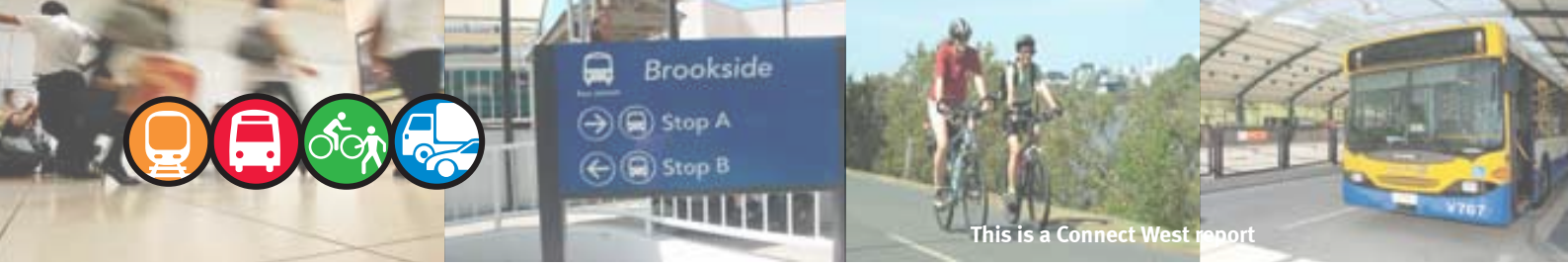
		Strategy Component	Lead Agency	Strategic Estimate ($m)	Estimate Category (see note 2)	Delivery Timeframe		
						Phase 1	Phase 2	Phase 3
Western Brisbane Rail								
	R1	Full sectorisation and 'Turn-up-and-go' timetabling	QT	1450	0			
	R2	Upgraded stabling						
	R3	Signalling upgrades						
	R4	Rolling stock procurement	QT	4030	0			
	R5.1	Redevelop CBD rail stations to cater for additional passenger throughput	QT	600	0			
	PR1	Rail Operational Review	QT	15	0			
Ferny Grove rail								
	R6.1	Implement SEQIPP (Michelton to Keperra to Ferny Grove track duplication)	QT	SEQIPP project	1&4			
	R5.2	Upgrade Mitchelton, Ferny Grove stations bus-rail interchange	QT	30	0			
	R7.1	Level crossing upgrade program - 4 major crossings (Shand St, Dawson St, Osborne Rd, Prospect St)	QT	700	0			
	R7.2	Level crossing upgrade program - 4 minor crossings (Arbor St, Samford Rd, Wilston Rd, Glen Holm St) (c)						
	R5.3	Ferny Grove station TOD opportunity	QT	30	0			
	R5.4	Extended Ferny Grove Park 'n' Ride	QT	20	0&1			
	R5.5	Upgrade Enoggera/Alderley station bus-rail hub	QT	30	0			
Ipswich rail								
	R6.2	Implement SEQIPP (Darra to Springfield passenger rail line, third track upgrade Corinda to Darra, Darra to Redbank)	QT	SEQIPP project	1&3			
	R5.6	Milton, Indooroopilly and Darra station TOD opportunity	QT	80	0			
	R5.7	Upgrade Oxley, Wacol, Redbank and Dinmore Park 'n' Ride	QT	40	0			
	R7.3	Level crossing upgrade program - 2 major crossings (Sherwood Rd, Wacol Station Rd)	QT	180	0			
	R5.8	Upgrade Goodna station bus-rail hub	QT	20	0			
Caboolture rail								
	R6.3	Implement SEQIPP (Third track Lawnton to Petrie)	QT	SEQIPP project	1			
	R5.9	Upgrade Zillmere, Northgate and Bald Hills Park 'n' Ride	QT	25	0			
	R7.4	Level crossing upgrade program - 6 major crossings (Robinson Rd, Telegraph Rd, South Pine Rd, Beams Rd, Northgate Rd, Ellison Rd)	QT	530	0			
	R5.10	Upgrade Strathpine and Carseldine stations bus-rail hub	QT	30	0			
		Western Brisbane Rail sub total		7810				
Western Brisbane bus network								
	B1.1	Implement SEQIPP (Northern Busway to Kedron)	QT	SEQIPP project	3			
	B1.2	Implement SEQIPP - Centenary Motorway bus priority/ transit lanes (Ipswich Motorway to Toowong)	QT	SEQIPP project	1			
	B2.1	Northern Busway - staged bus lanes (Kedron to Chermside to Aspley)	QT	SEQIPP project	1			
	B3	Western Bus Corridor staged bus lanes - (Inner Northern Busway to Kenmore)	QT	750	0			
	B4	Stafford Road High Occupancy Vehicle lanes	DMR	300	0			
	B5	Kelvin Grove Road/ Enoggera Road bus lanes	BCC	50	0			
	B6	Waterworks Road/ Musgrave Road bus lanes	BCC	130	0			
	B7	North West Transport Corridor bus lanes	DMR	300	0			
	B8.1	Upgrade Chermside bus interchange	QT	20	0			
	B8.2	Mt. Ommaney and Kenmore Park 'n' Ride	QT	10	0			
	B8.3	Northern Busway - staged upgrade towards busway (Kedron to Chermside to Aspley)	QT	SEQIPP project	0			
	B9	Aspley and Albany Creek Park 'n' Ride	QT	10	0			
	PB1	Public Transport Improvement Program	QT	300	0			
	PB2	Western Bus Corridor (Inner Northern Busway to Kenmore) Transport Investigation	QT	6	0			
	PB3	Northern Busway Transport Investigation	QT	SEQIPP project	0			
	PB4	High Occupancy Vehicle Network Plan Investigation	QT	SEQIPP project	0			
		Western Brisbane bus network sub total		1876				

Table 16.1 Indicative program for network strategy for western Brisbane cont'd

		Strategy Component	Lead Agency	Strategic Estimate ($m)	Estimate Category (see note 2)	Delivery Timeframe Phase 1	Phase 2	Phase 3
Major road network								
	RD1.1	Implement SEQIPP (Airport Link)	DMR	SEQIPP project	3			
	RD2	TransApex Northern Link	BCC	SEQIPP project	0			
	RD3	Kenmore Bypass	DMR	SEQIPP project	0			
	RD4	Moggill Road upgrade (a)	DMR	130	0			
	RD5	North West Transport Corridor	DMR	1100	0			
	RD6	Inner Orbital tunnel	DMR	5600	0			
	RD1.2	Implement SEQIPP Centenary Motorway HOV lanes - (Ipswich Motorway to Toowong)	DMR	SEQIPP project	0			
	RD7	Centenary Motorway Upgrade - (Ipswich Motorway to Toowong) (b)	DMR	SEQIPP project	0			
	RD8	Northern Crosslink Corridor (Stafford Road tunnel)	DMR	2500	0			
	PRD1	Western Orbital Corridor Investigation	DMR	25	0			
	PRD2	East-West Arterial Upgrade Study	DMR	SEQIPP project	0			
	PRD3	South West Sub-Regional Transport Network Investigation	DMR	10	0			
		(a) Subject to Kenmore Bypass investigation (b) Subject to South West Sub-Regional Transport Network Investigation						
				Western Brisbane road network sub total	9365			
Active Transport network (c)								
	A1	Implement SEQIPP (Brisbane and Western Corridor sub-regional cycle and walking network)	QT	SEQIPP project				
	A2	'Connect Two' Program	QT	1000	0			
	A3	'Links to School' and Safety Programs						
	A4	Active Neighbourhood Zones						
	A5.1	Northern Veloway - Section 1 (Kedron to CBD)	QT	760	0			
	A6	Northern Crosslink Veloway (Stafford Road)	DMR					
	A7.1	Western Veloway - Section 1 (Indooroopilly to Toowong)	BCC					
	A7.2	Western Veloway - Section 2 (Kenmore to Indooroopilly)	DMR					
	A8	Gap Access Veloway (Ashgrove to CBD)	BCC					
	A9.1	North-Western Veloway - Section 1 (Everton Park to Kelvin Grove)	BCC					
	A9.2	North-Western Veloway - Section 2 (Carseldine to Everton Park)	DMR					
	A5.2	Northern Veloway - Section 2 (Aspley to Kedron)	QT					
	A10	Western Ring Veloway (Toowong to Everton Park)	DMR					
	A11	Albert Street Garden Axis Veloway	BCC					
	A12	Uni Link Veloway (Indooroopilly to Dutton Park)	BCC					
	A13	Uni River Link (St Lucia to West End)	QT	150	0			
	PA1	Active Transport Investigation - Veloways and River Links	QT	4	0			
		(c) The walking and cycling projects will be implemented with the proposed public transport and road corridor upgrades. Additional funding for Veloway projects is included in the Major Road Network scheme.						
				Western Brisbane walking and cycling sub total	1914			
				Total	20965			

Notes:

1. The table identifies the indicative delivery timeframe for the WBTNI strategy projects.
2. These are pre-project estimates in $2007. Estimating has been carried out using a strategic estimate method for a cost comparison only. It is not to be used as a project budget. Compares to SEQIPP Type 0 estimate except where noted otherwise.
3. The strategic estimates make no allowance for risk & opportunities.
4. The program does not include ALL projects within Western Brisbane proposed by SEQIPP, BCC, PRSC, DMR and ICC. It is assumed that these projects will be implemented in accordance with their individual works program.
5. The program is indicative only. It is expected that the timing and delivery will be refined for each project with a detailed corridor assessment.
6. The strategic estimates are an incremental investment to SEQIPP 2008 and exclude funding already allocated in SEQIPP.
7. All corridor planning projects for roads and bus priority include investigation for associated provision for walking and cycling as per the Active Transport Strategy.



This investment is incremental to SEQIPP 2008 and to the ongoing operational and maintenance requirements of QR, QT and Main Roads, including the replacement of existing rolling stock and signalling systems.

The investment in rail of $7.8 billion over 18 years only includes expenditure on the Ipswich line, Ferny Grove line and Caboolture lines. The incremental investment required to fully implement the rail strategy across the metropolitan network is estimated at a total of $15 billion, incremental to SEQIPP 2008 and ongoing rolling stock replacement programs.

16.5.2 Public Private Partnerships opportunities

The preferred network strategy encourages private financing of new links and Public Private Partnerships (PPPs) opportunities to fund strategic roads, freeing up government investment for public transport services, including rail.

An estimated $8 billion of investment could be sourced from the private sector and other agencies to finance the Western Orbital and other components.

16.5.3 Queensland Government investment

Public Private Partnership opportunities mean that the net investment from State Government to fund the network strategy, including implementing the rail strategy on the Ipswich, Ferny Grove and Caboolture lines is estimated at $13 billion over 18 years, which is equivalent to around $720 million per year, up to 2026. This is illustrated in Figures 16.7 and 16.8.

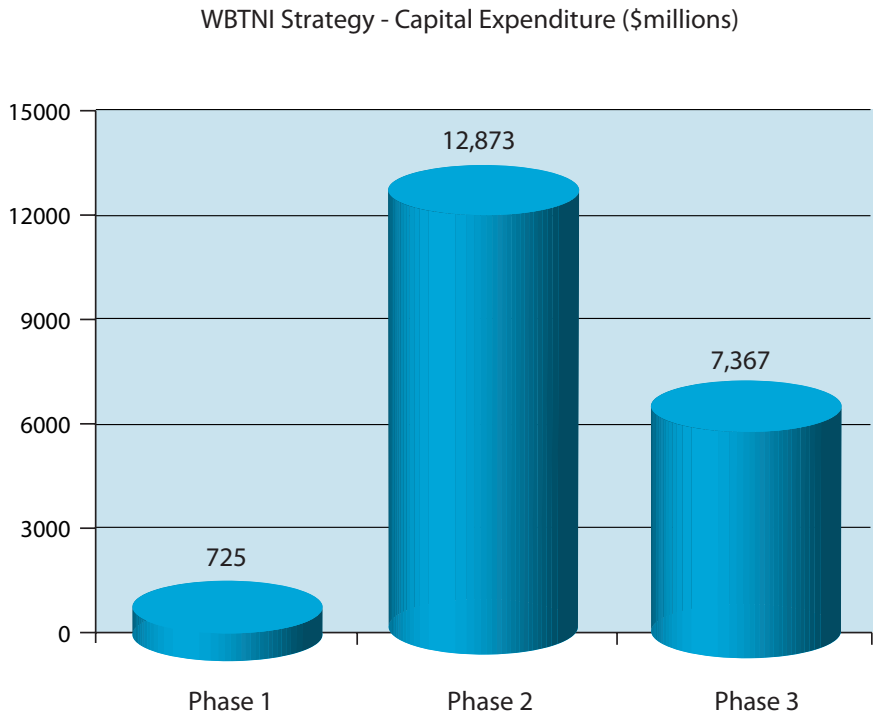


Figure 16.7 Transport investment, incremental to SEQIPP

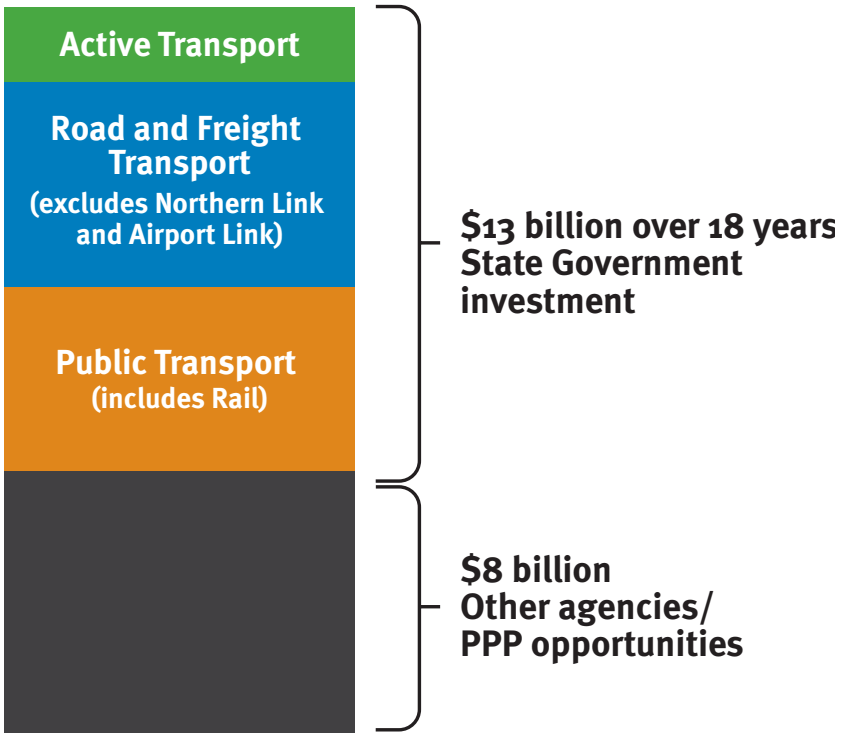


Figure 16.8 Total 18-year Queensland Government investment 2008–2026 in western Brisbane (incremental to SEQIPP 2008).

16.6 What long term revenue sources are available?

16.6.1 Some revenue source issues

Today the transport sector is almost entirely dependent on petroleum. With oil supplies in doubt and a growing demand for oil in China and India putting up prices the economic consequences of not planning for an alternative fuel future would be costly in the long run. The social effects will be declining mobility and higher disposable income given to transport.

There are three broad strategies for reducing petroleum dependency and greenhouse gas emissions:

1. Improve fuel economy through research into engine technology and more use of smaller cars;
2. Develop alternative fuel technology and clean fuels; and
3. Through substitution, demand management including denser land use and more use of public transport to reduce private vehicle trips and reduce average trip lengths.

This investigation has not looked at how technology can change demand and reduce fossil fuel dependency. It has investigated however alternative levels of substitution in respect to different levels of public transport growth and modal share on the network.

While land use (population and employment density and distribution) has been held constant in keeping with the given Regional Plan assumptions, it is clear that much more can be done to reduce our dependency on cars, in addition to moving to a denser city.

The importance of price as a demand management tool

Price demand management offers network managers a tool which has multiple objectives:

1. Peak spreading (for effective use of infrastructure);
2. Managing peak congestion (through congestion charging and parking fees);
3. Reducing overall travel and fuel use;
4. Cost recovery, including applying non-subsidised fares to cover public transport costs; and
5. Income raising to implement infrastructure projects early (e.g. through tolls) and new rolling stock.

16.6.2 Revenue sources

Transport network improvements are currently financed from a variety of user fees, fares, general taxes, fuel excise and private charges.

Funds for surface transport come from all three levels of government (Local, State and Federal) and there is a growing recognition and use of private charges through tollway fees. Table 16.2 lists potential transport revenue sources against their generally accepted use.

Different sources serve different objectives. User pays objectives often provide effective outcomes when covering user costs and which are paid only on use. Public transport fares and tolls are examples of user pays revenues. The most efficient user pays charges cover user costs of provision and operation, and in the case of public transport would require higher fares than at present to cover total system costs.

People are prepared to pay for good services, especially public transport services, and if higher 'real' fares to cover costs were introduced they would need to be matched with convenient, reliable and comfortable services. For example, improved rail services could justify new, user pays fares.

The first phases of the network strategy could be funded from traditional revenue sources (fares, registration fees, fuel excise – as general consolidated taxes returned to transport – and private finance). But what of the longer term and the sources which will become more acceptable with applied technology in respect to measuring use of the network?

Table 16.2 Assessment of potential transport revenue sources

Revenue source	Revenue adequacy	Equity	Eonomic efficiency	Ease of implementation	Rating
Fuel excise tax					
Registration fee					
Vehicle sales tax					
Environmental fuel use tax					
Congestion pricing					
Development fees					
Traditional tolls					
Tolling new lanes					
Tolling existing lanes					
Public-private partnerships					
Sales of government land/assets					
Mileage-based user fees					

Legend:

Excellent Very good Good Not good Poor Very poor

Future long term revenue sources

The movement towards less fixed taxes and more user charges could provide a more flexible and rational basis on which to price and fund transport. Road user charging is one of the tools that could help solve future transport challenges. Tolling is important because it establishes a direct connection between the use of roads and the payment for that use. Other key sources which will need increasing consideration to combat congestion and fund SEQIPP and the network strategy include:

- Congestion pricing on both new and existing capacity;
- Use of PPPs;
- Fares based on quality of service;
- Carbon emissions trading scheme;
- Distance based user fees; and
- High Occupancy Toll (HOT) lanes.

16.7 Moving towards the vision beyond 2026

Chapter 14 described the land use and transport network vision to support a denser city beyond 2026 than we are living in today.

The network strategy and proposed implementation need to fit into this vision and be consistent with the future changes in the Regional Plan as it moves forward.

One important determining factor in managing transport demand which has been a given input to this investigation is the density and distribution of future population and employment. In this investigation, the current Regional Plan assumptions have been used as a basis of setting strategy. Clearly, any change to the future land use assumptions will change the transport demand on the network and therefore will significantly affect the timing of the strategy components, as will the price of transport, which is the second most influential determinant of demand (next to land use), particularly in respect to the timing of the public transport strategy.

Chapter 15 described the effects on the network demand of key uncertainties moving forward, including the increasing cost of transport.

The preferred network strategy described in the earlier part of this chapter puts rail and the movement of buses on the network to support rail as a priority to provide improved services as early as possible to accommodate an expected and continuing large increase in public transport use over the foreseeable future, with most of this demand on existing corridors.

To emphasise the growing importance of public transport on the western Brisbane network, the preferred network strategy will reform the way transport invests between the modes. Traditionally rail and bus, particularly rail, have been and continue to be the poor cousin to roads and investing in active transport has been seen to be an afterthought at best. The network strategy will provide a balanced long term investment program between road, active transport and public transport, moving towards our vision for the future.

It recognises the importance of roads for the movement of people and goods over 24 hours of the day given the expectation that demand for road use will continue at high mode share levels into the future, irrespective of the supply and price of oil based fuel.

Alternative fuelled powered cars will still need the same road space as oil based fuelled vehicles.

There remain risks of under investment in public transport and over investment in roads or in the timing of the staging and implementation of individual strategy components given all the planning uncertainties. The network strategy manages these risks by providing an implementation plan which is flexible and puts priority on those improvements which will be required under all scenarios.

There is a clear and pressing need to move forward on a vision for the region within the process of developing the Regional Plan. Any changes to the Regional Plan would require review of this implementation plan.

16.8 Conclusions

The preferred network strategy, the Balanced Transport Strategy would create opportunities for land use changes and revitalisation of transport corridors. In order to advance the implementation of the preferred network strategy, a number of transport investigations are required in addition to SEQIPP 2008. These are:

- Western Bus Corridor (Inner Northern Busway to Kenmore) Investigation. The purpose of this investigation is to determine the opportunities, constraints planning and staging issues with the provision of this corridor. It should also consider active transport opportunities;
- A project to identify the strategic road network plan of motorways and supporting arterials and how they are developed to meet their defined service requirements to inform corridor level investigations. This will be developed under an integrated transport system for Brisbane for beyond 2026;
- North South Motorway Corridor Investigation. The purpose of this investigation is to develop the concept of a motorway link from Gateway North to the Ipswich Motorway west of the Brisbane Central Business District, including but not limited to interchange locations, potential land requirements, tunnel portals and opportunities for private sector involvement. It will involve consideration of Northern Link interconnections and traffic impacts;
- Rail Operational Review. The purpose of this investigation is to determine the feasibility and develop a detailed implementation and delivery model for potential improvements that could deliver higher capacity rail services of the rail strategy advanced in this investigation. The review should consider outcomes of the Department of Transport and Main Road's Inner City Rail Capacity Study and Rail Access Capacity Assessment Study; and
- Active Transport Corridor Investigations. The purpose of these investigations is to investigate the feasibility of cycleway projects, and pedestrian and cycle bridges recommended in this study.

Of the above investigations, the highest priorities are:

- Rail Operational Review. This investigation is critical to commence the staged delivery of improvements to rail operations and to determine timing of the new Inner City Rail tunnel capacity;
- Western Bus Corridor (Inner Northern Busway to Kenmore) Investigation. The outcome of this investigation will enable the early staged implementation of bus priority to the western suburbs in conjunction with delivery of Northern Link and the Kenmore Bypass, subject to their approval and funding; and
- North South Motorway Corridor Investigation. This investigation is critical to determine impacts of the two motorways on property, the environment and the community. It will also enable early assessment of private sector interest.

The following SEQIPP investigation projects will utilise the findings of the Western Brisbane Transport Network Investigation:

- Northern Busway Investigation. The purpose of this investigation is to plan the staged delivery of two additional lanes for buses within the Gympie Road corridor from Kedron to Aspley. The investigation should look at the staging opportunities to upgrade to busway standard and land use regeneration opportunities along Gympie Road; and
- SEQ High Occupancy Vehicle Network Plan Investigation. The purpose of this study is to investigate across the South East Queensland region the opportunities and constraints, planning and staging of the bus and High Occupancy Vehicle lane projects, including those recommended in this investigation.

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