7

Brisbane, the Gold Coast and Sunshine Coast

7.1 Brisbane's population is growing, and so is its transport task

Brisbane's transport network performance over the past decade

Between the 2006 and 2016 Census years Brisbane's population grew from almost 1.8 million[114] to over 2.2 million. Brisbane's population has consistently expanded into the city fringes, particularly to the north and south west. There have also been strong surges of growth in central areas within 10km of the CBD. Brisbane's population growth has placed greater pressure on the city's transport infrastructure, both in terms of access to the CBD from outer areas and movement through the city.

In the decade preceding 2016, passenger kilometres on Brisbane's roads increased by about 14%. Despite investment in extra capacity, growth in demand has progressively caused the deterioration of the performance of Brisbane's road network, affecting bus passengers, car users and truck drivers.

7.2 There are variations between the 2015 and 2019 Audit forecasts

There have been substantial changes to the 2019 Audit inputs and assumptions

Since the 2015 Audit, Brisbane, the Gold Coast and Sunshine Coast's forecast cost of road congestion has decreased by 35% (Table 22 and Figure 56). This is largely the result of model recalibration based on actual journey to work data.

In the 2015 Audit, 2031 population projections for South East Queensland were derived from ABS Series B projections. In the 2019 Audit, projections have been provided by the Queensland Government. There are marginal differences between these projections. The Brisbane, greater capital city statistical areas, and Gold Coast and Sunshine Coast population is forecast to be two percent higher in the 2019 Audit.

Table 22: The cost of road congestion and public transport crowding in Brisbane, the Gold Coast and Sunshine Coast, 2016 and 2031

	Cost of public transport crowding ($ millions)	Cost of road congestion ($ millions)	Total ($ millions)
2016 (2019 Audit)	14	2,084	2,098
2031 (2019 Audit)	90	5,969	6,059
2031 (2015 Audit)	N/A	9,206	N/A
2031 (change from 2015 Audit)		-3,237 (-35%)	

Source: Infrastructure Australia (2015) and Veitch Lister Consulting (2019)[115]

In addition to the slightly higher population and employment, the mapping suggests the following key differences in demographic assumptions between 2015 and 2019 Audits:

- Statistical Area Level 3s in inner Brisbane are forecast to have slightly larger populations than was previously expected
- The largest difference in forecast population in Brisbane Greater Capital City Stastical Area is in Springfield Redback (44,000 fewer residents)
- Sunshine Coast and Caboolture regions also have significantly lower population in the 2019 Audit.

Employment assumptions remain largely unchanged. Table 24 reflects changes in model inputs and key outputs between the 2015 and 2019 Audit modelling.

The largest single contributor to the decreased forecast cost of road congestion in Brisbane, the Gold Coast and Sunshine Coast has been the recalibration of the transport model based on actual journey-to-work data from the 2016 Census. This recalibration has resulted in the number of road trips increasing in length but decreasing in number, thereby subtracting from the disproportionate impact, modelled and forecast in the 2015 Audit, of additional vehicles being added to already congested roads.

Figure 56: The cost of road congestion and public transport crowding, 2016 and 2031

Source: Infrastructure Australia (2015) and Veitch Lister Consulting (2019)[116]

The challenge of matching transport needs to population projections: differences between the Infrastructure Australia and Queensland Government (ShapingSEQ) datasets

Forecasting future congestion is highly dependent on projections of future population distribution. This report uses baseline projections from the Queensland Government Statistician's Office (Rebased 2015ed) that reflect current planning schemes as approved by local councils.

These projections are consistent with our methodology of modelling a 'business as usual' future scenario. The Queensland Government has developed a separate set of demographic forecasts for their South East Queensland Regional Plan 2017, ShapingSEQ, which provides a policy framework for managing the region's population growth.

The ShapingSEQ demographic data is a policy aspiration of the Queensland Government, in contrast to the Queensland Government Statistician's Office baseline projection, which is based on historical trends.

As a result, there is variation between model outputs in this report and Queensland Government policy as represented by the ShapingSEQ plan and the Queensland Government State Infrastructure Plan (Part B).

The differences in demographic projections are shown in Table 23. The primary difference is that ShapingSEQ anticipates growth will be 58,453 people lower in 2031 as well as increased development in southern Brisbane, and less growth along the Ipswich corridor and on the Gold Coast, thereby reducing pressure on transport links in these areas..

Table 23: Resident population projections, Statistical Area Level 4 (SA4), 2031 and 2041

SA4	Rebased 2015ed	Shaping SEQ	Difference	Rebased 2015ed	Shaping SEQ	Difference
	2031			2041		
Brisbane – East	264,956	262,383	-2,573	272,596	271,035	-1,561
Brisbane – North	242,814	243,883	1,069	259,254	264,839	5,584
Brisbane – South	404,314	426,782	22,468	439,225	489,409	50,184
Brisbane – West	198,206	196,644	-1,561	201,349	200,742	-608
Brisbane Inner City	345,549	354,137	8,588	395,476	413,127	17,651
Gold Coast	815,634	785,638	-29,996	988,358	944,524	-43,834
Ipswich	578,779	537,913	-40,866	794,886	719,479	-75,407
Logan – Beaudesert	472,609	469,905	-2,704	598,440	615,109	16,669
Moreton Bay – North	337,397	335,122	-2,275	406,704	409,856	3,152
Moreton Bay – South	249,936	243,837	-6,099	265,517	255,056	-10,460
Sunshine Coast	480,714	476,209	-4,505	566,195	558,354	-7,841
Total region	**4,390,908**	**4,332,455**	**-58,453**	**5,188,000**	**5,141,530**	**-46,471**

Source: Supplied by Queensland Government

Table 24: Changes in key model inputs and outputs between 2015 and 2019 modelling in Brisbane, the Gold Coast and Sunshine Coast

		Demographic assumptions		Network assumptions		Travel cost assumptions			
		Population	Jobs	Road investment	Public transport investment	Fuel	PT fares	Parking	Tolls
Change in inputs		⇩ Population forecasts are similar (-2%)	⇩ Employment forecasts are similar and proportion of jobs in Brisbane Inner SA3 remains stable	⇧ More investment in the road network (+5% network lane km)	⇧ More investment in the PT network (+~22% service kms)	⇩ Reduction in fuel price (140 c/L to 104 c/L AUD 2011)	— No change in other transport costs		
Impact on output (AM peak)	Total trips (no change)	⇩ Slightly lower total population reduces total modelled trips	— Total trips are generated by population assumptions and model parameters only						
	Car trips (-24%)	⇩ Slightly lower total population reduces total modelled car trips	— The distribution of employment is similar between the audits, as such a decline in overall employment does not substantially alter the balance between car and PT travel	⇧ Better roads encourage car travel	⇩ Better PT can encourage more PT travel and fewer car trips	⇧ Lower fuel prices encourage car travel	— No change = no impact		
	Car vehicle kms travelled (-4%)	⇩ An overall reduction in population reduces car kilometres. Lower population growth in urban fringe and peri-urban areas also causes a reduction in this metric	— The distribution of employment is similar between the audits, as such a decline in overall employment does not substantially alter the balance between car and PT travel	⇧ Better roads encourage car travel	⇩ Better PT can encourage more PT travel and fewer car kms	⇧ Lower fuel prices encourage car travel	— No change = no impact		
	Public transport trips (-24%)	⇩ Slightly lower total population reduces total modelled PT trips	— The distribution of employment is similar between the audits, as such a decline in overall employment does not substantially alter the balance between car and PT travel	⇩ Better roads encourage car travel and fewer PT trips	⇧ Better PT can encourage more PT travel	⇩ Lower fuel prices encourage car travel and reduce PT travel	— No change = no impact		

Source: Veitch Lister Consulting (2019)[117]

New network assumptions

Both audits use a similar approach to developing network assumptions that assumes only projects with funding or significant levels of political commitment will be completed by 2031. For Brisbane, the Gold Coast and Sunshine Coast, there are three key differences in network assumptions. Cross River Rail, Brisbane Metro and the Gold Cost Light Rail Stage 2 are included in the 2019 Audit but not the 2015 Audit.

Variation between road network capacities in 2031

There are only minor differences between the South East Queensland forecast traffic volumes in the 2019 Audit in the 2031 AM and PM peaks. This is mainly a result of the small variation in population forecasts. The worst-performing corridors (Pacific Motorway, Bruce Highway, Ipswich Motorway and Mt Lindesay Highway) are largely consistent between the audits.

The 2015 and 2019 Audits identify roads that have different levels of congestion at the AM and PM peaks. For instance, The Gateway Motorway and arterial roads around Brisbane Airport are forecast to have less congestion in the 2019 Audit. Likewise, there is forecast to be less congestion in the 2019 Audit on local and arterial roads in Wynnum West, Manly West and Tingalpa. A similar trend is mirrored in Forestlake, Richlands and Inala.

Vehicle delays are forecast to decrease by more than the corresponding change in traffic volumes. This is a function of the underlying dynamics of traffic flow, which is when additional traffic is added to an already congested road, as a result, delay is disproportionately higher than in less congested conditions.

Table 25 compares corridor-level average traffic and delay hours for the AM peak for the ten most delayed corridors in the 2019 Audit.

Table 25: Most congested roads ranked by total delay hours, 2031 AM Peak and ranking in 2015 Audit in Brisbane, the Gold Coast and Sunshine Coast

City rank (2019 Audit)	Corridor	Direction	Average peak hour traffic volumes			Total delay hours			City rank (2015 Audit)
			2015 Audit	2019 Audit	Difference	2015 Audit	2019 Audit	Difference	
1	Beenleigh to city corridor (Pacific Motorway)	N/B	6,500	7,300	13%	7,500	11,700	55%	1
2	Helensvale to Beenleigh corridor (Pacific Motorway)	N/B	7,600	8,200	8%	4,800	9,300	94%	5
3	Sippy Downs to Mango Hills corridor (Bruce Highway)	S/B	3,900	3,900	1%	5,200	6,700	28%	3
4	Goodna to Mount Gravatt corridor (Ipswich Motorway / Kessels Road)	E/B	4,000	4,600	16%	3,400	5,700	67%	8
5	Ipswich to Goodna corridor (Brisbane Road / Ipswich Motorway)	E/B	4,000	4,300	7%	3,900	5,600	43%	7
6	Beaudesert to North Logan corridor (Mount Lindesay Highway)	N/B	2,000	1,900	-4%	5,000	5,200	4%	4
7	Loganholme to Mount Gravatt corridor (Pacific Motorway)	N/B	6,400	7,300	15%	4,300	4,900	14%	6
8	Bald Hills to Tingalpa corridor (Gateway Motorway)	S/B	4,900	5,300	10%	2,200	4,200	89%	10
9	Beenleigh to Helensvale corridor (Pacific Motorway)	S/B	7,400	7,100	-5%	5,800	4,100	-30%	2
10	Ipswich Motorway to Indooroopilly corridor (Centenary Highway)	N/B	3,900	3,900	0%	2,700	3,400	26%	9

Note: N/B, S/B, W/B and E/B represent northbound, southbound, westbound and eastbound, respectively.

Source: Veitch Lister Consulting (2019)[118]

Variation between public transport capacities in 2031

In both the 2015 and 2019 Audit, Brisbane's rail and bus routes are projected to carry significantly more commuters by 2031 due to population growth. Both audits have similar patterns of public transport demand.

The 2015 Audit suggests that the Rosewood and Ipswich Line, and the Springfield line are likely to experience high instances of crush capacity at AM peak. By comparison, the 2019 Audit suggests that rail crowding in 2031 will be low, with exceptions of medium crowding on small sections of the Rosewood and Ipswich line. This crowding is likely to be a result of projected population growth in Ipswich and surrounding areas.

Bus travel demand in the metropolitan area is similar in both the 2015 and 2019 Audits. Both audits highlight that bus services from Springwood, Brown Plains and surrounding areas will have high demand.

7.3 Brisbane residents, visitors and businesses are exposed to daily road congestion and crowded public transport

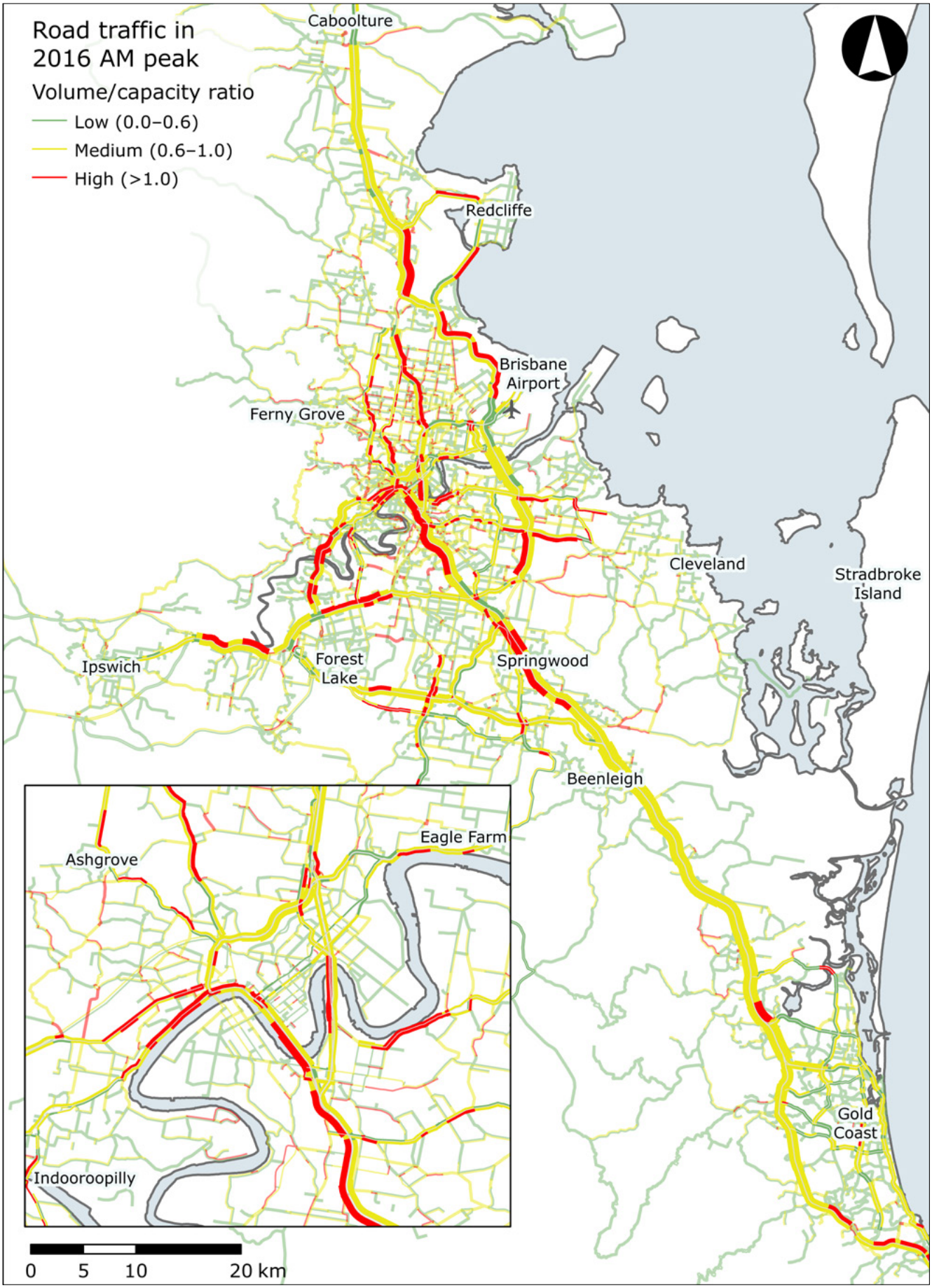
Snapshot of Brisbane's road network in 2016

Brisbane's drivers already experience congestion on a day-to-day basis (Figure 57), although this is lower than the congestion experienced in other Australian capital cities. Our modelling indicates the annualised cost of road congestion and public transport crowding in the Brisbane GCCSA, Gold Coast and the Sunshine Coast was approximately $2.1 billion in 2016. For Brisbane only, this was $1.7 billion.

Brisbane's most significant congestion occurs along a north-south spine – in particular, on the Pacific Motorway and Gateway Motorway / Bruce Highway corridors, which link Brisbane with the Gold Coast and Sunshine Coast respectively.

The Ipswich Motorway and Centenary Highway also experience significant levels of congestion. These are important connections between Brisbane CBD and the Ipswich growth corridor.

Figure 57: Brisbane weekday traffic volume / capacity ratio, 2016 AM peak



Note: Volume / capacity ratios show the quantity of traffic relative to a road's capacity. Any link operating at a VCR above 1.0 is coloured red, indicating that more vehicles are using the road than it was designed to accommodate under free-flow conditions.

Source: Veitch Lister Consulting (2019)[119]

Brisbane's most congested roads in 2016: what the driver experiences

Infrastructure Australia has measured the most congested corridors in Brisbane based on a variety of metrics that relate to user experience, including the percentage of total journey time that is spent in congestion. The ten most congested corridors for the AM and PM peaks are shown in Table 26 and Figure 58.

The city's most congested corridors are those that provide access to the CBD from outer suburbs. Travel in the peak direction is most constrained southbound for roads north of the Brisbane River and northbound for roads south of the Brisbane River. However, some routes experience high levels of congestion in both directions of travel, such as the Centenary Highway and the Pacific Motorway.

Brisbane's major activity centres in the south are affected by congestion on the Bruce Highway, Sandgate Road and the Gateway Motorway, as residents in Brisbane's northern suburbs travel south for work, particularly during peak periods.

In addition, corridors servicing east-west movements such as the Ipswich Motorway and the Logan Motorway are subject to moderate to high levels of congestion. These corridors service demand for travel from growth areas in the western part of the city to the CBD.

Brisbane's most congested roads in 2016: the cost to the community of total vehicle delays

As a measure of the whole-of-network impacts of congestion, Infrastructure Australia has aggregated total delay hours experienced by all vehicles using the most congested roads during the modelled period. The ten most congested corridors under this approach for the AM and PM peak are shown in Table 27 and Figure 59.

Brisbane's public transport system in 2016

The use of public transport in Brisbane has increased significantly in recent years. Between 2004–05 and 2014–15 the public transport task increased by about 27%.

Brisbane's rail system connects Brisbane's outer suburbs to the CBD, and enables travel between the city centre, the Gold Coast and Sunshine Coast. Brisbane has a relatively uncongested railway network, with low VCRs on all lines, as observable in Figure 60.

Brisbane's bus network includes high-capacity corridors, such as the South Eastern and Northern busways, feeder services to rail stations and local services. With the exception of some busway services, Brisbane's bus network primarily caters to the city's internal demand, serving a radial function rather than cross-regional travel demand.

In 2016, varied levels of crowding were apparent on Brisbane's major bus corridors during peak periods (Figure 61). The most crowded sections of the bus network are those just before bus routes join major busways, and areas outside the catchment of the rail network. This means that passengers experience modest crowding on major busways close to the CBD, while in the outer suburbs crowding can be quite significant. Brisbane's busiest routes in both peak periods include La Trobe Terrace, Given Terrace and Caxton Street just north of the CBD, Kelvin Grove Road north of the CBD and Ipswich Road south of the Pacific Motorway.

The model does not take into account congestion of buses on the dedicated busway corridor, only crowding of passengers within bus capacity.

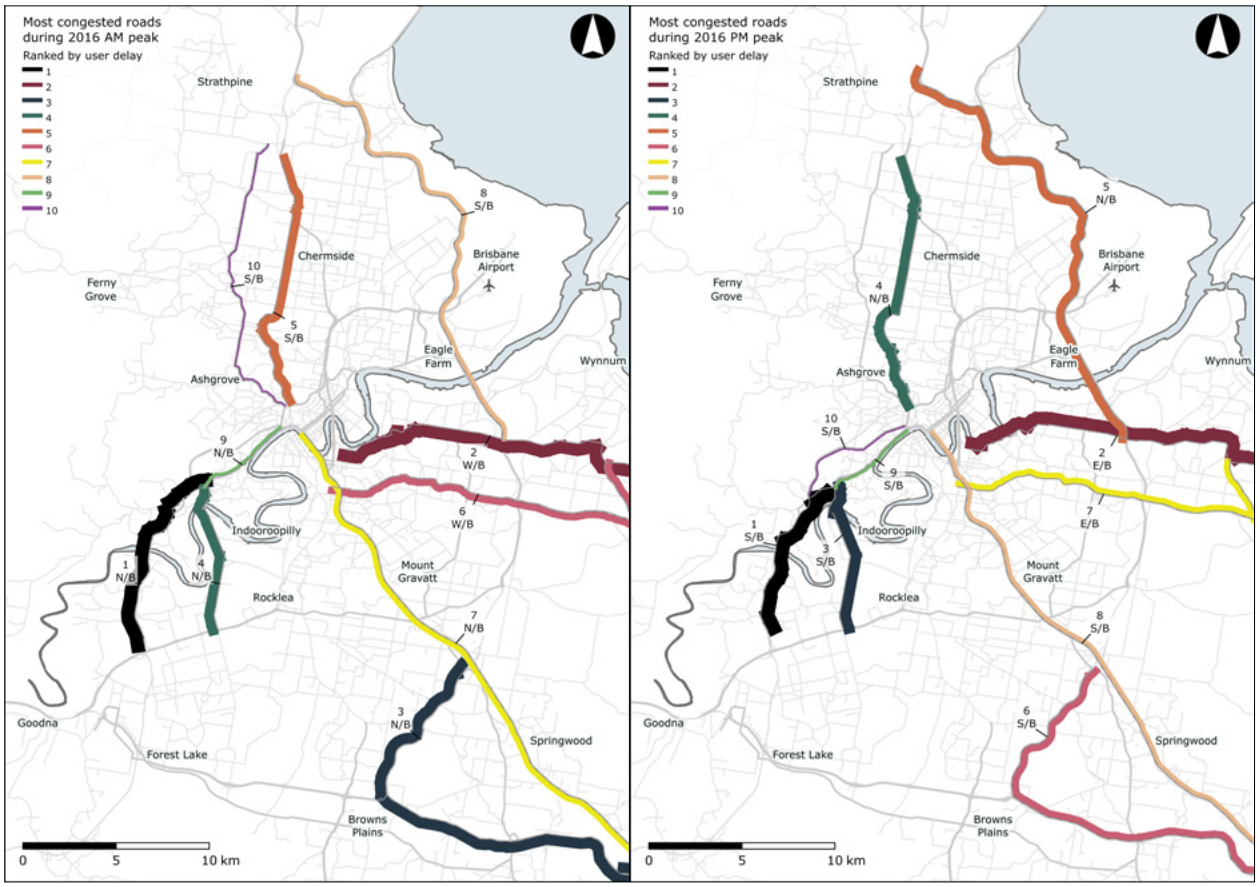
Table 26: Brisbane's most congested roads (user experience), 2016

City rank	Corridor including origin / destination connected (direction)	Length (km)	Share of journey time due to congestion	Delay per vehicle (mins)	Cost of congestion for a car	Cost of congestion for a heavy commercial vehicle
AM peak						
1.	Ipswich Motorway to Indooroopilly via Centenary Highway (N/B)	10	68%	18	$4.97	$21.41
2.	Thorneside to Woolloongabba via Wynnum Road (W/B)	17	59%	25	$6.90	$29.74
3.	Loganholme to Mount Gravatt via Pacific Motorway (N/B)	17	58%	14	$3.87	$16.66
4.	Ipswich Motorway to Indooroopilly via Oxley Road (N/B)	8	57%	13	$3.59	$15.47
5.	M1 to Inner City Bypass via Kelvin Grove (S/B)	14	57%	22	$6.08	$26.17
6.	Thorneside to Woolloongabba via Old Cleveland Road (W/B)	21	56%	25	$6.90	$29.74
7.	Beenleigh to city via Pacific Motorway (N/B)	35	55%	27	$7.46	$32.12
8.	Bald Hills to Tingalpa via Gateway Motorway (S/B)	26	55%	20	$5.52	$23.79
9.	Moggill Road to Inner City Bypass via Coronation Drive (N/B)	5	52%	7	$1.93	$8.33
10.	M1 to Inner City Bypass via Bridgeman Road (S/B)	16	50%	20	$5.52	$23.79
PM peak						
1.	Indooroopilly to Ipswich via Centenary Highway (S/B)	9	66%	14	$3.87	$16.66
2.	Woolloongabba to Thorneside via Wynnum Road (E/B)	17	54%	20	$5.52	$23.79
3.	Indooroopilly to Ipswich via Oxley Road (S/B)	8	52%	10	$2.76	$11.90
4.	Inner City Bypass to M1 via Kelvin Grove (N/B)	14	50%	17	$4.69	$20.22
5.	Tingalpa to Bald Hills via Gateway Motorway (N/B)	26	50%	16	$4.42	$19.03
6.	Mount Gravatt to Loganholme via Pacific Motorway (S/B)	16	48%	9	$2.49	$10.71
7.	Woolloongabba to Thorneside via Old Cleveland Road (E/B)	21	48%	18	$4.97	$21.41
8.	City to Beenleigh via Pacific Motorway (S/B)	34	48%	20	$5.52	$23.79
9.	Inner City Bypass to Moggill Road via Coronation Drive (S/B)	5	47%	6	$1.66	$7.14
10.	Inner City Bypass to Moggill Road via Milton Road (S/B)	7	46%	5	$1.38	$5.95

Note: N/B, S/B, W/B and E/B represent northbound, southbound, westbound and eastbound, respectively.

Source: Veitch Lister Consulting (2019)[120]

Figure 58: Brisbane's most congested roads (user experience), 2016 AM (left) and PM (right) peak periods



Source: Veitch Lister Consulting (2019)[121]

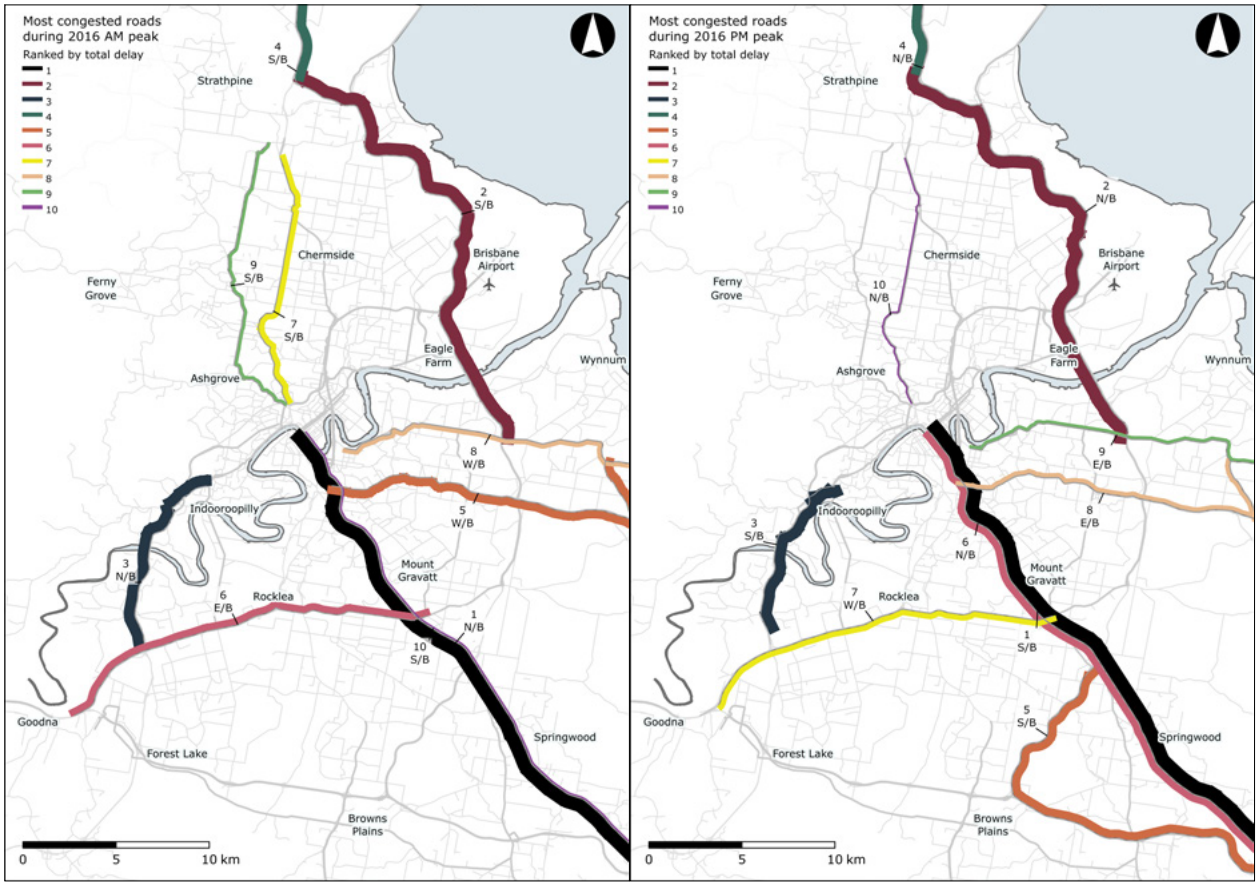
Table 27: Brisbane's most congested roads (total vehicle delays), 2016

City rank	Corridor	Direction	Total delay hours	Cost of congestion (daily)
AM peak				
1.	Beenleigh to city corridor (Pacific Motorway)	N/B	4,800	$95,000
2.	Bald Hills to Tingalpa (Gateway Motorway)	S/B	2,400	$50,000
3.	Ipswich Motorway to Indooroopilly corridor (Centenary Highway)	N/B	2,100	$42,000
4.	Sippy Downs to Mango Hills corridor (Bruce Highway)	S/B	2,000	$41,000
5.	Woolloongabba to Thorneside (Old Cleveland Road)	W/B	1,700	$33,000
6.	Goodna to Mount Gravatt corridor (Ipswich Motorway / Kessels Road)	E/B	1,700	$34,000
7.	M1 to Inner City Bypass corridor (via Kelvin Grove)	S/B	1,500	$29,000
8.	Thorneside to Woolloongabba corridor (Wynnum Road)	W/B	1,400	$27,000
9.	M1 to Inner City Bypass corridor (Bridgeman Road)	S/B	1,200	$23,000
10.	City to Beenleigh corridor (Pacific Motorway)	S/B	1,200	$25,000
PM peak				
1.	City to Beenleigh corridor (Pacific Motorway)	S/B	3,700	$71,000
2.	Tingalpa to Bald Hills corridor (Gateway Motorway)	N/B	2,100	$43,000
3.	Ipswich Motorway to Indooroopilly corridor (Centenary Highway)	S/B	1,800	$35,000
4.	Mango Hills to Sippy Downs corridor (Bruce Highway)	N/B	1,700	$35,000
5.	Mount Gravatt to Loganholme corridor (Pacific Motorway)	S/B	1,600	$32,000
6.	City to Beenleigh corridor (Pacific Motorway)	N/B	1,500	$30,000
7.	Mount Gravatt to Goodna corridor (Kessels Road / Ipswich Motorway)	W/B	1,300	$26,000
8.	Woolloongabba to Thorneside corridor (Old Cleveland Road)	E/B	1,200	$23,000
9.	Woolloongabba to Thorneside corridor (Wynnum Road)	E/B	1,200	$23,000
10.	Inner City Bypass to M1 (via Kelvin Grove)	N/B	1,200	$22,000

Note: N/B, S/B, W/B and E/B represent northbound, southbound, westbound and eastbound, respectively.

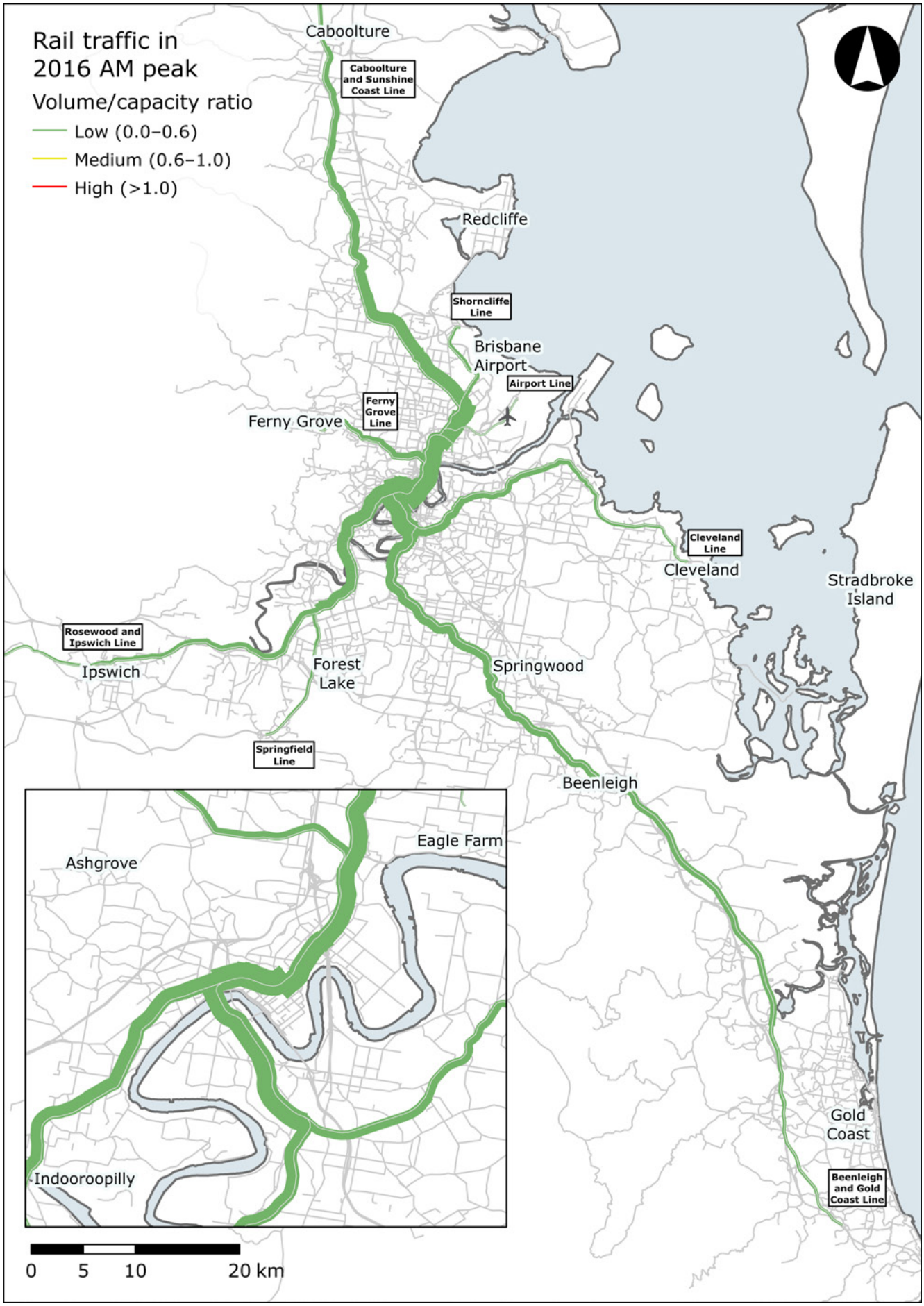
Source: Veitch Lister Consulting (2019)[122]

Figure 59: Brisbane's most congested roads (total vehicle delays), 2016 AM (left) and PM (right) peak periods



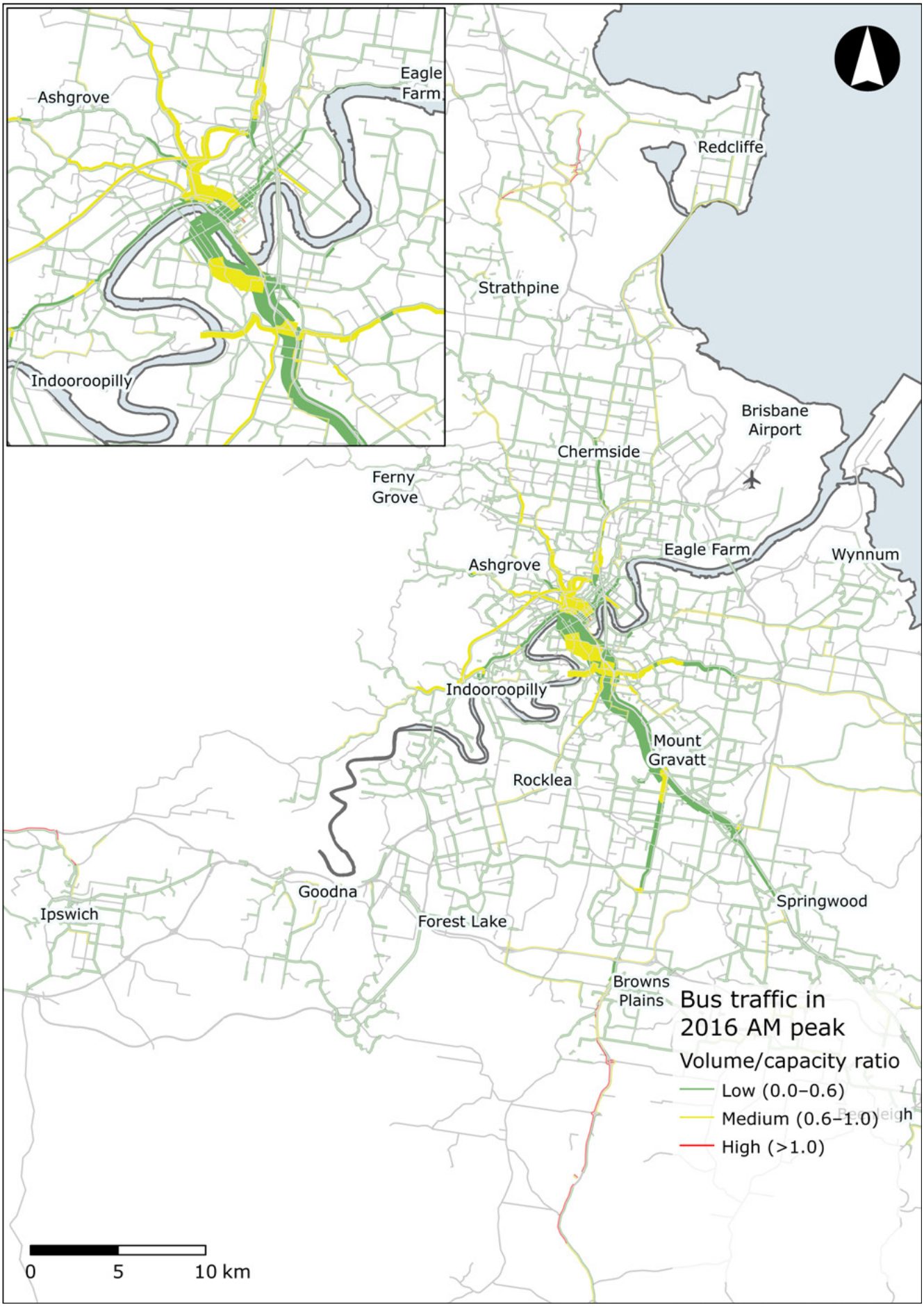
Source: Veitch Lister Consulting (2019)[123]

Figure 60: Brisbane weekday train passenger volume / capacity ratio, 2016 AM peak



Source: Veitch Lister Consulting (2019)[124]

Figure 61: Brisbane weekday bus passenger volume / capacity ratio, 2016 AM peak



Source: Veitch Lister Consulting (2019)[125]

Findings

- Brisbane's most congested transport corridors are key routes providing access to the CBD from outer suburbs. Congestion is most severe at access points immediately surrounding the CBD.
- The Brisbane River concentrates traffic and commuters onto several key corridors that provide river crossings. Travel in the peak direction is most constrained southbound for roads north of the Brisbane River and northbound for roads south of the Brisbane River).
- Some routes experience high levels of congestion in both directions of travel, most notably the Centenary Highway and the Pacific Motorway.
- The demand for travel between Brisbane's northern suburbs and the major activity centres in the south drives congestion on the Bruce Highway, Sandgate Road and Gateway Motorway.
- The most significant corridors servicing east-west movements are the Ipswich Motorway (with high levels of congestion) and the Logan Motorway (with moderate congestion). Congestion on these corridors result from the demand for travel from the western parts of the city (Ipswich, Springfield and Redbank) to the activity centres located further east.
- Brisbane's bus routes outside of major busways are subject to significant crowding in peak periods, while bus corridors closer to the CBD experience more modest crowding in peak periods. This indicates that there is insufficient bus capacity to cater for Brisbane's expanding population outside of established suburbs.
- There are currently low levels of crowding on Brisbane's rail services.

7.4 Even with programmed investment, Brisbane's transport networks are forecast to become more congested

Snapshot of Brisbane's transport networks in 2031

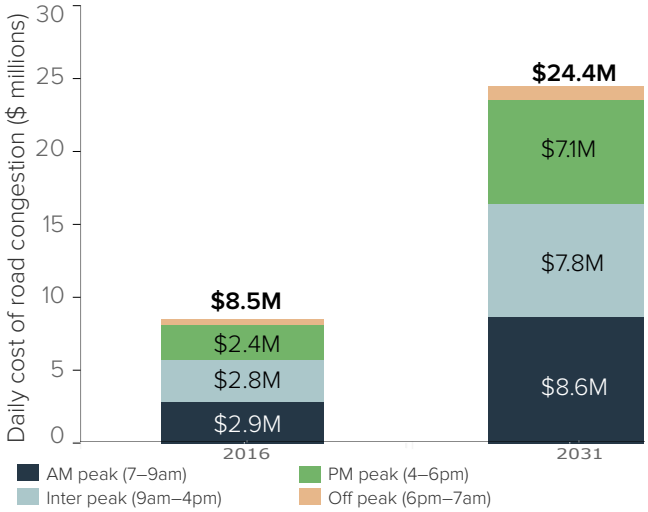
Brisbane's transport network demand is forecast to increase roughly in line with population growth. Greater Brisbane's population is estimated to grow by approximately 30%, to just over 3 million people, by 2031. Population is predicted to grow most quickly in the outer suburbs of Brisbane, such as Jimboomba, Springfield-Redbank and Ipswich. In line with Brisbane's population growth, trips on Brisbane's transport network are expected to increase by 26%, to over 6 million daily trips, by 2031.

Trips by public transport will grow at a faster rate than by car, continuing a shift towards public transport use in the city seen over the last few years. Public transport journeys are expected to increase by 55%, while the use of cars will only increase by 21%.

Despite this shift towards public transport, congestion on Brisbane's roads is forecast to grow substantially. Our modelling indicates the annualised cost of road congestion in 2031 will be approximately $6.0 billion for Brisbane GCCSA, the Gold Coast and Sunshine Coast. For Brisbane, it will be $4.7 billion.

This will result in more time spent in traffic and on crowded public transport. As a result, the daily cost of road congestion on Brisbane, the Gold Coast and Sunshine Coast's roads is expected to almost triple, from about $8.5 million in 2016 to $24.4 million in 2031 (Figure 62). Congestion on the rail network will also increase, but this will be from a relatively low base and is expected to have a small impact. In comparison, road congestion and bus network delays and crowding will be a larger impact. While the cost of public transport crowding is significantly less than for road congestion, it is expected to increase more than six-fold. The annualised cost across Brisbane, the Gold Coast and Sunshine Coast will increase from $14 million in 2016 to $90 million in 2031, with most of this cost being borne by bus passengers.

Figure 62: Brisbane, the Gold Coast and Sunshine Coast's average weekday cost of road congestion, 2016 and 2031



Source: Veitch Lister Consulting (2019)[126]

The transport outcomes forecast for Brisbane account for projects that were either under construction, under procurement, or had a public commitment to fund construction from all relevant governments at the time of modelling for the *Australian Infrastructure Audit*.[127]

Major projects included in Brisbane, the Gold Coast and Sunshine Coast's forecast comprise:

- Cross River Rail
- Brisbane Metro
- Gold Coast Light Rail Stage 2
- Gateway Motorway widening
- Pacific Motorway widening
- South East Busway extension
- Inner City Bypass widening
- Logan Enhancement Project
- Pacific Motorway Upgrades.

As noted in Table 23, the population projections informing this Audit do not align with those in ShapingSEQ. The key difference is that ShapingSEQ identifies less growth and reduced pressure on corridors linking the outer suburbs and satellite cities, due to more infill development.

Brisbane's most congested roads in 2031: what the driver will experience

Between 2016 and 2031 there is expected to be a noticeable shift in the location of congestion in Brisbane. In 2016, Brisbane's inner eastern roads were some of its most congested. However, by 2031 Brisbane's most congested roads will be those linking the city centre with growth areas to the south-west. Aside from this shift, north-south corridors such as the Pacific and Bruce highways, as well as the Ipswich Motorway, will continue to be some of the most congested roads in the city (Table 28, Figure 63 and Figure 64).

By 2031, traffic is forecast to grow substantially on Greater Brisbane's road network. The patterns of congestion identified in the 2016 model are forecast to become more pronounced. Commuters on Brisbane's roads can expect higher levels of traffic and longer delays, and it will become more common for peak congestion to be encountered in both directions.

Population growth, particularly in Brisbane's western and southern suburbs, will increase traffic volumes on key city centre access routes. Brisbane's north-south development pattern will mean that major northern corridors such as the Bruce Highway and Gateway Motorway will become in-demand thoroughfares for commuters and freight vehicles. Longer sections of road that are subject to high and moderate congestion levels are predicted to be common on these corridors by 2031.

Population growth in Brisbane's southern suburbs will drive increasing congestion on the Pacific Motorway. Forecasts indicate that a greater proportion of the motorway will operate in highly congested conditions in peak periods. Congestion is expected to extend well into Brisbane's outer suburbs. The Pacific Motorway corridor south of Eight Mile Plains can expect a 25% increase in traffic volumes by 2031.

Long sections of Greater Brisbane's main east-west corridors can also be expected to experience worsening traffic congestion. Population growth in Ipswich is expected to place an additional 12,000 vehicles per day on the Logan Motorway in both directions. Congestion increases can also be expected on the Ipswich and Centenary Highways as commuters access central Brisbane from Ipswich. By 2031 the Mount Lindesay Highway is expected to carry traffic volumes well above its design capacity as a consequence of population growth in southern areas such as Jimboomba.

Brisbane's most congested roads in 2031: the forecast cost to the community of total vehicle delays

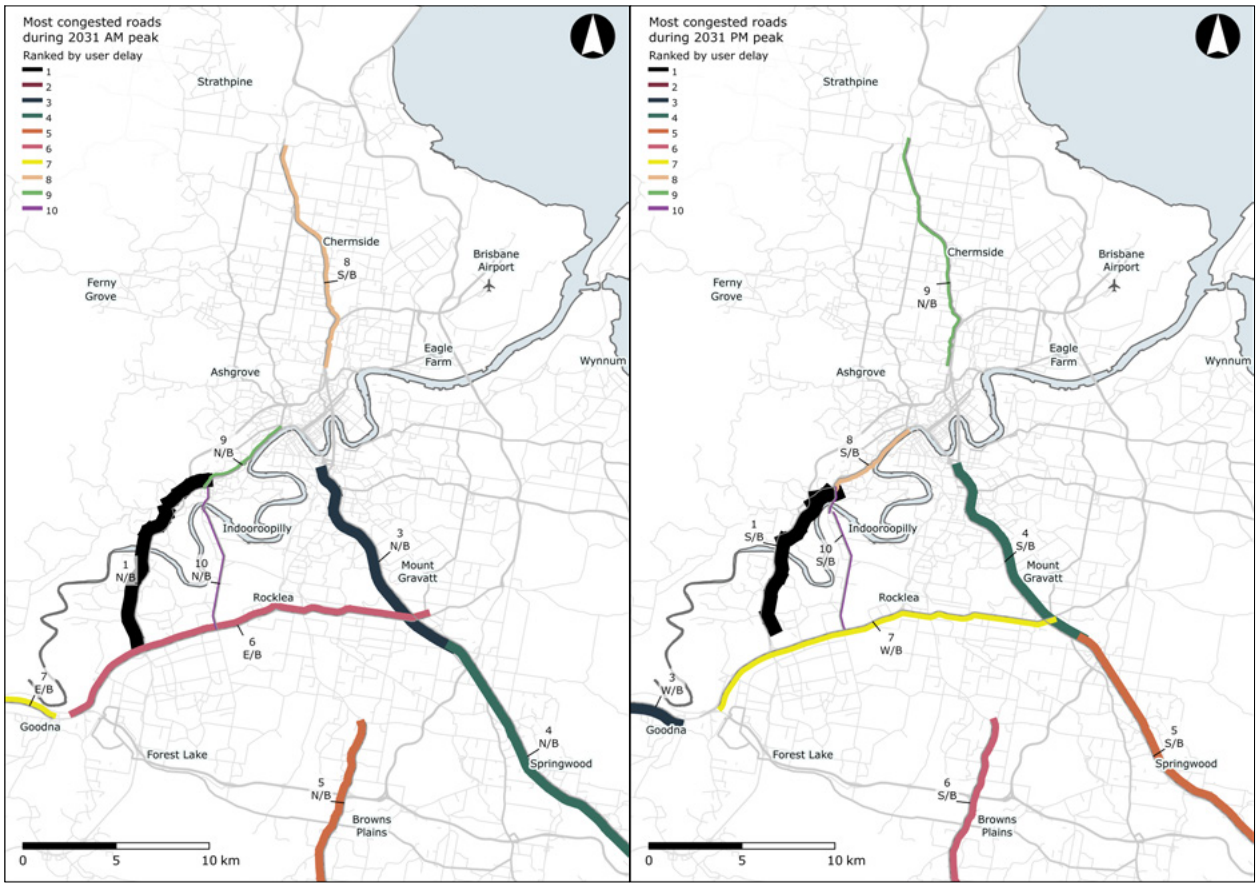
As for 2016, the most congested road corridors in Greater Brisbane have been forecast for 2031 based on aggregating the total delay hours experienced by all vehicles across the network during the modelled period. The ten most congested corridors under this approach are shown in Table 29 and Figure 65.

Table 28: Brisbane's most congested roads (user experience), 2031

City rank	Corridor including origin / destination connected (direction)	Length (km)	Share of journey time due to congestion	Delay per vehicle (mins)	Cost of congestion for a car	Cost of congestion for a heavy commercial vehicle
AM peak						
1.	Ipswich Motorway to Indooroopilly via Centenary Highway (N/B)	10	76%	26	$7.18	$30.93
2.	Helensvale to Beenleigh via Pacific Motorway (N/B)	26	73%	37	$10.22	$44.02
3.	Beenleigh to city via Pacific Motorway (N/B)	35	71%	53	$14.64	$63.05
4.	Loganholme to Mount Gravatt via Pacific Motorway (N/B)	17	70%	23	$6.35	$27.36
5.	Beaudesert to North Logan via Mount Lindesay Highway (N/B)	47	68%	73	$20.16	$86.85
6.	Goodna to Mount Gravatt via Ipswich Motorway / Kessels Road (E/B)	19	68%	34	$9.39	$40.45
7.	Ipswich to Goodna via Brisbane Road / Ipswich Motorway (E/B)	15	68%	28	$7.73	$33.31
8.	M1 to Inner City Bypass via Gympie Road / Lutwyche Road (S/B)	13	65%	12	$6.90	$29.74
9.	Moggill Road to Inner City Bypass via Coronation Drive (N/B)	5	65%	12	$3.31	$14.28
10.	Ipswich Motorway to Indooroopilly via Oxley Road (N/B)	8	65%	18	$4.97	$21.41
PM peak						
1.	Indooroopilly to Ipswich via Centenary Highway (S/B)	9	74%	20	$5.52	$23.79
2.	Beenleigh to Helensvale via Pacific Motorway (S/B)	27	71%	36	$9.94	$42.83
3.	Goodna to Ipswich via Ipswich Motorway / Brisbane Road (W/B)	15	69%	27	$7.46	$32.12
4.	City to Beenleigh via Pacific Motorway (S/B)	34	66%	42	$11.60	$49.97
5.	Mount Gravatt to Loganholme via Pacific Motorway (S/B)	16	63%	16	$4.42	$19.03
6.	North Logan to Beaudesert via Mount Lindesay Highway (S/B)	47	63%	56	$15.47	$66.62
7.	Mount Gravatt to Goodna via Kessels Road / Ipswich Motorway (W/B)	18	61%	23	$6.35	$27.36
8.	Inner City Bypass to Moggill Road via Coronation Drive (S/B)	5	60%	10	$2.76	$11.90
9.	Inner City Bypass to M1 via Lutwyche Road / Gympie Road (N/B)	13	60%	20	$5.52	$23.79
10.	Indooroopilly to Ipswich Motorway via Oxley Road (S/B)	8	59%	14	$3.87	$16.66

Source: Veitch Lister Consulting (2019)[128]

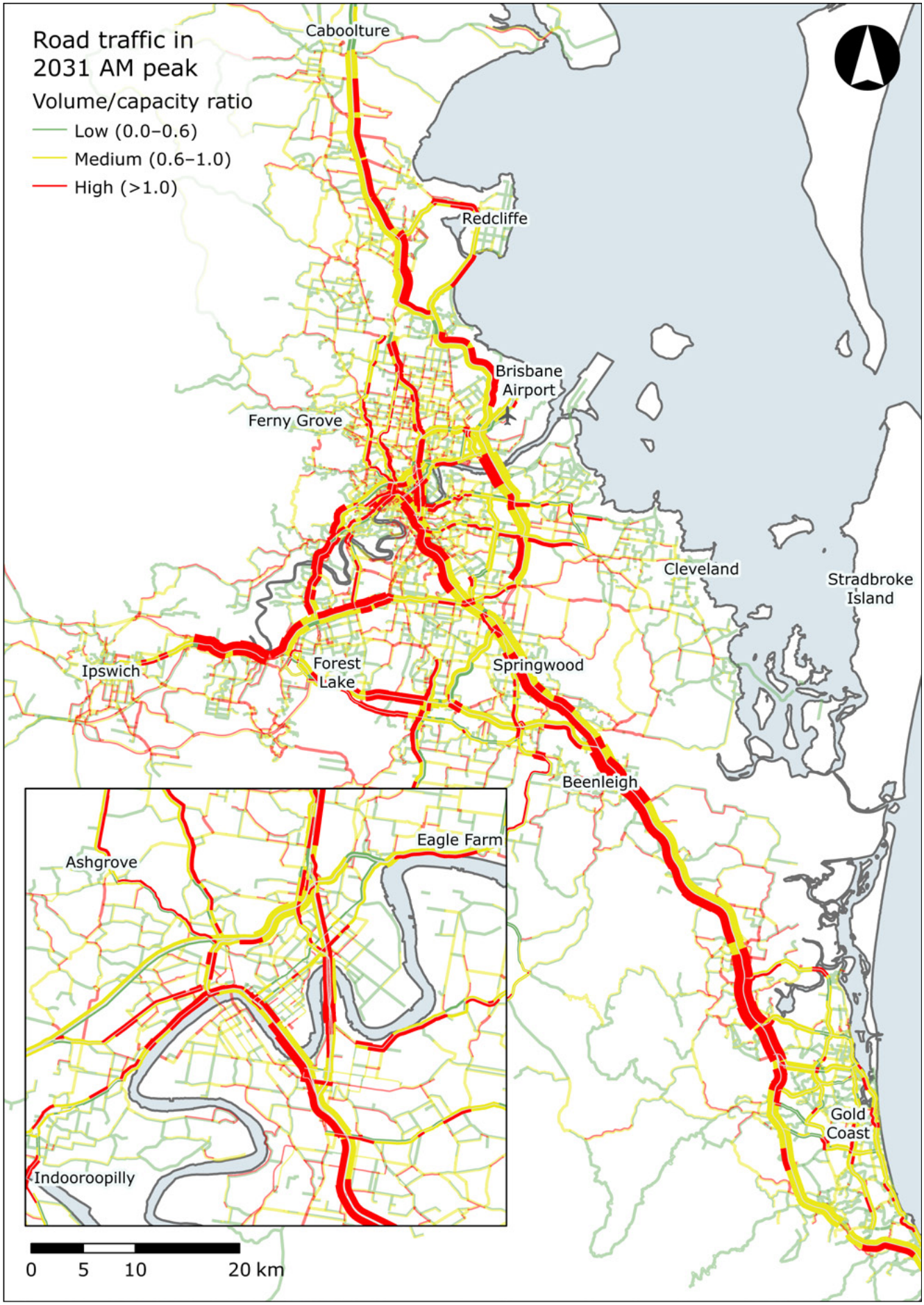
Figure 63: Brisbane's most congested roads (user experience), 2031 AM (left) and PM (right) peak periods



Note: The Beenleigh to Helensvale via Pacific Motorway corridor (2nd most congested corridor in both AM and PM peak periods) is located beyond the map extent, towards the Gold Coast in the south east.

Source: Veitch Lister Consulting (2019)[129]

Figure 64: Brisbane weekday traffic volume / capacity ratio, 2031 AM peak



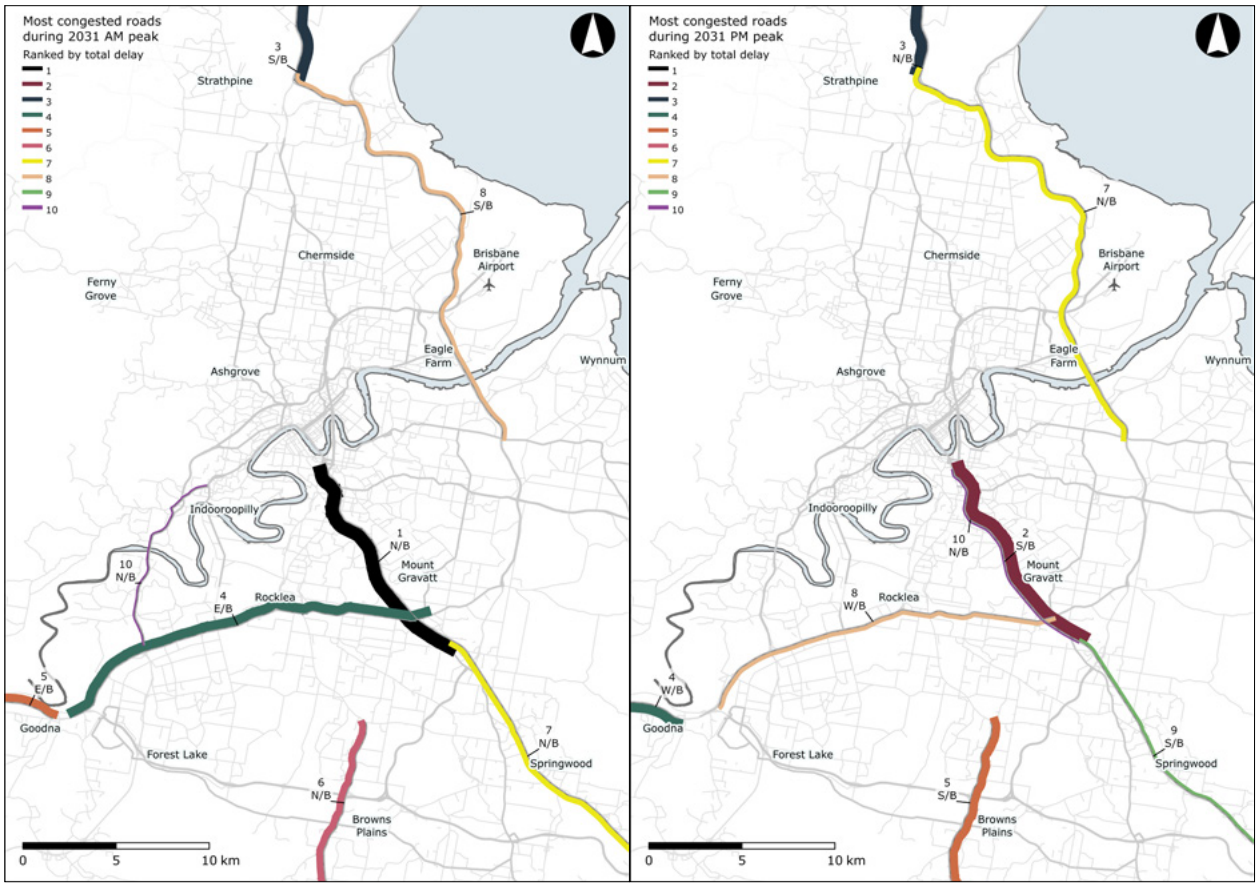
Source: Veitch Lister Consulting (2019)[130]

Table 29: Brisbane's most congested roads (total vehicle delays), 2031

City rank	Corridor	Direction	Total delay hours	Cost of congestion (daily)
AM peak				
1.	Beenleigh to city corridor (Pacific Motorway)	N/B	11,700	$235,000
2.	Helensvale to Beenleigh corridor (Pacific Motorway)	N/B	9,300	$189,000
3.	Sippy Downs to Mango Hills corridor (Bruce Highway)	S/B	6,700	$142,000
4.	Goodna to Mount Gravatt corridor (Ipswich Motorway / Kessels Road)	E/B	5,700	$114,000
5.	Ipswich to Goodna corridor (Brisbane Road / Ipswich Motorway)	E/B	5,600	$111,000
6.	Beaudesert to North Logan corridor (Mount Lindesay Highway)	N/B	5,200	$101,000
7.	Loganholme to Mount Gravatt corridor (Pacific Motorway)	N/B	4,900	$100,000
8.	Bald Hills to Tingalpa corridor (Gateway Motorway)	S/B	4,200	$89,000
9.	Beenleigh to Helensvale corridor (Pacific Motorway)	S/B	4,100	$86,000
10.	Ipswich Motorway to Indooroopilly corridor (Centenary Highway)	N/B	3,400	$67,000
PM peak				
1.	Beenleigh to Helensvale corridor (Pacific Motorway)	S/B	9,500	$188,000
2.	City to Beenleigh corridor (Pacific Motorway)	S/B	9,400	$183,000
3.	Mango Hills to Sippy Downs corridor (Bruce Highway)	N/B	5,500	$114,000
4.	Goodna to Ipswich corridor (Ipswich Motorway / Brisbane Road)	W/B	5,500	$108,000
5.	North Logan to Beaudesert corridor (Mount Lindesay Highway)	S/B	3,900	$75,000
6.	Helensvale to Beenleigh corridor (Pacific Motorway)	N/B	3,800	$77,000
7.	Tingalpa to Bald Hills corridor (Gateway Motorway)	N/B	3,800	$78,000
8.	Mount Gravatt to Goodna corridor (Kessels Road / Ipswich Motorway)	W/B	3,700	$72,000
9.	Mount Gravatt to Loganholme corridor (Pacific Motorway)	S/B	3,500	$69,000
10.	Beenleigh to city corridor (Pacific Motorway)	N/B	3,500	$71,000

Source: Veitch Lister Consulting (2019)[131]

Figure 65: Brisbane's most congested roads (total vehicle delays), 2031 AM (left) and PM (right) peak periods



Note: The Beenleigh to Helensvale via Pacific Motorway corridor (2nd and 9th most congested corridor in AM peak period, and 1st and 6th most congested corridor in PM peak period) is located beyond the map extent, towards the Gold Coast in the south east.

Source: Veitch Lister Consulting (2019)[132]

Brisbane's public transport system in 2031

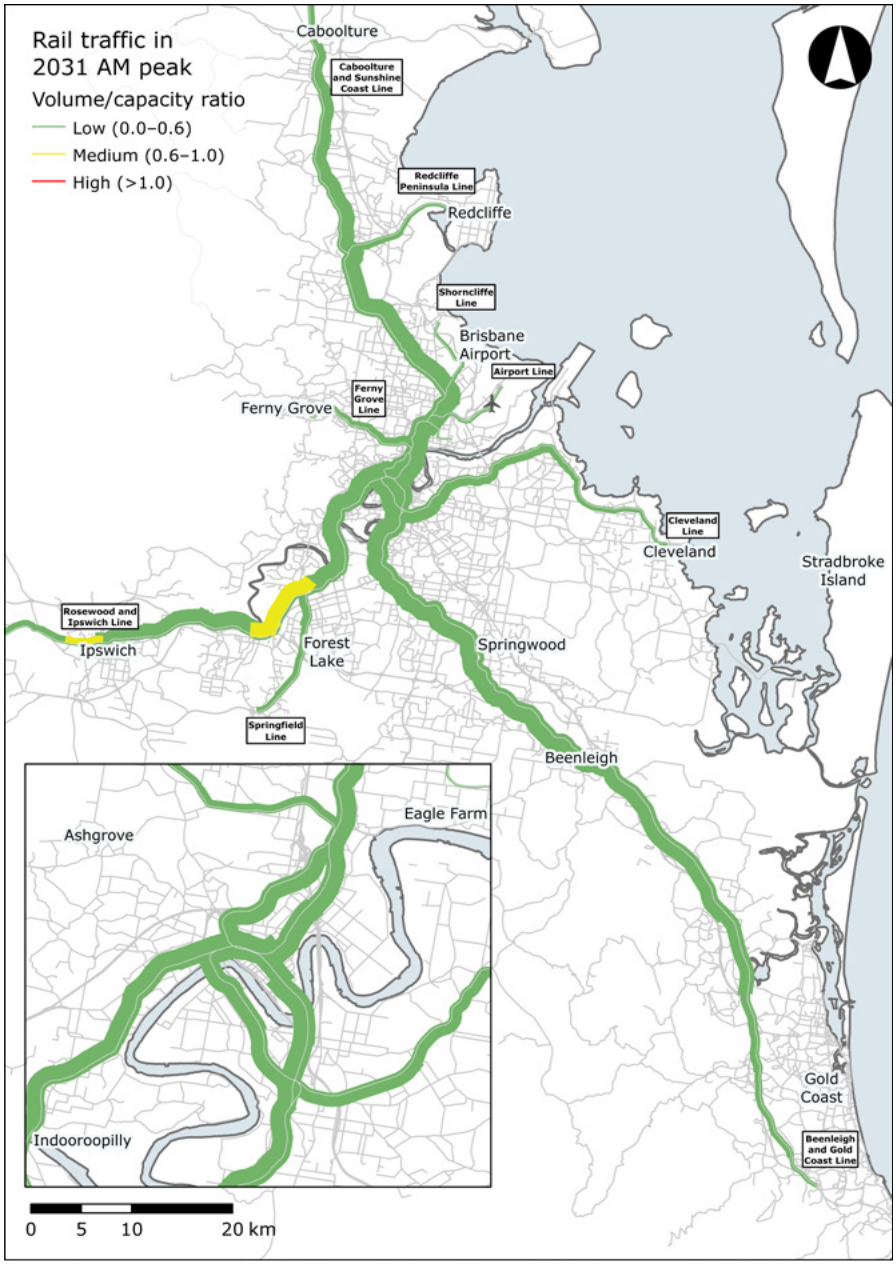
Public transport use in Brisbane is forecast to grow in coming years. By 2031 people in Brisbane are expected to take around 278,000 extra public transport trips (Figure 66). Patronage on rail is forecast to increase more than buses. Infrastructure improvements such as Cross River Rail as well as congestion of the road network are expected to increase the popularity of rail.

Despite increased patronage on Brisbane's trains, in 2031 the network will generally continue to see only modest crowding. This is due to the construction of the Cross River Rail that will quadruple the passenger-carrying capacity of the regional rail network. The only rail sections expected to experience higher levels of crowding by 2031 will be specific sections of the Rosewood and Ipswich lines, due to high levels of population growth projected in Ipswich.

Brisbane's bus routes are also projected to carry significantly more commuters by 2031 due to population growth (Figure 67). The strongest growth is expected on the South Eastern Busway along the Pacific Motorway (where line 1 of the proposed Brisbane Metro will run). Significant passenger increases are also predicted for the Northern Busway.

Due to increased patronage, bus crowding in 2031 is expected to reproduce 2016 patterns, with intensified levels of crowding. More significant crowding can be expected on buses further from the city, particularly on routes that serve areas outside rail catchments. Consequently, the modelling shows that long-distance commuters will experience longer periods of standing, and can expect more significant delays. In contrast, bus passengers using high-frequency corridors such as the South Eastern and Northern busways will experience greater crowding closer to the CBD.

Figure 66: Brisbane weekday train passenger volume / capacity ratio, 2031 AM peak



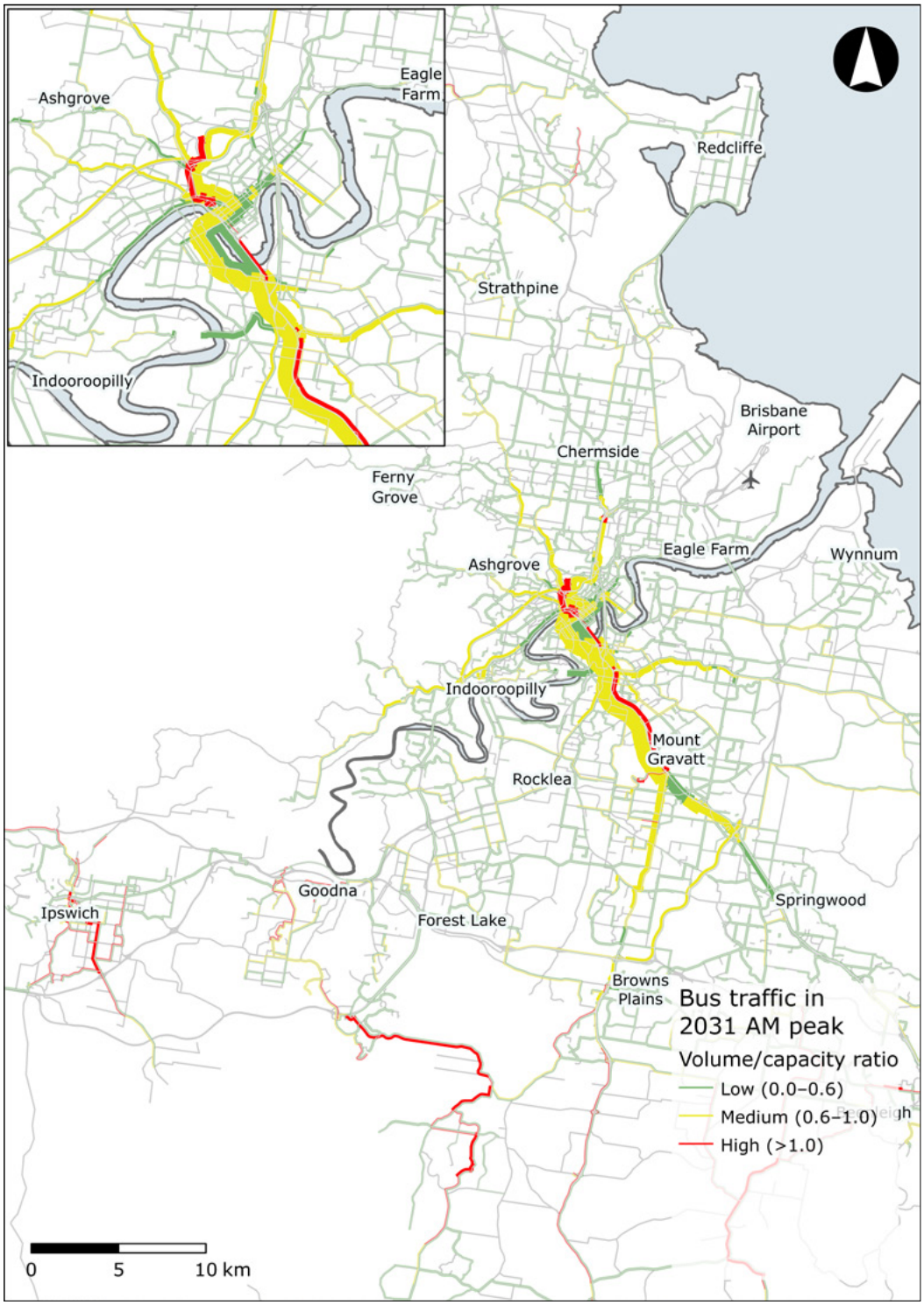
Source: Veitch Lister Consulting (2019)[133]

High levels of crowding outbound on the South Eastern busway are a function of the conservative approach taken to modelling Brisbane Metro. The model simply scales up 2016 frequencies to model the Brisbane Metro in 2031. In reality, counter peak crush capacity is likely to be reduced by additional services. Additionally, a network-wide set of seated capacities for buses has been assumed. In reality, it is like that Brisbane Metro vehicles in 2031 will have higher seating capacities. This means that it is likely that the counter peak capacity used in the 2031 forecast is likely to overstate crowding.

It is important to note bus service frequencies in 2031 are subject to significant uncertainty given the relatively flexible nature of bus service planning. The modelling assumes an annual growth rate of 1.5% in bus service kilometres across all cities. This assumption was based on growth in service kilometres recorded, and averaged, across Sydney, Melbourne and Adelaide. No data was available for Brisbane.

The model does not take into account congestion of buses on the dedicated busway corridor, only crowding of passengers within bus capacity.

Figure 67: Brisbane weekday bus passenger volume / capacity ratio, 2031 AM peak



Source: Veitch Lister Consulting (2019)[134]

Findings

- The 2019 Audit forecasts that the annualised cost of road congestion for Brisbane, the Gold Coast and Sunshine Coast will grow from approximately $2.1 billion in 2016 to $6.0 billion in 2031. This is 35% lower than the 2031 forecast cost of road congestion in the 2015 Audit.
- This is due to population growth and a 50% increase in bus patronage on public transport.
- Brisbane's most congested roads will be those linking the city centre with growth areas.
- Brisbane's south-western rail lines will experience high levels of crowding due to projected population growth in Ipswich and surrounding areas.
- Without adequate infrastructure and services to support population growth, bus crowding in outer suburbs will be intensified further by 2031.

7.5 Population growth is forecast to increase congestion on the Gold Coast's key access routes

Transport on the Gold Coast and its surrounding region, today and in 15 years

The Gold Coast region is forecast to experience significant population growth by 2031. Gold Coast City will grow by about 25%, while surrounding regions will grow more rapidly. Nerang and Surfers Paradise will each grow by about 30%, Southport with grow by 40%, while Ormeau-Oxenford will grow by over 70%. These growth rates will result in increased demand for use of the region's public transport network. In a similar manner to Brisbane, growth in public transport will outstrip cars. Trips by car are expected to increase by 37%, while trips on public transport will grow by 67%. The growth in demand will result in increased road congestion costs on the Gold Coast. This will quadruple,from $243 million in 2016 to $973 million in 2031.

Despite planned upgrades to the Pacific Motorway and widening of the Southport-Burleigh Road corridor, increased congestion is still forecast for the Gold Coast's roads (Figure 68). The Pacific Motorway, a key arterial route connecting the Gold Coast to Brisbane, is forecast to experience more traffic and longer delays by 2031. Additionally, roads linking the central Gold Coast with surrounding regions, such as Hope Island Road, Gooding Drive, Robina Parkway and Bermuda Street, are expected to become increasingly congested. While in 2016 the Gold Coast's population was primarily clustered along the seaboard, by 2031 it is expected to become more dispersed, growing strongly in areas such as Ormeau-Oxenford and Southport.

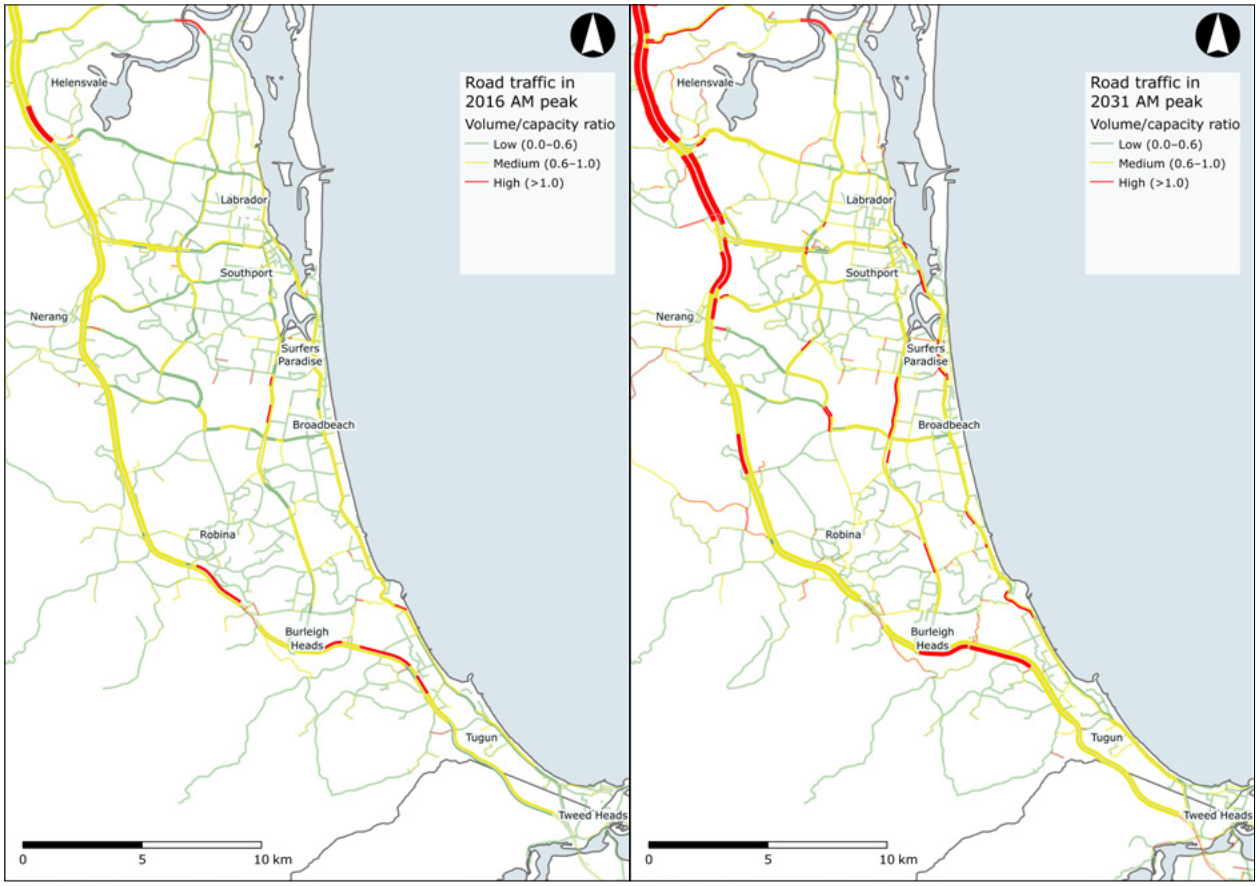
In 2016 the Gold Coast region experienced low levels of public transport crowding, with the exception of some bus routes. Crowded routes were those connecting to the rail system, facilitating the high demand for travel between the Gold Coast light rail system and the rail link to Brisbane.

Bus services have since been replaced by stage 2 of the Gold Coast Light Rail (G:Link) providing additional capacity in the corridor.

By 2031, growth rates in the Gold Coast region are expected to significantly increase patronage across the public transport network, in particular on routes travelling north where people are commuting mainly to work from Helensvale and on the light rail in both directions through Southport.

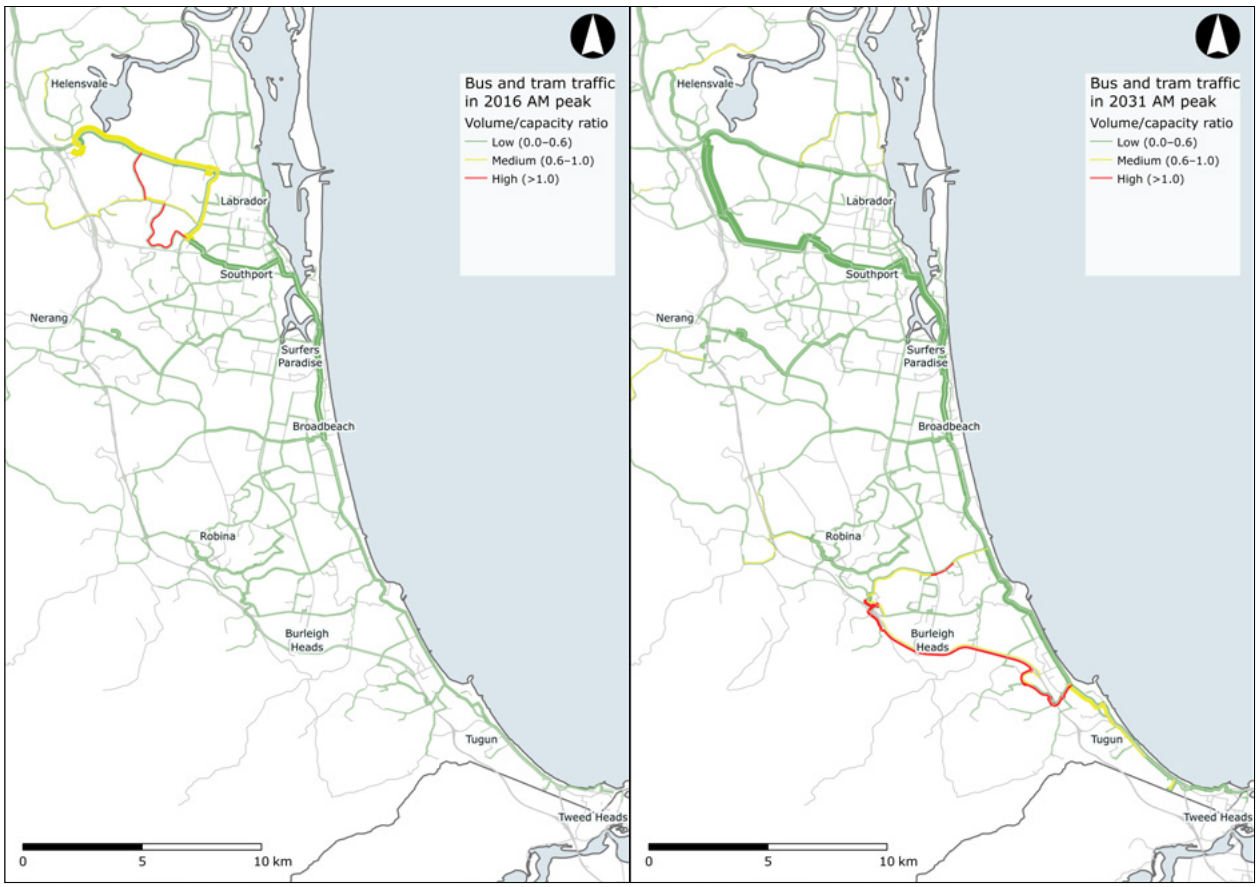
In 2031, the Gold Coast's most significant crowding is forecast on routes connecting the Brisbane rail line to Burleigh Heads and Coolangatta, as displayed in Figure 69.

Figure 68: Gold Coast weekday traffic volume / capacity ratio, 2016 and 2031 AM peak



Source: Veitch Lister Consulting (2019)[135]

Figure 69: Gold Coast bus and light rail passenger volume / capacity ratio, 2016 and 2031 AM peak



Source: Veitch Lister Consulting (2019)[136]

Findings

- The population of the Gold Coast is forecast to grow by 200,000 people by 2031. While this represents growth of 37%, total hours driven are forecast to increase much more rapidly, by approximately 100% in both peak periods by that year.
- Key routes linking the Gold Coast with Brisbane and other surrounding areas are forecast to become increasingly congested, causing delays particularly for commuters travelling in peak periods.
- Despite road improvements, Gold Coast roads are expected to experience increased congestion. This will be seen in the counter-peak as well as the peak direction, especially on the Pacific Motorway, with an additional 31,000 peak period vehicles forecast to be travelling in each direction by 2031.
- In 2031 the extension of the Gold Coast Light Rail to Helensvale will have additional patronage of 3,000 passengers in each direction at peak. Away from the light rail, passengers will experience high levels of crowding on buses connecting the rail network to Burleigh Heads and Coolangatta.
- Many of these light rail and bus users will be among the 10,000 extra passengers forecast as travelling between Helensville and Brisbane city every weekday by 2031.
- Crowding of rail services will however remain low.

7.6 The Sunshine Coast is growing, and so are its transport network demands

Transport on the Sunshine Coast and its region, today and in 15 years

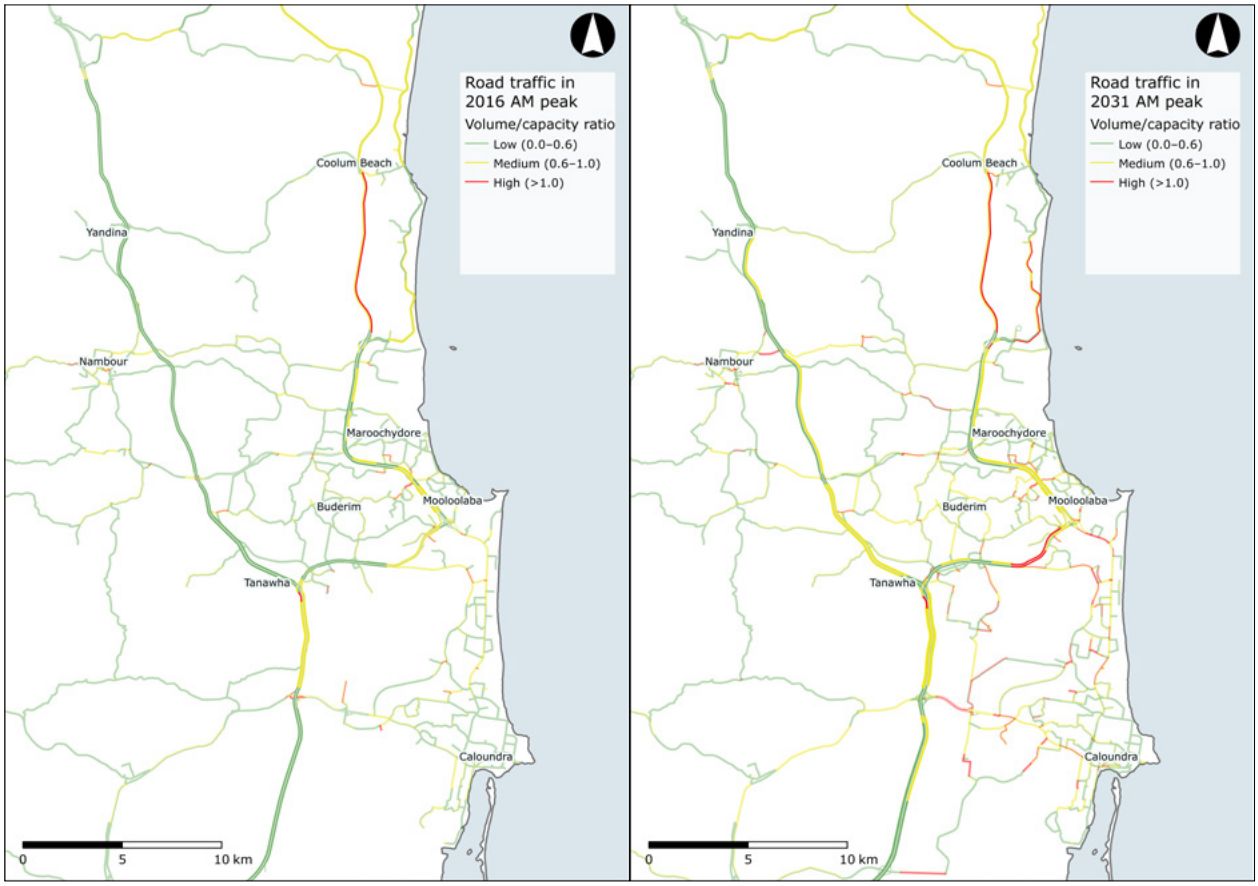
The Sunshine Coast region is forecast to experience significant population growth by 2031, expecting growth of 33%, or 120,000 people. Caloundra can expect growth of 61%, while Maroochydore is predicted to grow by 29%. Consequently, demand for the region's public transport will grow. Public transport demand will increase by 56%, or to about 39,000 trips per day, while car trips will only grow by 33%.

Increased demand is expected to heighten congestion costs. The cost of congestion on the Sunshine Coast's roads will more than double, from $123 million in 2016 to $324 million in 2031.

Road congestion experienced on the Bruce Highway, the Sunshine Motorway, Emu Mountain Road, Nicklin Way and Kawana Way in 2016 is forecast to rise and extend by 2031. The highway, a key arterial route between the Sunshine Coast and Brisbane, is expected to accommodate a further 21,000 vehicles in each direction by 2031. Other corridors experiencing congestion in 2016 were key routes linking the Sunshine Coast city centre to the railway line at Woombye, as well as the Sunshine Motorway running between the airport and the city centre. The congestion on these roads is forecast to worsen by 2031 (Figure 70).

In 2016, the Sunshine Coast's bus network experienced low levels of crowding. Moderate levels of crowding occurred on lower-volume routes. By 2031, crowding on particular routes are expected to increase. Routes providing access to Caloundra from the west are predicted to be the most crowded, as illustrated in Figure 71. This movement pattern may be driven by the significant increase in employment opportunities expected in Caloundra.

Figure 70: Sunshine Coast weekday traffic volume / capacity ratio, 2016 and 2031 AM peak



Source: Veitch Lister Consulting (2019)[137]

Figure 71: Sunshine Coast bus volume / capacity ratio, 2016 and 2031 AM peak

Source: Veitch Lister Consulting (2019)[138]

Findings

- Key routes linking the Sunshine Coast to Brisbane are expected to become significantly more congested by 2031, primarily as a result of population growth. At least 21,000 additional vehicles are forecast to travel in each direction on the Bruce Highway during peak periods, adding to congestion in both directions. There will be further delays on the Gateway Motorway for people travelling between the Sunshine Coast and the centre of Brisbane.
- Strong patronage growth is expected along the Sunshine Coast Line. With the addition of patronage growth on the Caboolture Line, trains passing through Albion are expected to carry approximately 27,000 passengers in each direction by 2031.
- Public transport routes providing access to Caloundra from surrounding areas are forecast to become significantly more congested as Caloundra becomes a larger employment centre.
- Intra-regional roads, including the Sunshine Motorway and Emu Mountain Road, will experience worsening congestion as will arterials servicing the Mooloolaba region.

7.7 Transport decisions impact access to jobs and services

Hospital access in Brisbane, the Gold Coast and Sunshine Coast – by car and public transport, in 2031

Southeast Queensland residents' access to healthcare is measured as the travel time to their nearest public hospital, or hospital with an emergency department, by car versus public transport.

Figure 72 demonstrates that access to hospitals in Brisbane, the Gold Coast and Sunshine Coast is significantly quicker by car than public transport. For residents with access to a car in the modelled areas, the Gold Coast was found to have the shortest average travel time to a hospital at 18 minutes in the AM peak in 2031.

Without reliance on a car, 30-minute access to healthcare will be limited to people living near rail lines and other major public transport corridors including the South East and Inner Northern busways and the Gold Coast Light Rail.

Residents of some other areas away from trunk public transport corridors could have to spend over an hour accessing a hospital by public transport in 2031. This will also be true for some parts of the Gold Coast and the Sunshine Coast, although this travel time will an improvement from 2016 in both cities due to public transport upgrades (by nine minutes in the Gold Coast and 11 minutes in the Sunshine Coast).

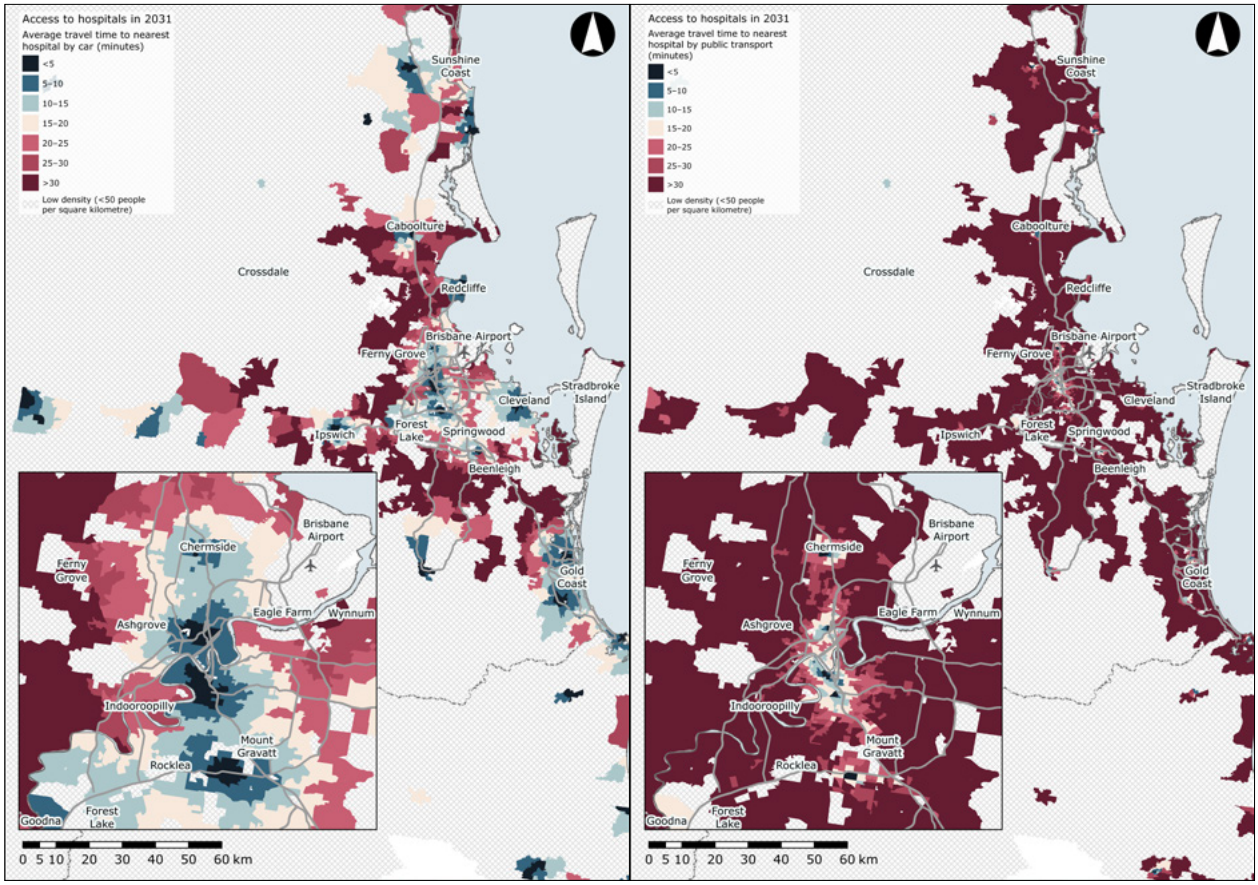
Access to childcare and schools in Brisbane, the Gold Coast and Sunshine Coast – by car and public transport, in 2031

Modelling indicates that residents with access to a car, childcare centres, public primary schools and public secondary schools will be, on average, accessible within seven minutes in 2031. In 2016, these services were, on average, accessible within 5 to 6 minutes (Figure 73, Figure 74 and Figure 75). The average Gold Coast resident can expect similar travel times to Brisbane, while residents of the Sunshine Coast can expect longer travel times due to its dispersed population.

In comparison, residents without access to a car have significantly slower travel times. On average, residents in 2031 can expect to access these services in approximately 46 minutes by public transport, which is marginally faster than 2016. This marginal improvement reflects most public transport investments in Brisbane having involved upgrades of existing corridors, rather than expansion of the overall transport network.

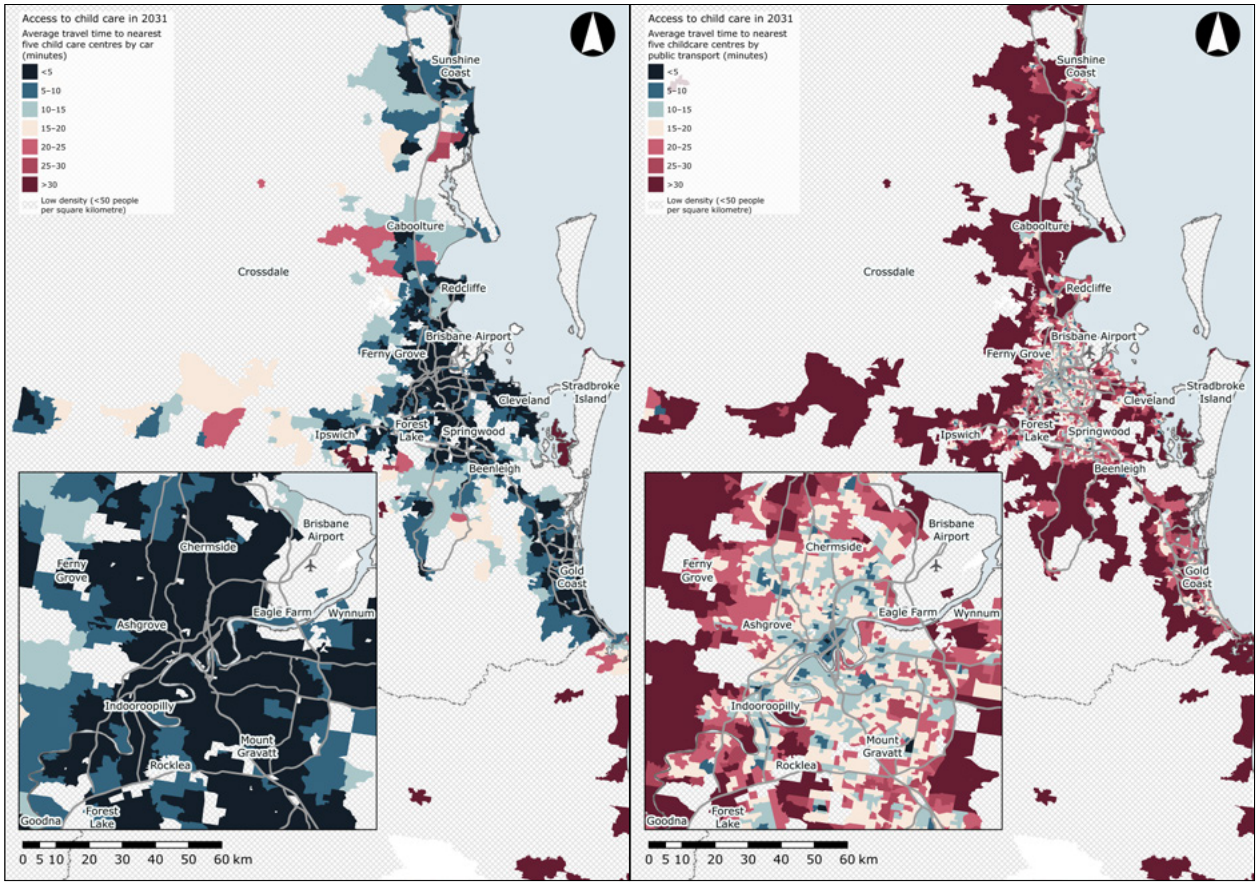
Public transport advancements in the Gold Coast and Sunshine Coast are forecast to improve non-car travel times to social infrastructure destinations compared with 2016. In 2031, most residents of the Gold Coast can expect a public transport travel time of 47 minutes to a hospital, while residents of the Sunshine Coast can expect a time of just under an hour.

Figure 72: Greater Brisbane average time to nearest hospital by car (left) and public transport (right), 2031 AM peak



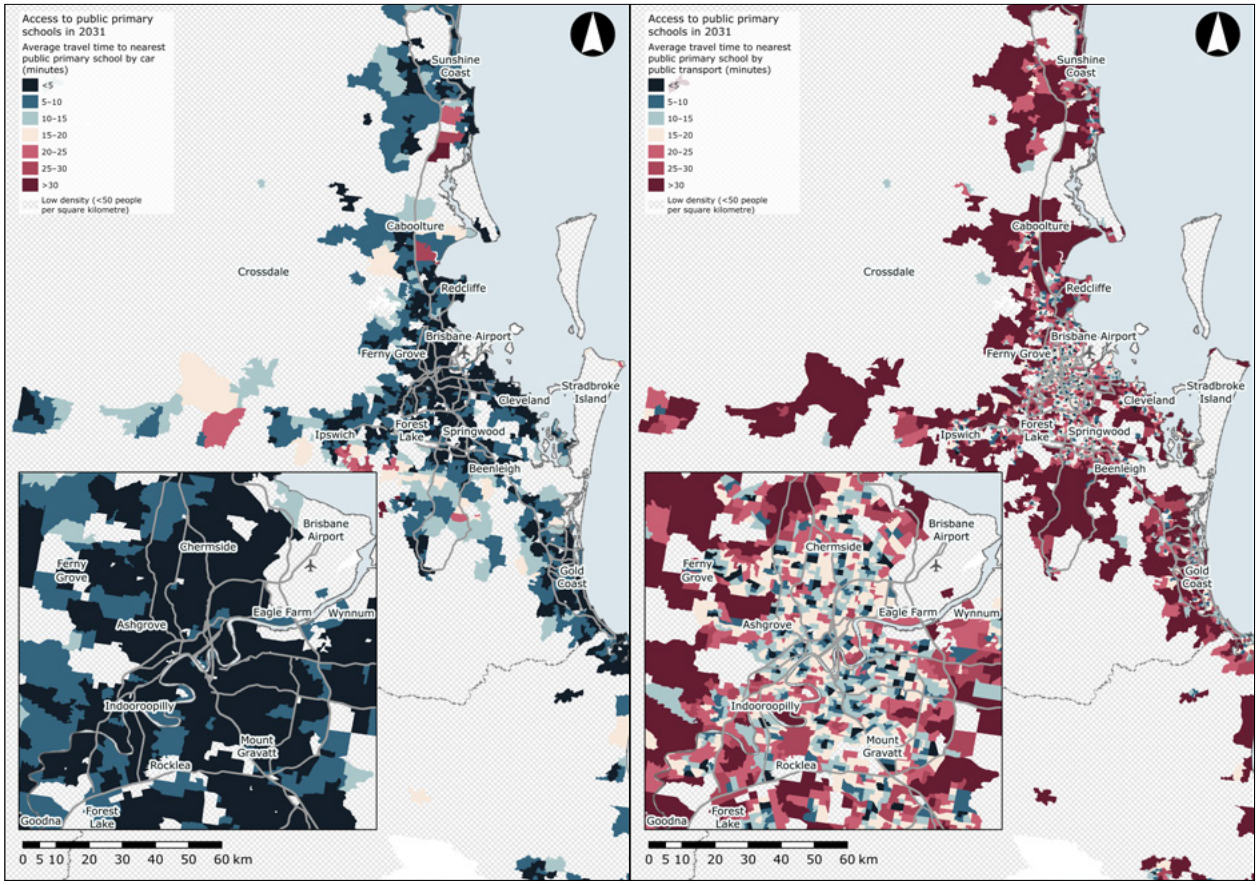
Source: Veitch Lister Consulting (2019)[139]

Figure 73: Greater Brisbane average time to nearest five childcare centres by car (left) and public transport (right), 2031 AM peak



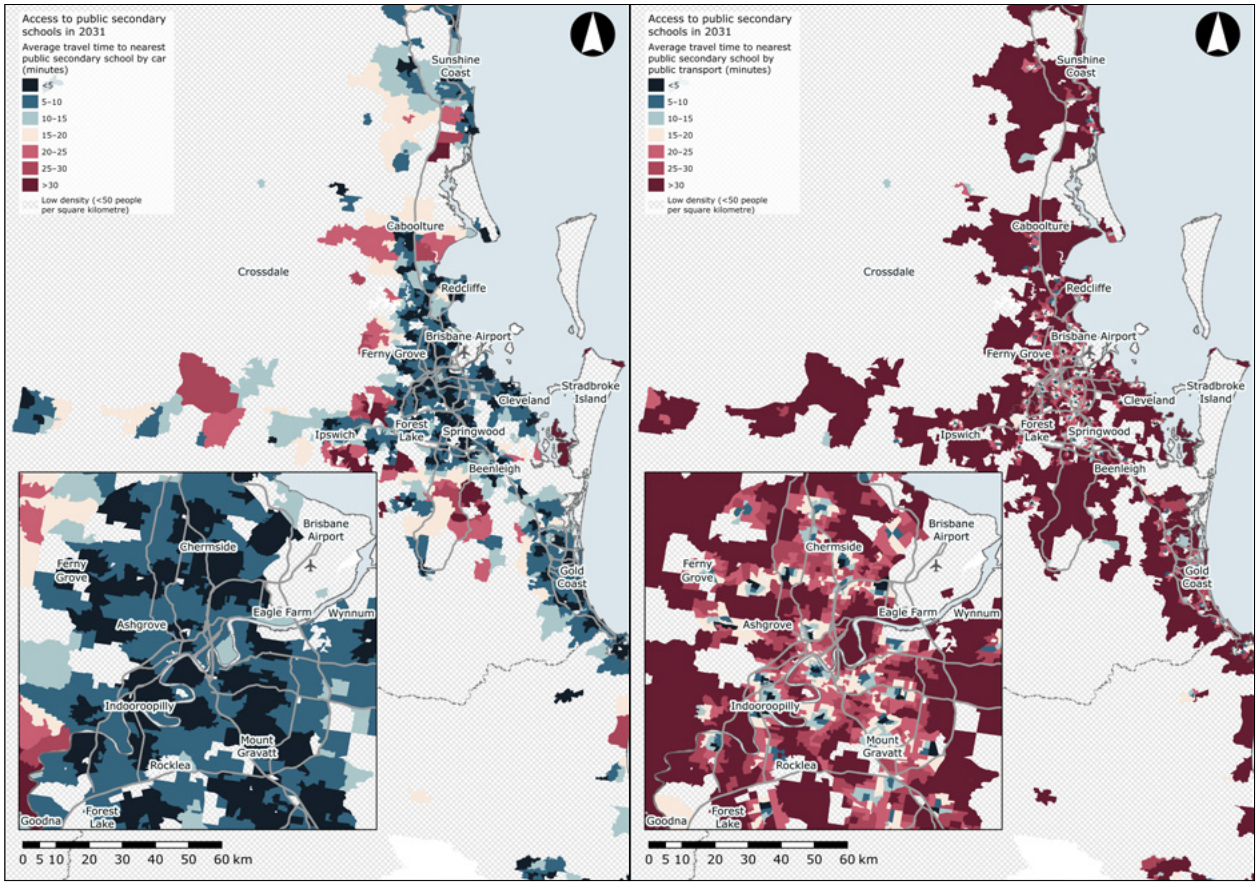
Source: Veitch Lister Consulting (2019)[140]

Figure 74: Greater Brisbane average time to nearest public primary school by car (left) and public transport (right), 2031 AM peak



Source: Veitch Lister Consulting (2019)[141]

Figure 75: Greater Brisbane average time to nearest public secondary school by car (left) and public transport (right), 2031 AM peak



Source: Veitch Lister Consulting (2019)[142]

Access to jobs in Brisbane, the Gold Coast and Sunshine Coast – by car and public transport, in 2016 and 2031

Employment accessibility has been measured as the percentage of jobs that can be reached in each of the three self-contained areas (the Greater Brisbane Capital City Statistical Area, the Gold Coast and the Sunshine Coast) within 30 minutes from home by car (Figure 76) and by public transport (Figure 77) in the two modelled years.

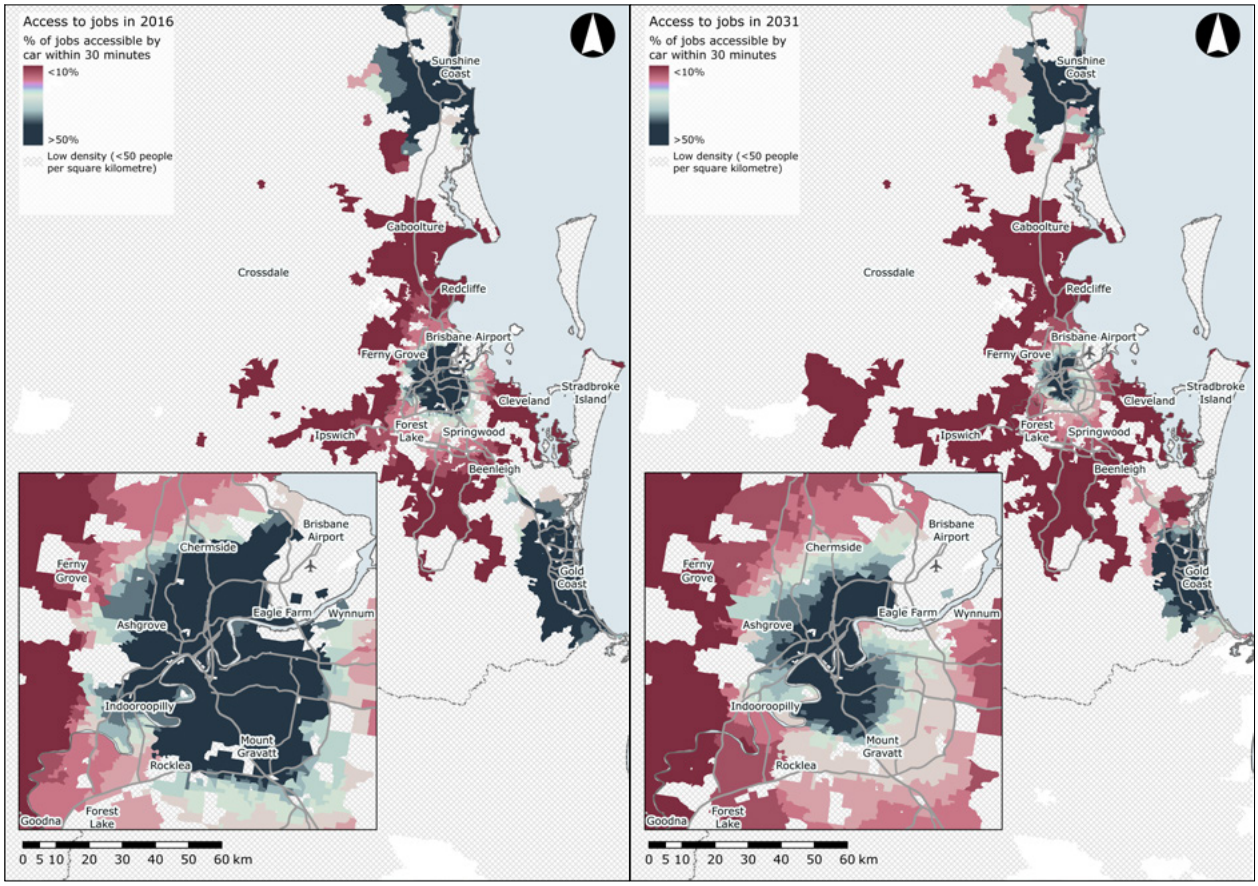
The high current and future concentration of jobs in Brisbane's urban core means that people living in or near these areas will continue to have good access to employment using existing infrastructure and services in this region. Ease of access to Brisbane's CBD determines employment accessibility. Residents living in areas with direct road or public transport access to the CBD have the highest level of access by both car and public transport.

Residents with access to a car generally have greater access to jobs across all parts of Brisbane. However, between 2016 and 2031 AM peak accessibility by car is expected to deteriorate due to increased congestion on Brisbane's roads. Comparatively, access to jobs by public transport is expected to stay relatively constant.

For residents of the Gold Coast and Sunshine Coast, job accessibility within a 30-minute car trip is forecast to stay relatively high, albeit due to traffic congestion this accessibility will decrease slightly between 2016 and 2031, more significantly in the Gold Coast than the Sunshine Coast. Residents travelling to work by public transport in these areas have a much more limited choice of jobs within 30 minutes. However, public transport upgrades will improve accessibility for residents serviced by upgraded corridors.

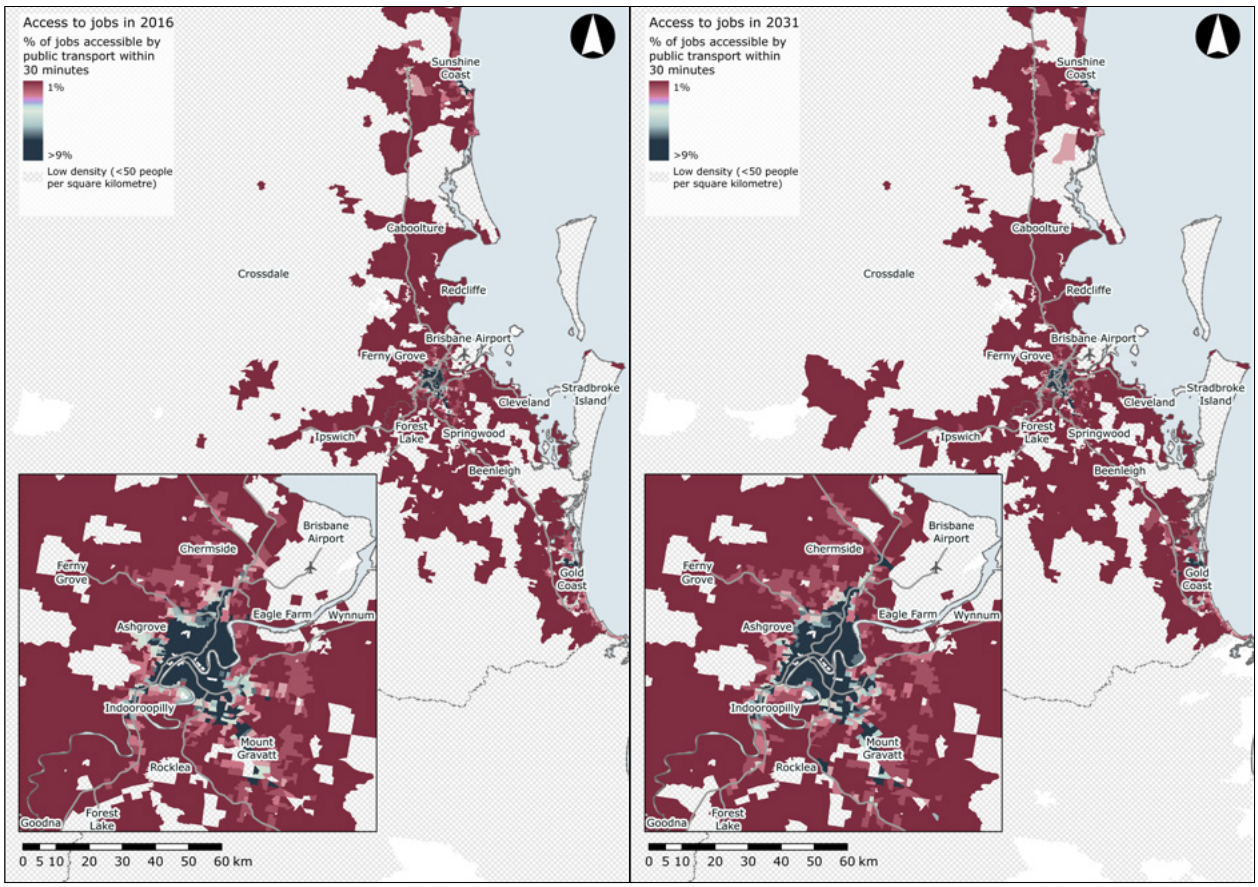
The percentage of jobs accessible is greater in Sunshine Coast and Gold Coast than Brisbane. This does not mean that people in these areas have access to a greater number of jobs, it simply means they have access to a higher percentage of the total jobs in their region. This is largely a function of the size Sunshine Coast and Gold Coast relative to Brisbane.

Figure 76: Greater Brisbane access to jobs by car, 2016 and 2031 AM peak



Source: Veitch Lister Consulting (2019)[143]

Figure 77: Greater Brisbane access to jobs by public transport, 2016 and 2031 AM peak



Source: Veitch Lister Consulting (2019)[144]

Findings

- Despite improvements to public transport, cars consistently provide faster access to social infrastructure in Greater Brisbane. This is not forecast to change by 2031, except for residents living near major public transport corridors.
- In Brisbane and on the Sunshine and Gold Coasts access to jobs by public transport is expected to stay largely consistent to 2031.
- In Brisbane, Sunshine Coast and the Gold Coast access to jobs by car is expected to decline. Access in the Western Suburbs of Sunshine Coast as well as the north, south and west of Brisbane and the Gold Coast will decline.

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