

## Freight vehicle congestion in Australian capital cities – 2023

### Summary

This is the fifth issue of an annual series that uses freight vehicle telematics data to provide measures of traffic congestion across 71 selected routes across Australia’s five mainland state capital cities—Sydney, Melbourne, Brisbane, Adelaide and Perth—and, for the first time, two additional routes in Hobart. This issue provides congestion measures for calendar year 2023.

The selected routes comprise the major motorways, highways and arterial roads within each city that service both passenger and freight vehicles. The data have been used to provide estimates of congestion based on how much longer journeys take (compared to a baseline of ‘free-running’ or uncongested conditions), and uncertainty in travel times (by measuring the variability in travel time of trips across each route).

This is the second year, since the initial report in 2019, where none of Australia’s capital cities experienced major lockdowns due to the COVID-19 pandemic. In 2022, city-wide congestion levels, based on freight vehicle telematics data, were slightly above pre-pandemic levels. The 2023 data implies that congestion levels have returned even more towards pre-pandemic (2019) levels.

Comparing traffic congestion measures for 2023 with those of 2022 (BITRE 2023), this report identifies the following notable features across the 73 selected urban routes:

- City-wide vehicle congestion, as measured by the mean excess time ratio (METR) index, increased (worsened) slightly in Perth, between 2022 and 2023, remained more or less unchanged in Brisbane and fell (improved) across the other three capital cities (i.e. Sydney, Melbourne and Adelaide).
- City-wide congestion uncertainty, measure by the mean excess uncertainty ratio (MEUI) index, increased (worsened) in Perth, between 2022 and 2023, remained more or less unchanged in Melbourne and fell (improved) across the other three capital cities (i.e. Sydney, Brisbane and Adelaide).
- On a route-by-route basis:
  - Most routes in Sydney recorded reductions in both METR and MEUR between 2022 and 2023. A handful of routes, including NorthConnex, recorded increases in METR and/or MEUR.
  - In Melbourne, many routes exhibit a decrease in both METR and MEUR between 2022 and 2023. Notably, the M1 (East) route exhibits a significant increase in MEUR between 2022 and 2023.
  - In Brisbane, most routes exhibit little change in METR between 2022 and 2023. However, the M1 (northbound) exhibited a significant reduction in MEUR between 2022 and 2023.
  - Adelaide’s overall METR and MEUR index results are heavily influenced by reductions in travel time and travel time uncertainty on the A2-M2 (North-South Road) between 2022 and 2023.
  - In Perth, the overall increase in METR and MEUR indexes is due to measured increases in travel time and travel time uncertainty, between 2022 and 2023, across almost all routes.
  - The unexplained ‘third peak’ observed on many arterial road routes, between midnight and 4:00am, in each of the four previous reports is still present on many routes. The cause remains unclear.

## Introduction

This is the fifth issue of an annual series that uses vehicle telematics data to provide measures of traffic congestion for freight vehicles on 73 selected routes across Australia's five mainland state capital cities—Sydney, Melbourne, Brisbane, Adelaide and Perth. This issue also includes, for the first time, congestion measures for two routes in Hobart. The selected routes comprise the major motorways, highways and arterial roads within each city that service both passenger and freight vehicles. For each route, the paper presents measures of congestion based on mean excess travel time and excess uncertainty about how long journeys will take compared to free running conditions. The estimates presented in this report cover calendar year 2023, and includes a comparison of changes in congestion, measured by mean excess travel time and mean excess travel time uncertainty indexes. This is the second year since the initial report where none of the cities experienced major lockdowns as part of the COVID-19 pandemic.

The routes comprise motorways, freeways and major arterial roads within each city that service both passenger and freight vehicles. For each route, separate congestion measures are presented for each travel direction. The following section provides an overview of observed heavy vehicle travel times (and congestion measures) across all routes in each city. More detailed route-specific outputs, including median and interquartile range travel times for each route, are provided in Appendix A and a brief summary of the methods is outlined in Appendix B.

The paper presents two congestion measures for each route:

- The first is the Mean Excess Time Ratio (METR), which reflects how much the average expected travel time across the day exceeds the best (lowest) expected travel time. These best times are usually in the early morning hours, when network traffic volumes are lowest and are assumed to be close to free running conditions.
- The second is the Mean Excess Uncertainty Ratio (MEUR) which reflects how much the average uncertainty measured as the breadth of the interquartile range, or the middle 50 per cent of trips exceeds the lowest observed uncertainty.

The lower the uncertainty, and the narrower the interquartile range, the more certainty a firm can have about how long journeys will take and their ability to provide deliveries at agreed times. Because firms are bound by speed limits, this uncertainty usually means more downside risk, with below average travel time more likely to be slower than above average times are swifter. In the travel time figures presented in this paper, the dark blue lines represent the median travel time over the course of the day, while the light blue bands demonstrate the interquartile range.

These measures are only indicators of congestion and may be prone to noise especially for routes or times of day (such as the early morning) with relatively sparse data. They also do not distinguish between a peak that lasts one hour and a peak that spreads over several.

The estimates for 2023 are derived from a smaller pool of data than prior years and as such estimates for smaller routes in particular must be treated with caution.

## Composite congestion index results

BITRE has estimated composite indices to represent aggregate changes in congestion across all routes in each city. The influence of each route is weighted by its share of distance and the number of vehicles (as measured by vehicle telematics observations). This ensures shorter routes and those with relatively low freight vehicle volumes, like the M1 in Sydney, do not overly influence results.

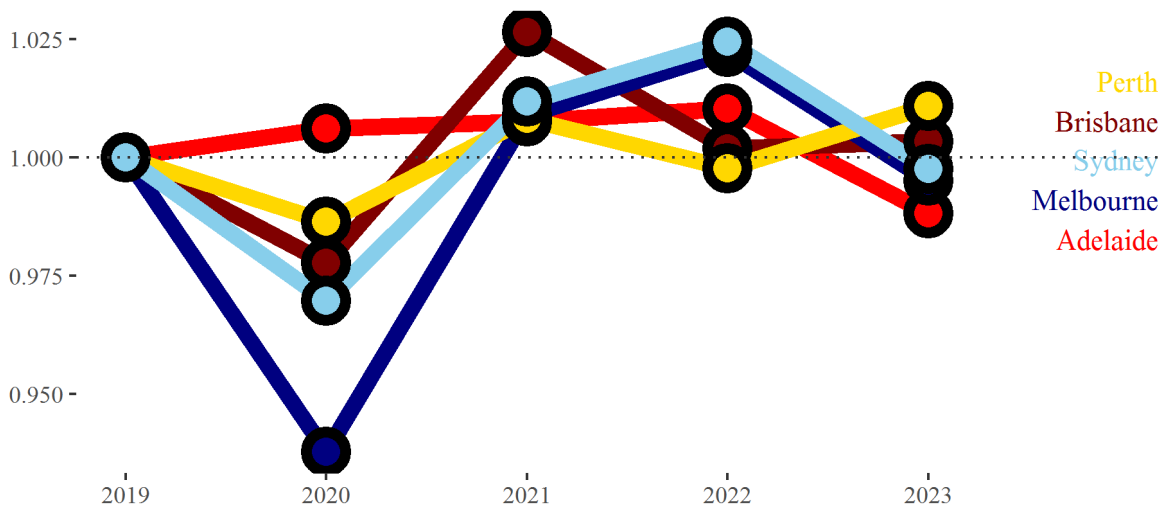
Table 1, and Figures 1 and 2, show the estimated change in freight vehicle congestion, as measured by indexes of the Mean Excess Time Ratio (METR) and Mean Excess Uncertainty Ratio (MEUR), between 2019 and 2022, across each of the five mainland capital cities. Whilst the report also includes two routes in Hobart, these are insufficient for a city wide measure.

**Table 1 Congestion measures of cities studied in this report**

City	Excess time index					Excess uncertainty index				
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
Sydney	1.000	0.970	1.012	1.024	0.998	1.000	0.876	1.048	1.193	0.952
Melbourne	1.000	0.938	1.009	1.022	0.995	1.000	0.689	1.202	1.078	1.053
Brisbane	1.000	0.978	1.027	1.002	1.003	1.000	1.061	1.445	1.095	0.808
Adelaide	1.000	1.006	1.008	1.010	0.988	1.000	1.093	0.842	1.191	0.790
Perth	1.000	0.986	1.008	0.998	1.011	1.000	0.969	1.148	0.893	1.215

Source: BITRE estimates.

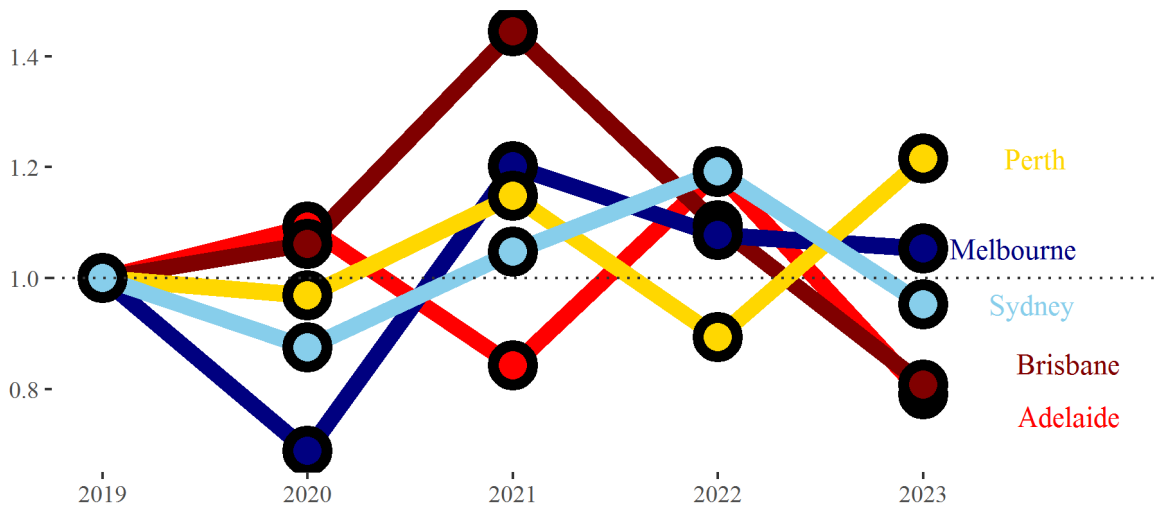
**Figure 1 Mean Excess Time Index, by capital city, 2019 to 2023**



Source: BITRE estimates.

Only one city, Perth, showed a meaningful increase in travel time congestion, as measured by the excess time index. This was driven by increases on a large number of smaller routes although major motorway routes were relatively unchanged. Likewise only Perth showed an increase in uncertainty congestion, again on smaller routes but also the Mitchell and Kwinana Freeways.

**Figure 2 Mean Excess Uncertainty Index, by capital city, 2019 to 2023**



Source: BITRE estimates.

Across routes within individual cities, the changes in mean excess time and uncertainty varied, even between directions. Both Sydney and Melbourne had broad decreases across routes although certain heavily-weighted motorways, including the M4 in Sydney and the M1 East in Melbourne, saw pronounced increases.

The additional routes added to the prior report have been retrospectively calculated for the previous years and these indices track all routes over all four years. In addition there are two routes in Hobart, although these were insufficient to produce a city-wide measure.

It should be noted the city-wide METR and MEUR indexes, and the METR and MEUR for individual routes, weight all hours of the day equally. This means that were the industry and its clients to shift journeys into more congested parts of the day the measures would not be significantly affected even as congestion experienced by freight vehicles increased. This is to try and limit the measure to factors largely outside the control of participants in the industry – i.e. most urban traffic congestion is due to passenger vehicle traffic. However, since most congestion occurs in daylight hours, which is also when the majority of urban freight vehicle operations occur, the magnitude of the measures and the magnitude of year-to-year increases and decreases would be larger if METR and MEUR were weighted by freight vehicle traffic volumes.

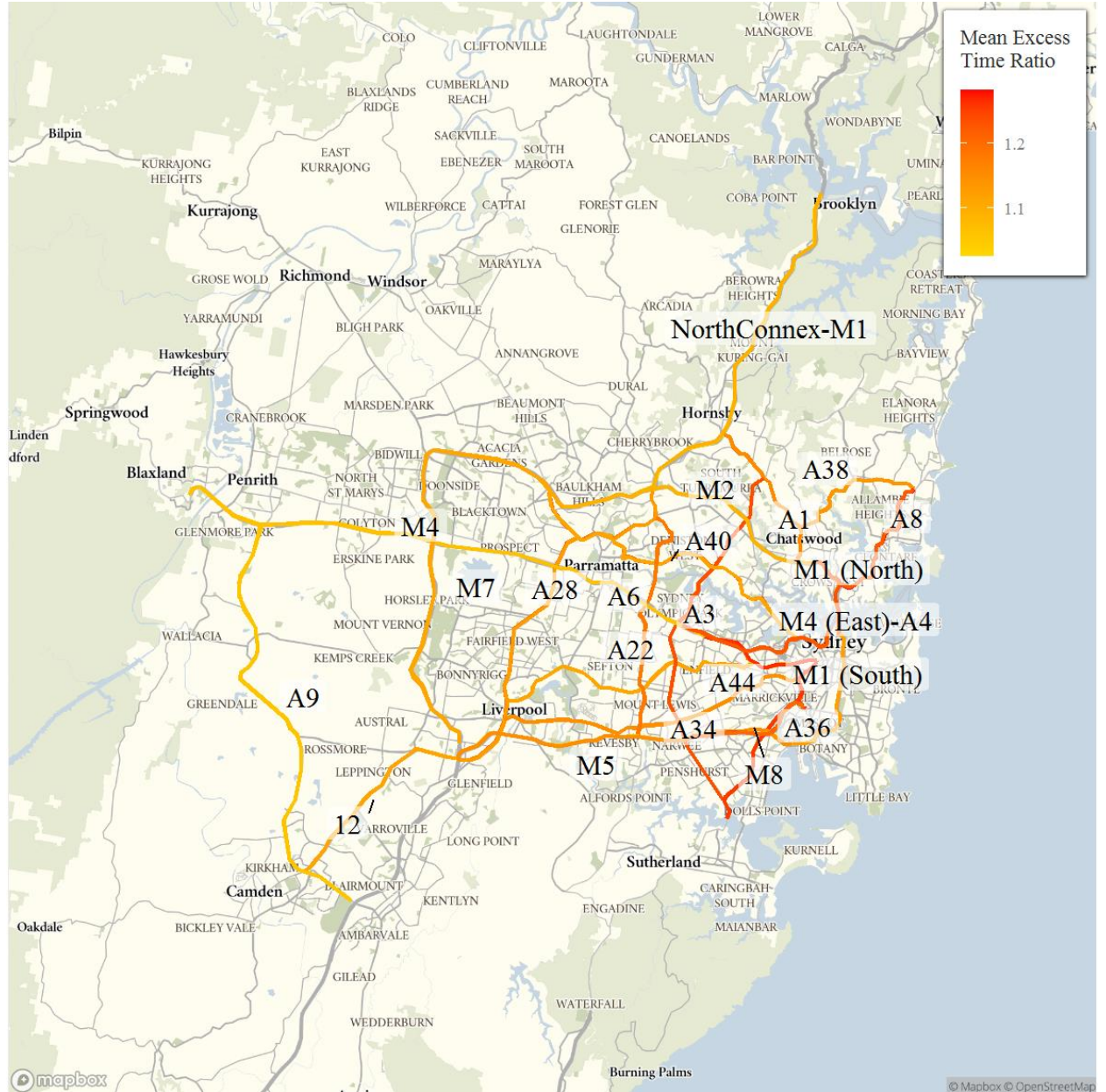
## Australian capital city freight vehicle congestion measures

### Sydney

Sydney metropolitan area freight vehicle routes cover the following 22 motorway, freeway and/or major arterial road routes:

- 12 - A9 to M7 / M7 to A9
- A1 - Artarmon to Wahroonga / Wahroonga to Artarmon
- A22 - Glebe to Liverpool / Liverpool to Glebe
- A28 - Casula to M2 Motorway / M2 Motorway to Casula
- A3 - Blakehurst to Pymble / Pymble to Blakehurst
- A34 - Liverpool to Newtown / Newtown to Liverpool
- A36 - Broadway to Georges River / Georges River to Broadway
- A38 - Dee Why to Roseville / Roseville to Dee Why
- A40 - Baulkham Hills to Rozelle / Rozelle to Baulkham Hills
- A44 - Camperdown to Strathfield / Strathfield to Camperdown
- A6 - Carlingford to Padstow / Padstow to Carlingford
- A8 - Dee Why to M1 / M1 to Dee Why
- A9 - Hume Freeway to M4 / M4 to Hume Freeway
- M1 (North) - Cahill Expressway to M2 / M2 to Cahill Expressway
- M1 (South) - Cahill Expressway to M5 / M5 to Cahill Expressway
- M2 - M1 to M7 / M7 to M1
- M4 - Glenbrook to Strathfield / Strathfield to Glenbrook
- M4 (East)-A4 - Cahill Expressway to Strathfield / Strathfield to Cahill Expressway
- M5 - Hume Motorway to M1 / M1 to Hume Motorway
- M7 - M2 to M5 / M5 to M2
- M8 - M5 to Mascot / Mascot to M5
- NorthConnex-M1 - Brooklyn to M2 / M2 to Brooklyn

Figure 3 Sydney congestion routes and median travel time index, 2023



Note: Ratio of median travel time to best (shortest) travel time for each route.  
 Source: BITRE estimates.

Figure 4 Sydney route METR and MEUR changes between 2022 and 2023



Size represents 2022 weights in citywide measure. New routes are shown as zero and marked with asterisk (\*).

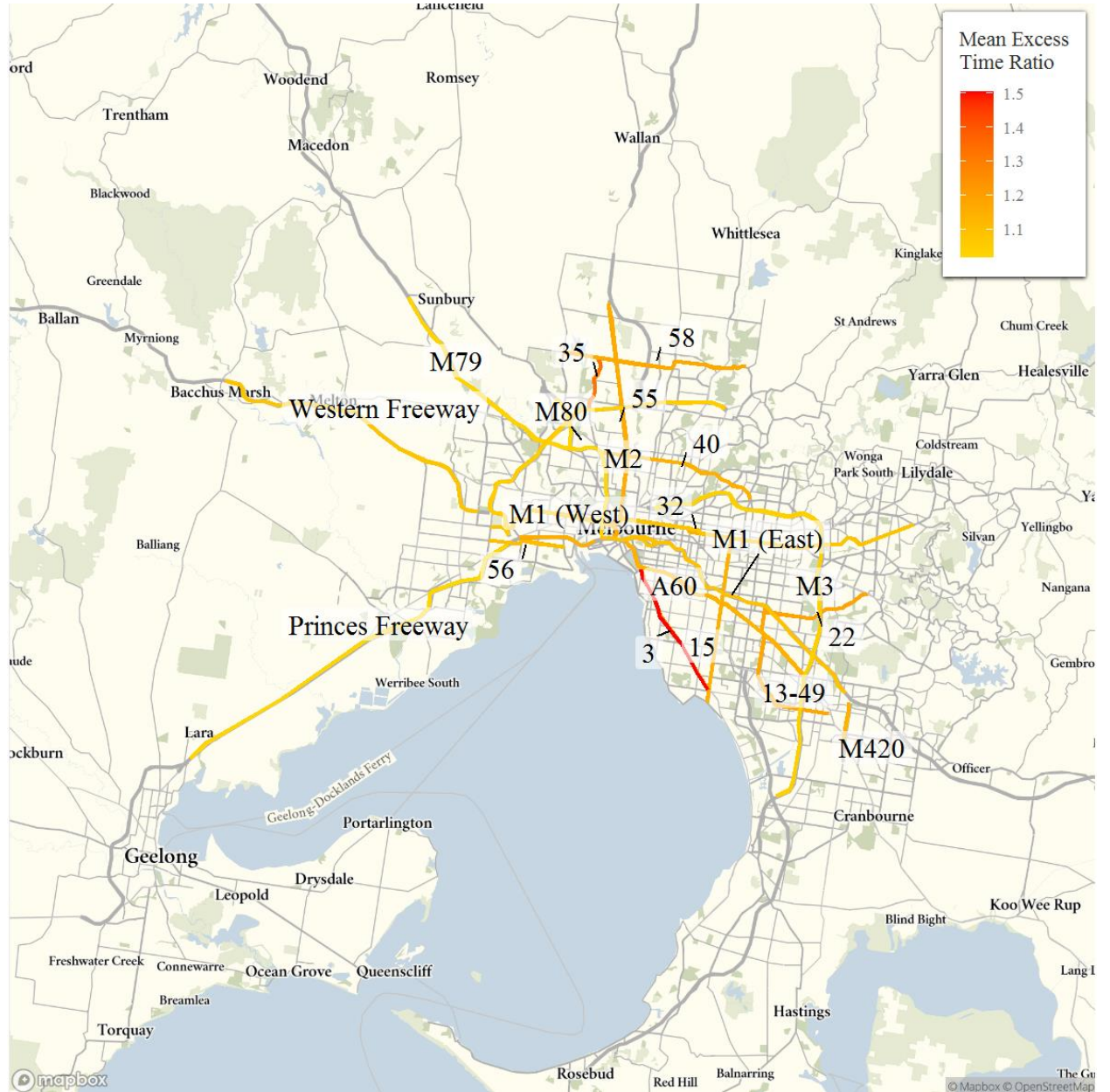
Source: BITRE estimates.

## Melbourne

Melbourne metropolitan area freight vehicle routes cover the following 20 motorway, freeway and/or major arterial road routes:

- 13-49 - Monash Freeway to South Gippsland Highway / South Gippsland Highway to Monash Freeway
- 15 - Beach Road to Surrey Hills / Surrey Hills to Beach Road
- 22 - Ferntree Gully to M1 / M1 to Ferntree Gully
- 3 - Albert Park to Cheltenham / Cheltenham to Albert Park
- 32 - Derrimut to Montrose / Montrose to Derrimut
- 35 - Hume Highway to M80 / M80 to Hume Highway
- 40 - Doncaster to M2 / M2 to Doncaster
- 55 - Hume Freeway to Montague Street / Montague St to Hume Freeway
- 56 - Laverton to Spotswood / Spotswood to Laverton
- 58 - Greenvale to Yan Yean Road / Yan Yean Road to Greenvale
- A60 - M3 to Southbank / Southbank to M3
- M1 (East) - City to M420 / M420 to City
- M1 (West) - City to M80 / M80 to City
- M2 - CityLink then Tullamarine / Tullamarine then CityLink
- M3 - Frankston to Hoddle Street / Hoddle St to Frankston
- M420 - Monash Freeway to South Gippsland Highway / South Gippsland Highway to Monash Freeway
- M79 - Essendon to Gap Road / Gap Road to Essendon
- M80 - Altona to Greensborough / Greensborough to Altona
- Princes Freeway - Geelong Ring Road to M80 / M80 to Geelong Ring Road
- Western Freeway - Bacchus Marsh to Derrimut / Derrimut to Bacchus Marsh

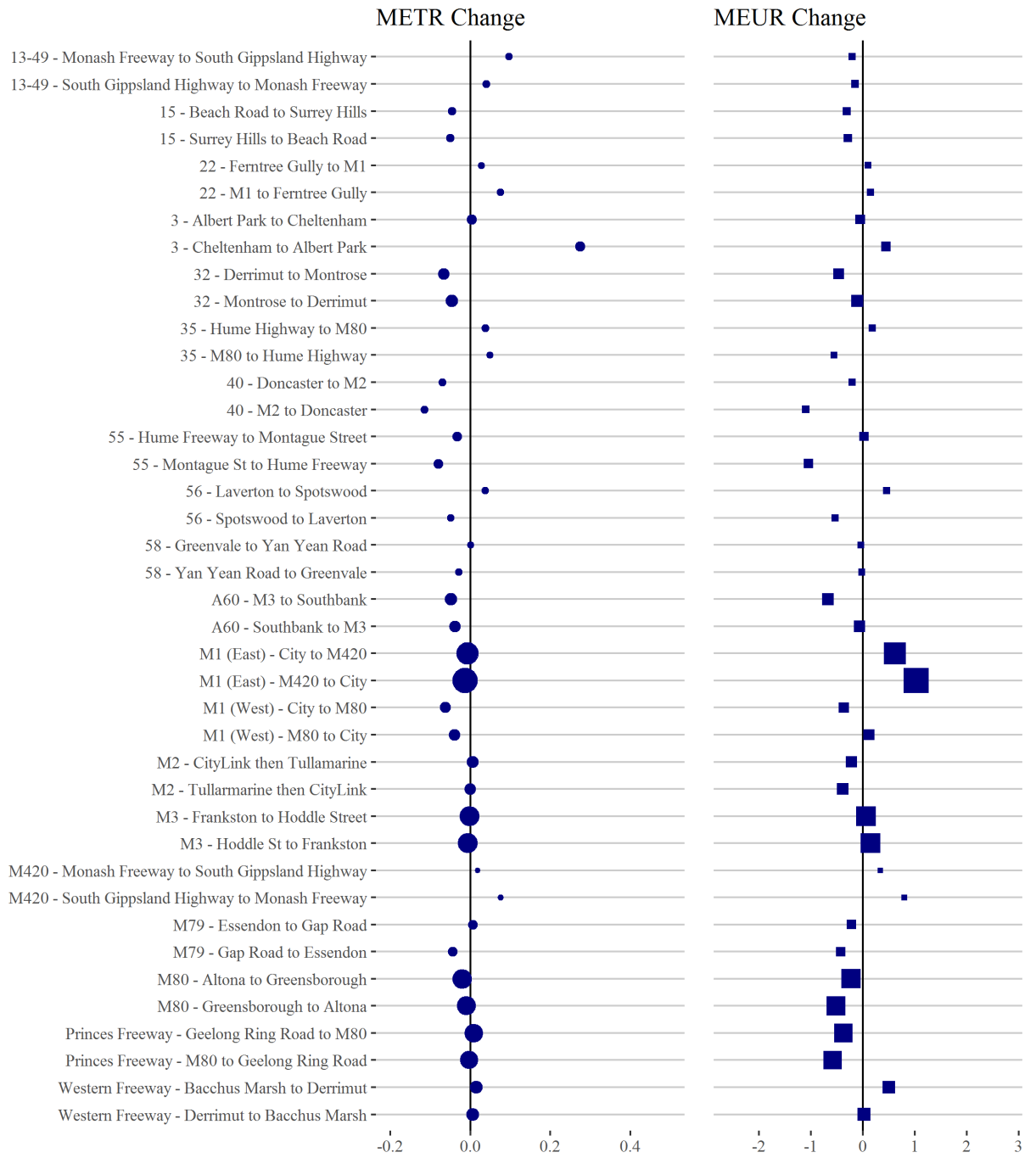
Figure 5 Melbourne congestion routes and median travel time index, 2023



Note: Ratio of median travel time to best (shortest) travel time for each route.  
 Source: BITRE estimates.



Figure 6 Melbourne route METR and MEUR changes between 2022 and 2023



Size represents 2022 weights in citywide measure. New routes are shown as zero and marked with asterisk (\*).

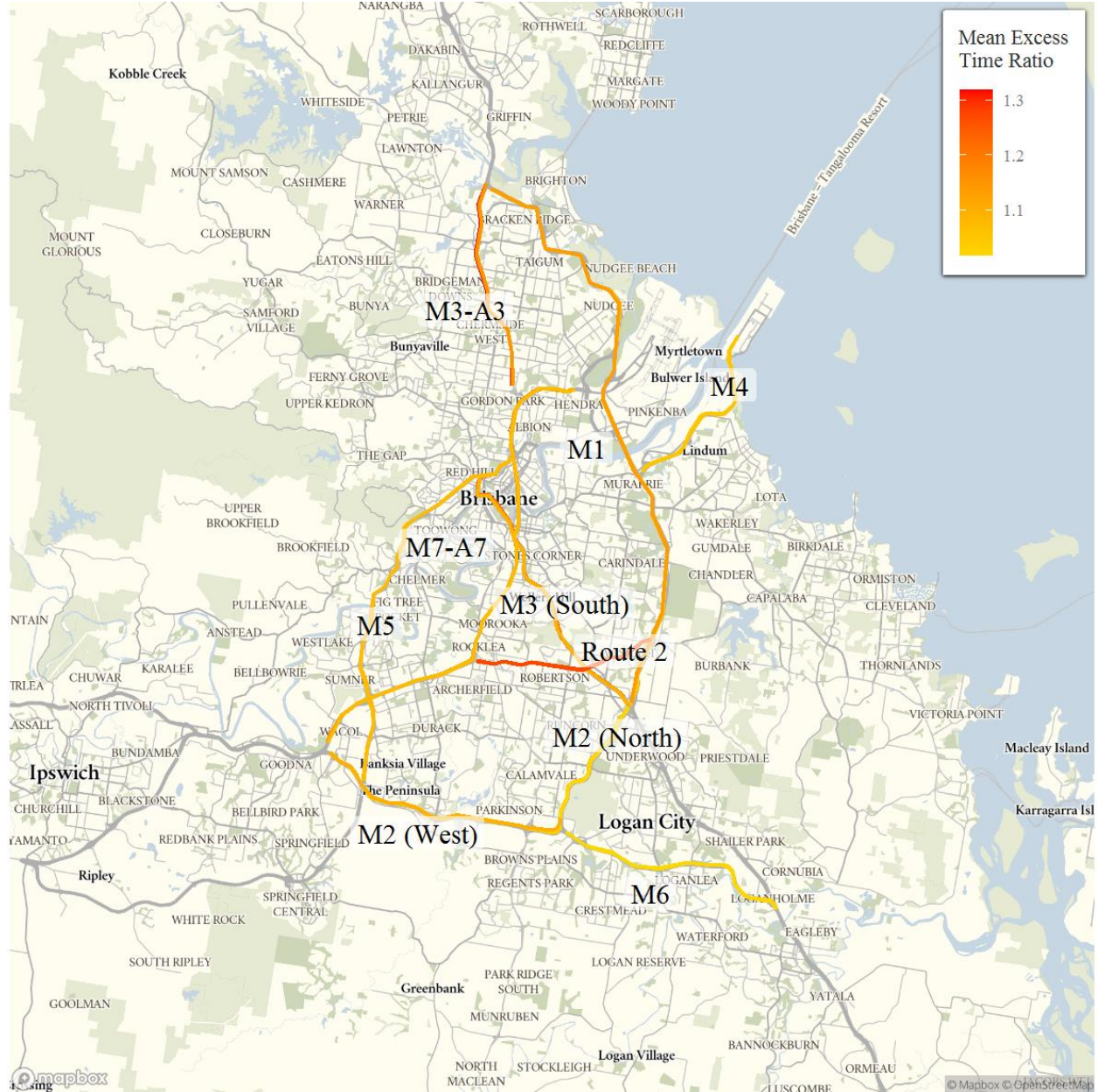
Source: BITRE estimates.

## Brisbane

Brisbane metropolitan area freight vehicle routes cover the following 10 motorway, freeway and/or major arterial road routes:

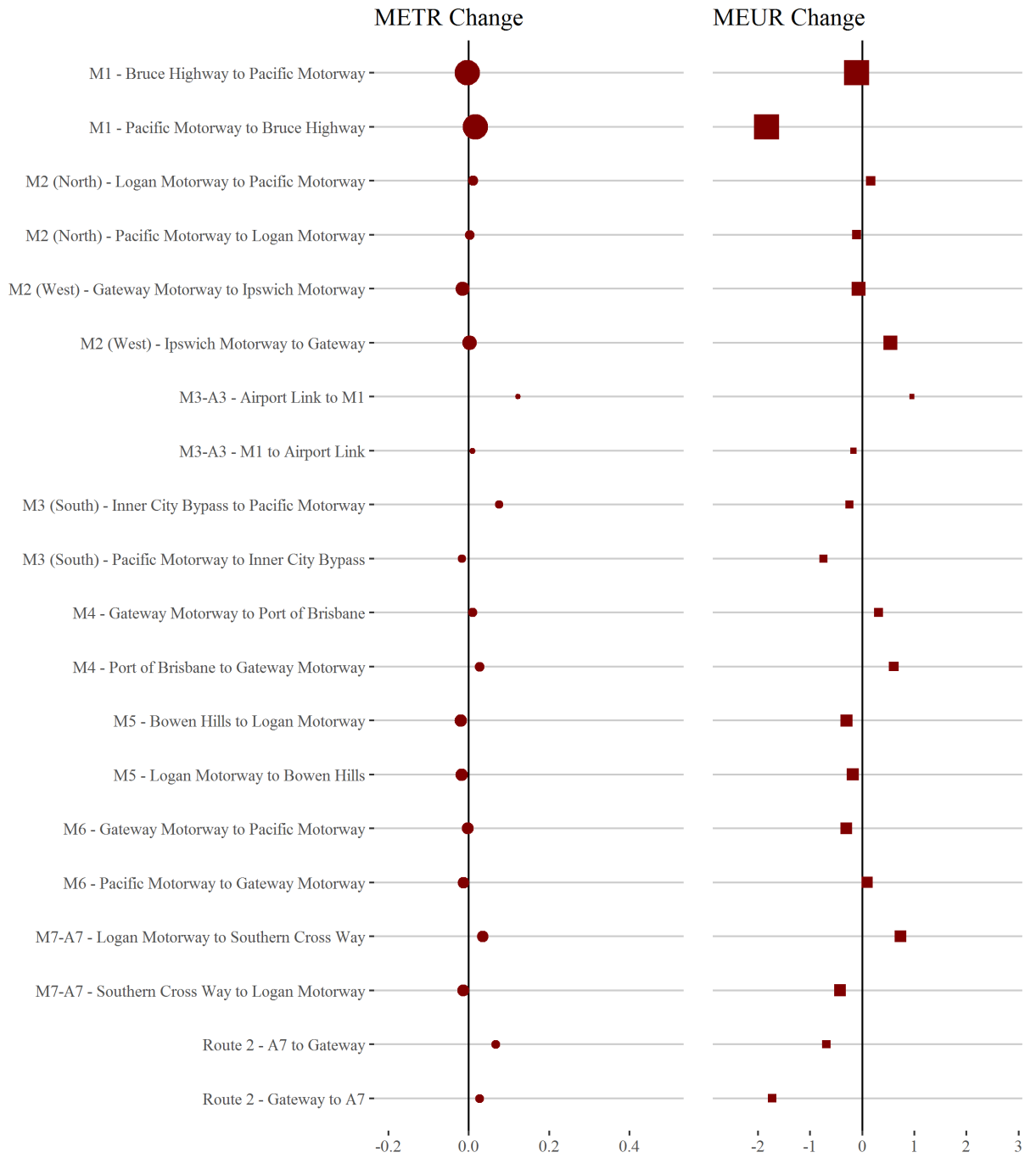
- M1 - Bruce Highway to Pacific Motorway / Pacific Motorway to Bruce Highway
- M2 (North) - Logan Motorway to Pacific Motorway / Pacific Motorway to Logan Motorway
- M2 (West) - Gateway Motorway to Ipswich Motorway / Ipswich Motorway to Gateway
- M3-A3 - Airport Link to M1 / M1 to Airport Link
- M3 (South) - Inner City Bypass to Pacific Motorway / Pacific Motorway to Inner City Bypass
- M4 - Gateway Motorway to Port of Brisbane / Port of Brisbane to Gateway Motorway
- M5 - Bowen Hills to Logan Motorway / Logan Motorway to Bowen Hills
- M6 - Gateway Motorway to Pacific Motorway / Pacific Motorway to Gateway Motorway
- M7-A7 - Logan Motorway to Southern Cross Way / Southern Cross Way to Logan Motorway
- Route 2 - A7 to Gateway / Gateway to A7

Figure 7 Brisbane congestion routes and median travel time index, 2023



Note: Ratio of median travel time to best (shortest) travel time for each route.  
Source: BITRE estimates.

Figure 8 Brisbane route METR and MEUR changes between 2022 and 2023



Size represents 2022 weights in citywide measure. New routes are shown as zero and marked with asterisk (\*).

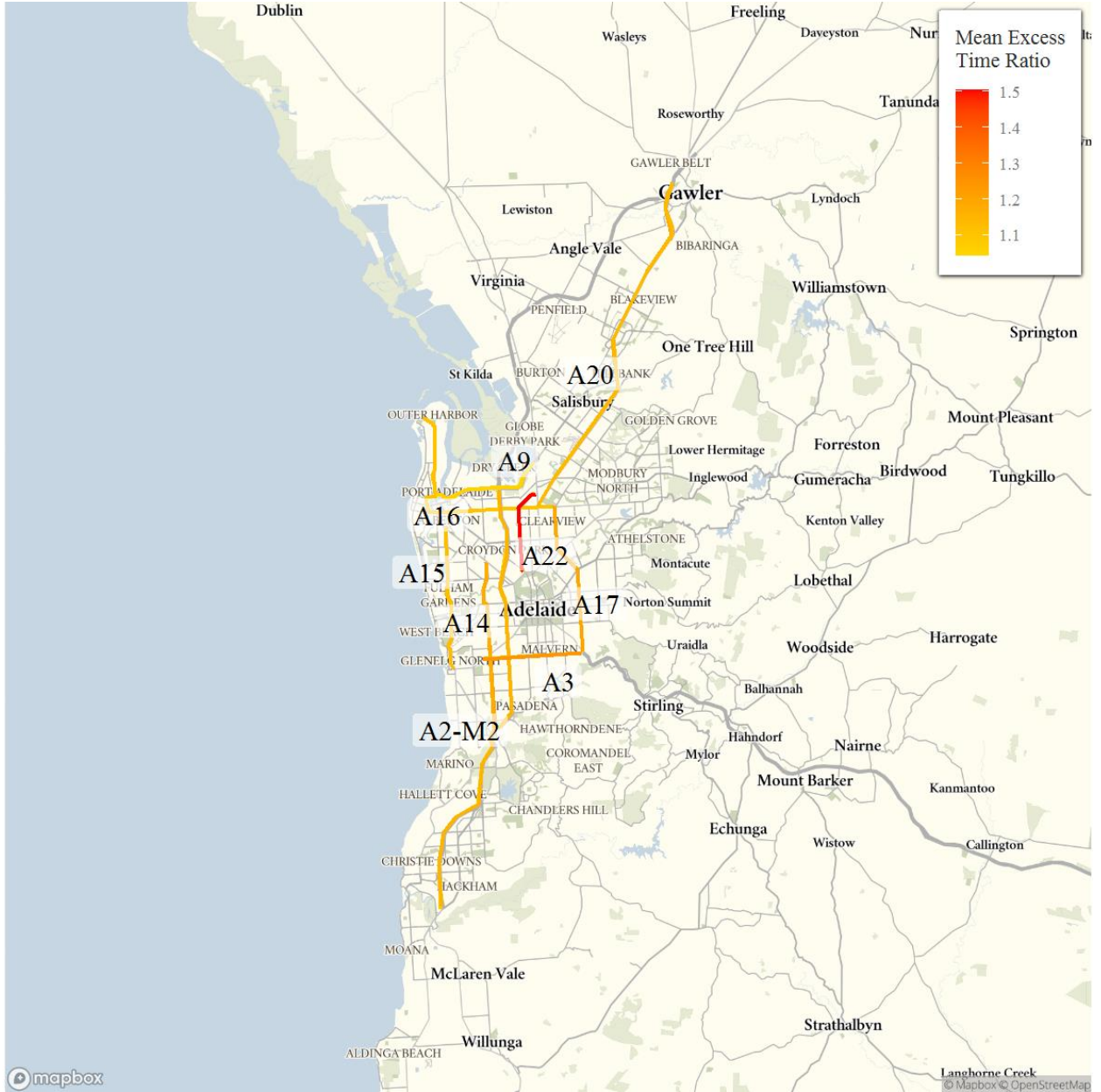
Source: BITRE estimates.

## Adelaide

Adelaide metropolitan area freight vehicle routes cover the following 9 motorway, freeway and/or major arterial road routes:

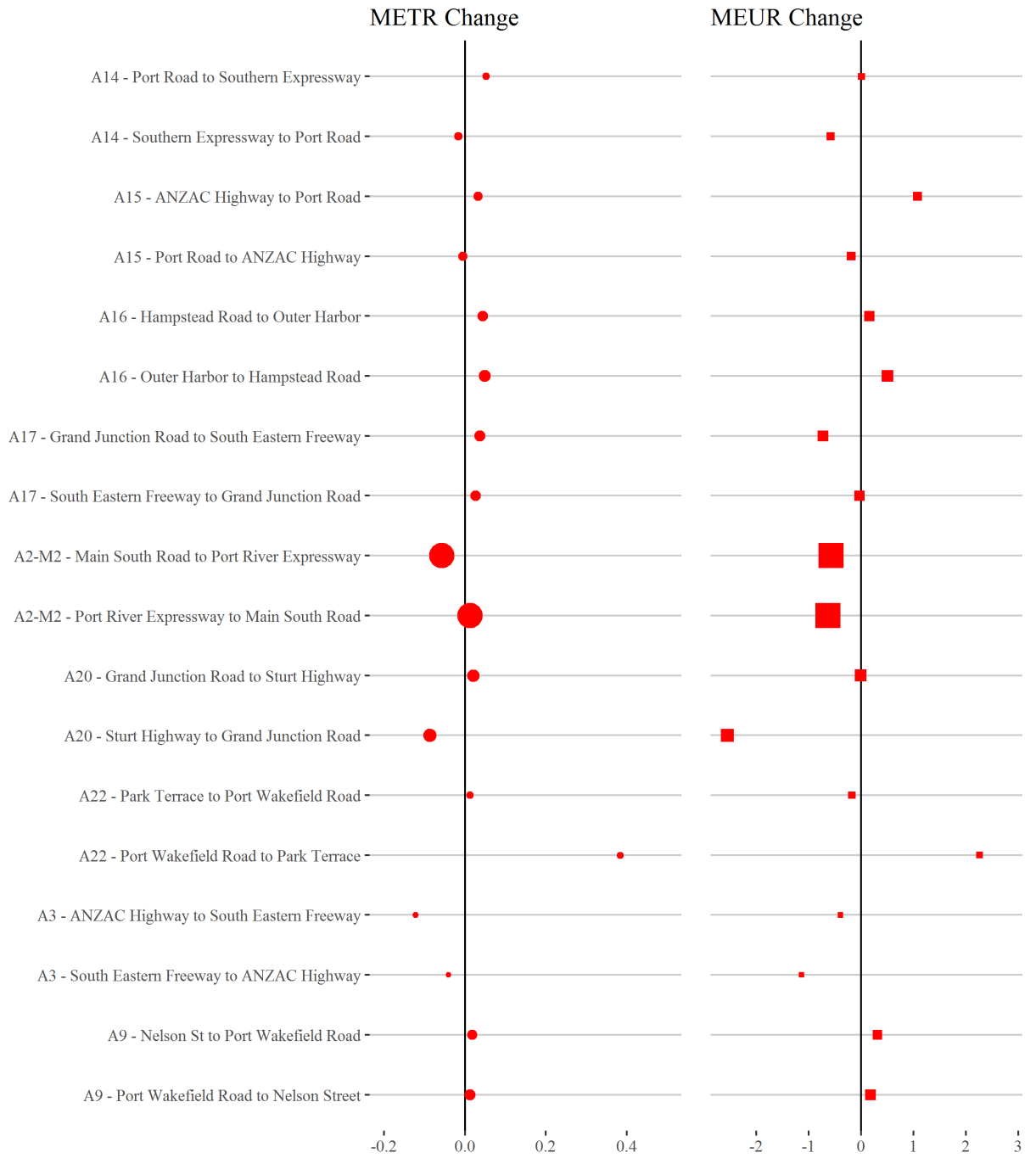
- A14 - Port Road to Southern Expressway / Southern Expressway to Port Road
- A15 - ANZAC Highway to Port Road / Port Road to ANZAC Highway
- A16 - Hampstead Road to Outer Harbor / Outer Harbor to Hampstead Road
- A17 - Grand Junction Road to South Eastern Freeway / South Eastern Freeway to Grand Junction Road
- A2-M2 - Main South Road to Port River Expressway / Port River Expressway to Main South Road
- A20 - Grand Junction Road to Sturt Highway / Sturt Highway to Grand Junction Road
- A22 - Park Terrace to Port Wakefield Road / Port Wakefield Road to Park Terrace
- A3 - ANZAC Highway to South Eastern Freeway / South Eastern Freeway to ANZAC Highway
- A9 - Nelson St to Port Wakefield Road / Port Wakefield Road to Nelson Street

Figure 9 Adelaide congestion routes and median travel time index, 2023



Note: Ratio of median travel time to best (shortest) travel time for each route.  
 Source: BITRE estimates.

**Figure 10 Adelaide route METR and MEUR changes between 2022 and 2023**



Size represents 2022 weights in citywide measure. New routes are shown as zero and marked with asterisk (\*).

Source: BITRE estimates.

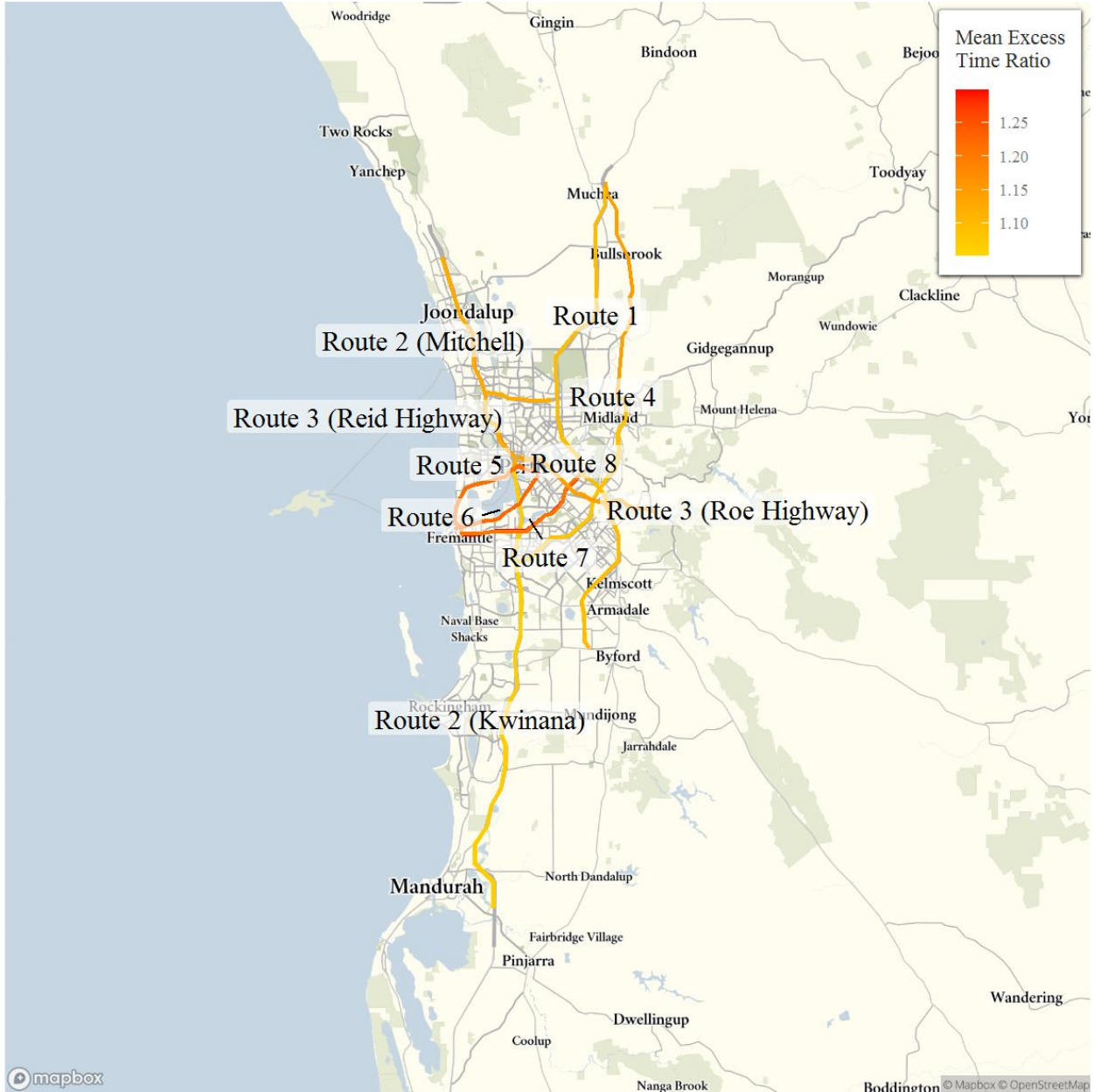
## Perth

Perth metropolitan area freight vehicle routes cover the following 10 motorway, freeway and/or major arterial road routes:

- Route 1 - Roe Highway to Tonkin Highway / Tonkin Highway to Roe Highway
- Route 2 (Kwinana) - Forrest Highway to Mitchell Freeway / Mitchell Freeway to Forrest Highway
- Route 2 (Mitchell) - Hester Avenue to Swan River / Swan River to Hester Avenue
- Route 3 (Reid Highway) - Mitchell Freeway to Tonkin Freeway / Tonkin Freeway to Mitchell Freeway
- Route 3 (Roe Highway) - Great Northern Highway to Kwinana Freeway / Kwinana Freeway to Great Northern Highway
- Route 4 - Great Northern Highway to Thomas Road / Thomas Road to Great Northern Highway
- Route 5 - Great Eastern Highway to Stirling Highway, High Street / Stirling Highway, High St to Great Eastern Highway
- Route 6 - Fremantle to Great Eastern Highway / Great Eastern Highway to Fremantle
- Route 7 - Stirling Highway to Tonkin Freeway / Tonkin Freeway to Stirling Highway
- Route 8 - Canning Road to Mitchell Freeway / Mitchell Freeway to Canning Road



Figure 11 Perth congestion routes and median travel time index, 2023



Note: Ratio of median travel time to best (shortest) travel time for each route.  
 Source: BITRE estimates.

Figure 12 Perth route METR and MEUR changes between 2022 and 2023



Size represents 2022 weights in citywide measure. New routes are shown as zero and marked with asterix (\*).

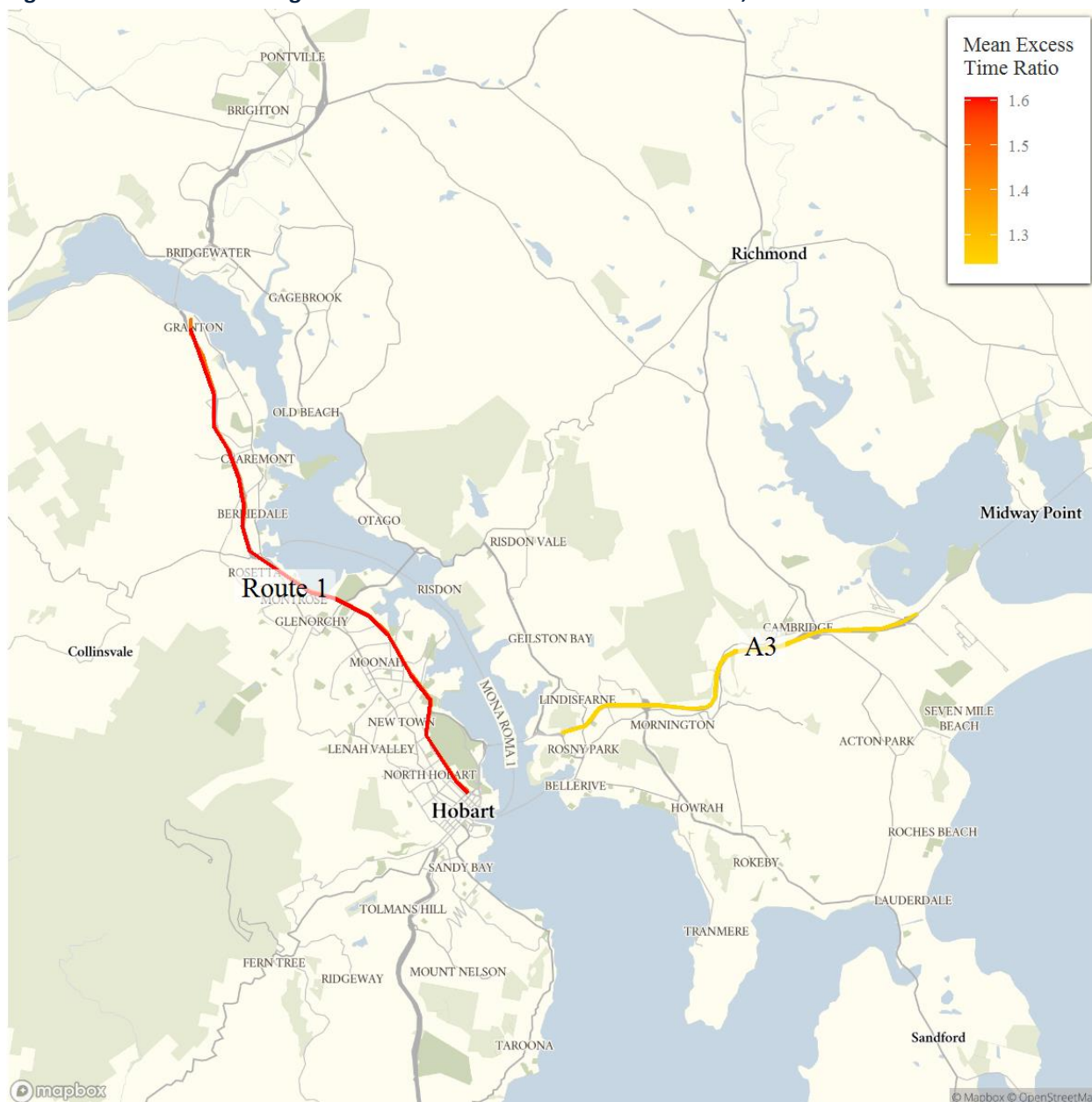
Source: BITRE estimates.

### Hobart

Hobart metropolitan area freight vehicle routes cover the following 2 motorway, freeway and/or major arterial road routes:

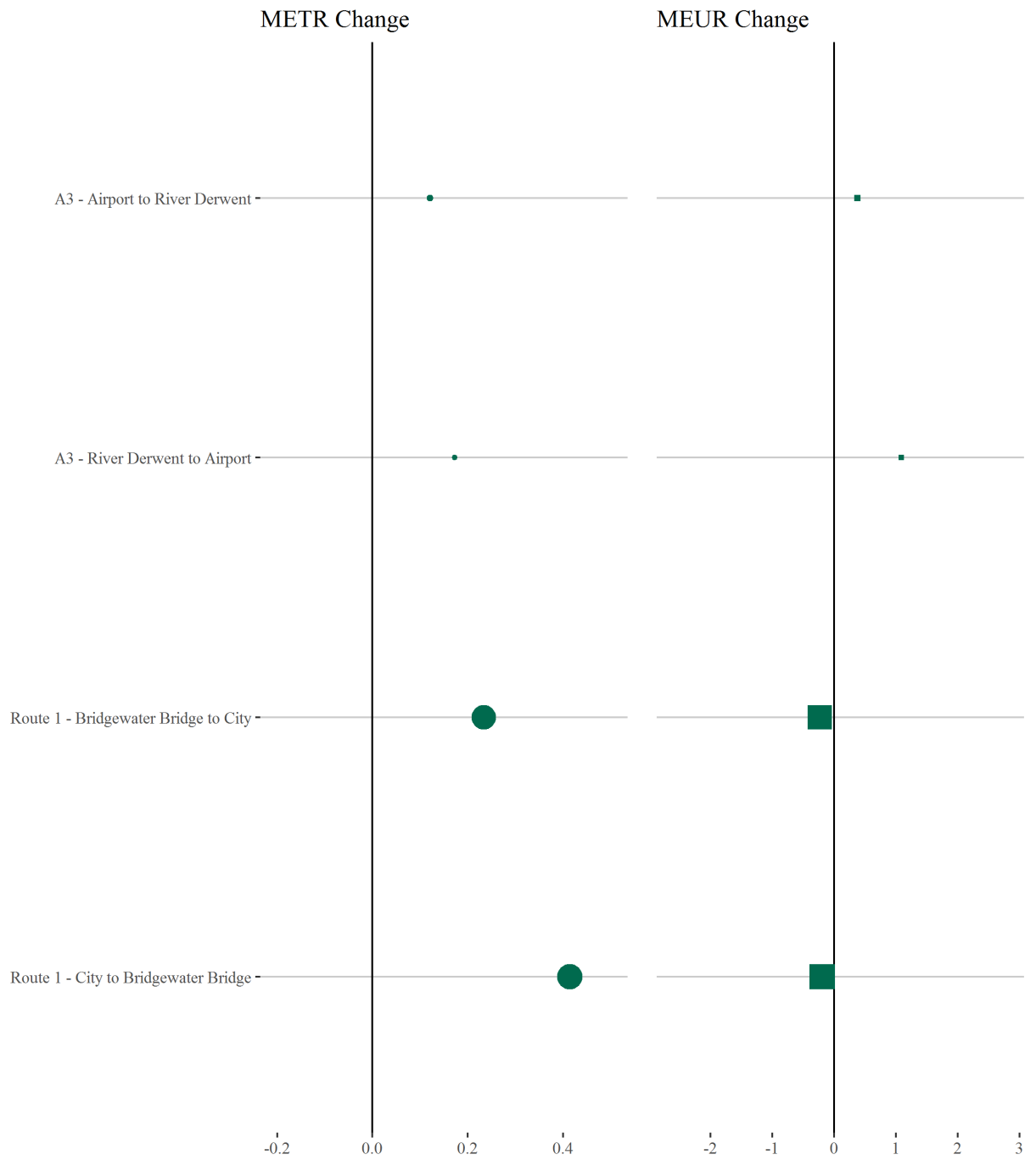
- A3 - Airport to River Derwent / River Derwent to Airport
- Route 1 - Bridgewater Bridge to City / City to Bridgewater Bridge

**Figure 13** Hobart congestion routes and median travel time index, 2023



Note: Ratio of median travel time to best (shortest) travel time for each route.  
 Source: BITRE estimates.

Figure 14 Hobart route METR and MEUR changes between 2022 and 2023



Size represents 2022 weights in citywide measure. New routes are shown as zero and marked with asterisk (\*).

Source: BITRE estimates.

## Appendix A – Individual route freight vehicle congestion measures

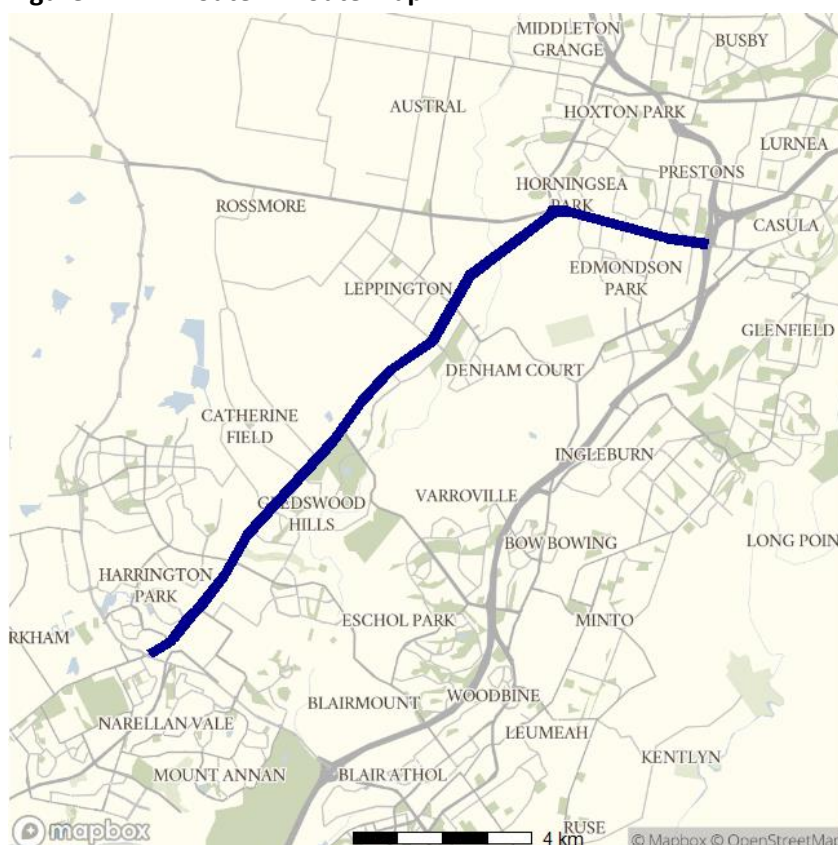
This appendix provides detailed route-specific freight vehicle travel times and congestion measures, including median and interquartile range travel times, for each route in each capital city. The routes are grouped by city and for each route the results comprise a route map, table of median and variation in travel times, and graphs showing the hourly distribution of the median and interquartile range of measured travel times. Unless stated otherwise a “decrease” or “increase” refers to the peak or minimum compared to calendar 2022, not the particular hour.

### Sydney routes

#### Route 12 - A9 to M7 / M7 to A9

This route follows surface routes in South Western Sydney from the A9 at Narellan to Casula where the Hume Motorway branches into the M5 and M7. It serves areas adjacent to Western Sydney Airport, currently under construction, and some light industrial areas. It runs predominantly along Camden Valley Way.

Figure A.1 Route 12 route map



Source: BITRE estimates.

Table A.1 Route 12 travel times and congestion measures, 2023

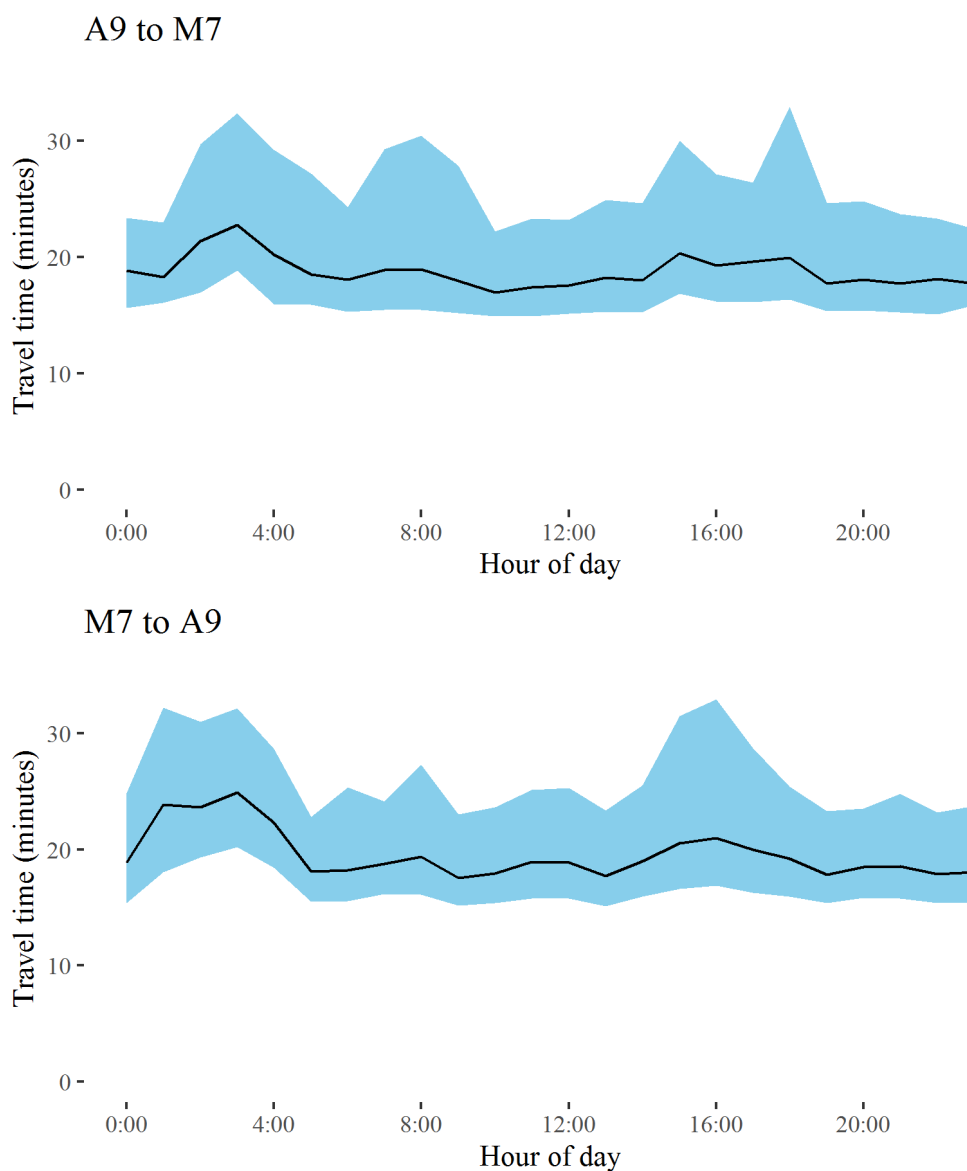
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
A9 to M7	00:16:57	00:22:46	1.108	00:06:32	00:16:35	1.604	17.1
M7 to A9	00:17:32	00:24:53	1.115	00:07:17	00:16:03	1.374	17.1

Source: BITRE estimates.

The best travel times and lowest uncertainty travelling from the A9 to the M7 were at 10am and 11pm, with a median travel time of 17 minutes and an interquartile range of 6.5 minutes. The longest median travel times were 23 minutes at 3am and the greatest uncertainty was at 6pm with an interquartile range of 17 minutes.

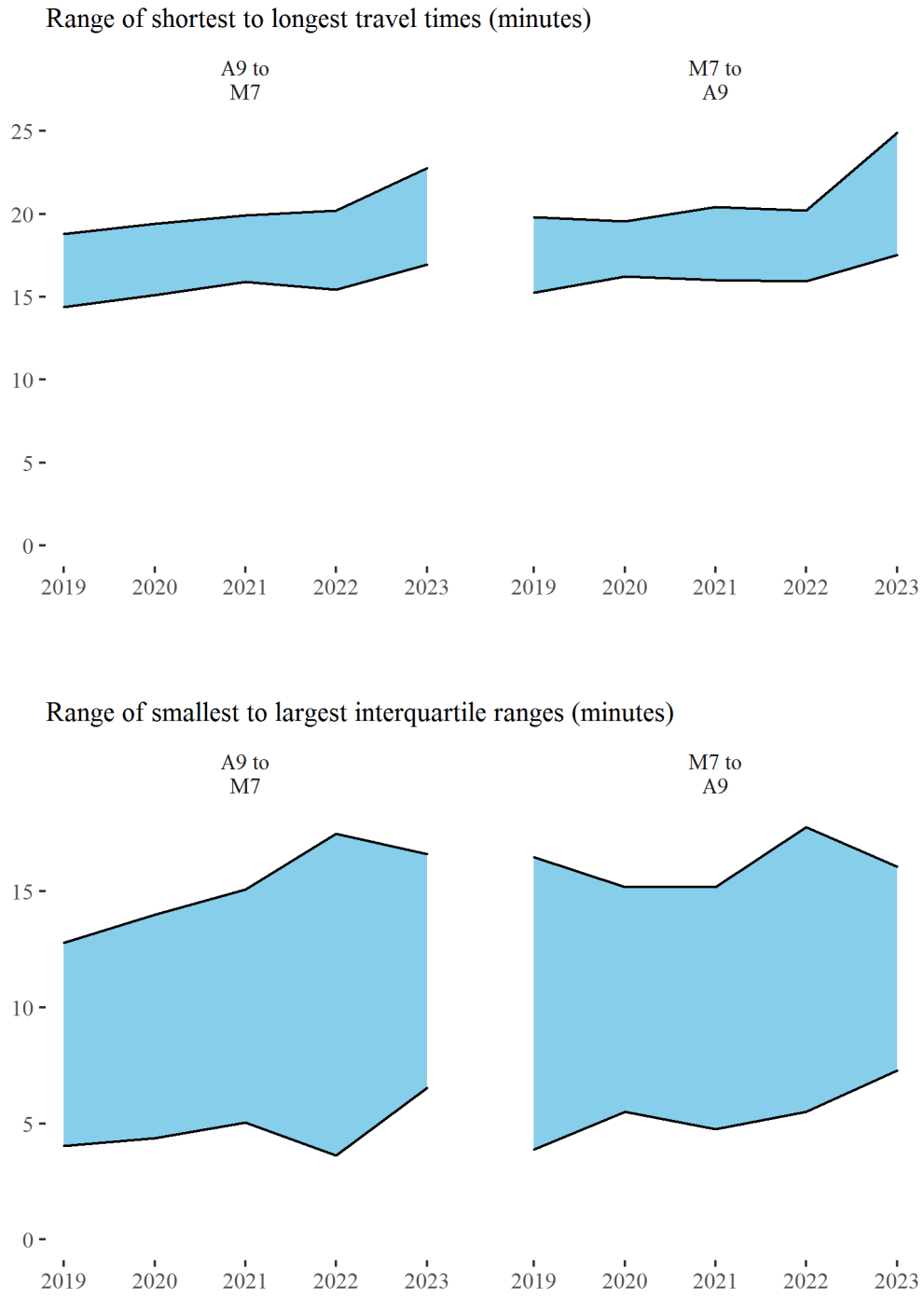
The best median travel times and least uncertainty for journeys from the M7 to the A9 were at 9am, with a median travel time of 18 minutes and an interquartile range of 7 minutes. The longest median travel times were 25 minutes at 3am and the greatest uncertainty was at 4pm with an interquartile range of 16 minutes.

**Figure A.2** Route 12 median and interquartile range travel times



Source: BITRE estimates.

**Figure A.3 Route 12 performance over time**

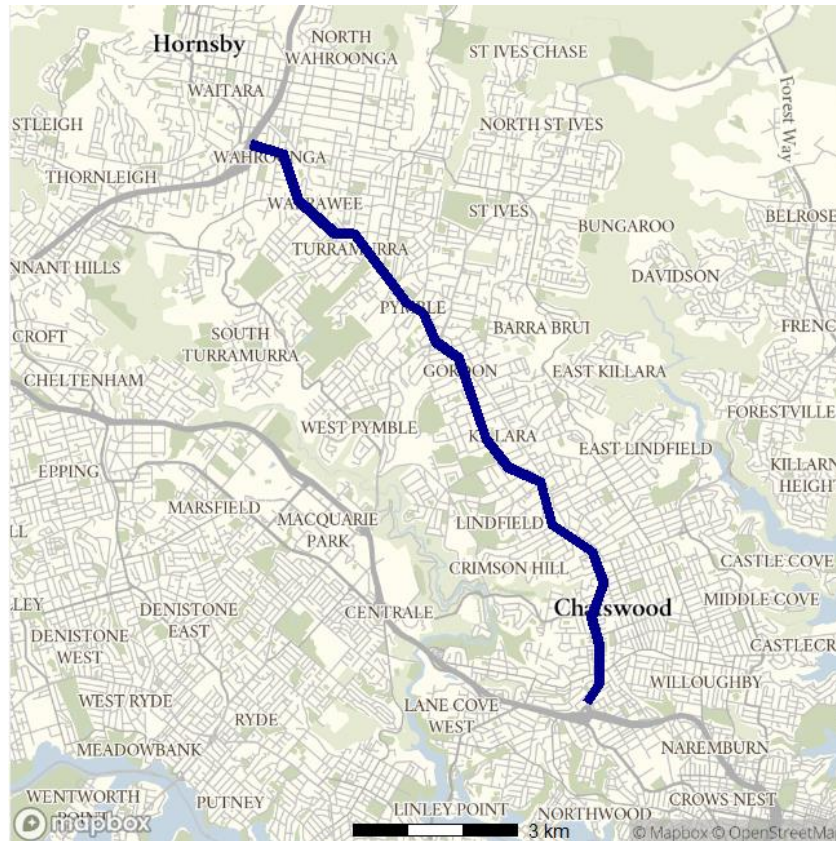


Source: BITRE estimates.

### A1 - Artarmon to Wahroonga / Wahroonga to Artarmon

This route follows the Pacific Highway from the Gore Hill Expressway at Artarmon and the M1 Motorway at Wahroonga. It, along with NorthConnex, is one of two routes connecting the orbital road network to the Pacific Motorway (M1) and the north of the state and Queensland. It also services most of the Upper North Shore of Sydney.

**Figure A.4 A1 route map**



Source: BITRE estimates.

**Table A.2 A1 route travel times and congestion measures, 2023**

Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Artarmon to Wahroonga	00:16:40	00:25:15	1.196	00:05:57	00:16:21	1.695	13.5
Wahroonga to Artarmon	00:17:36	00:27:23	1.153	00:06:45	00:16:49	1.525	13.5

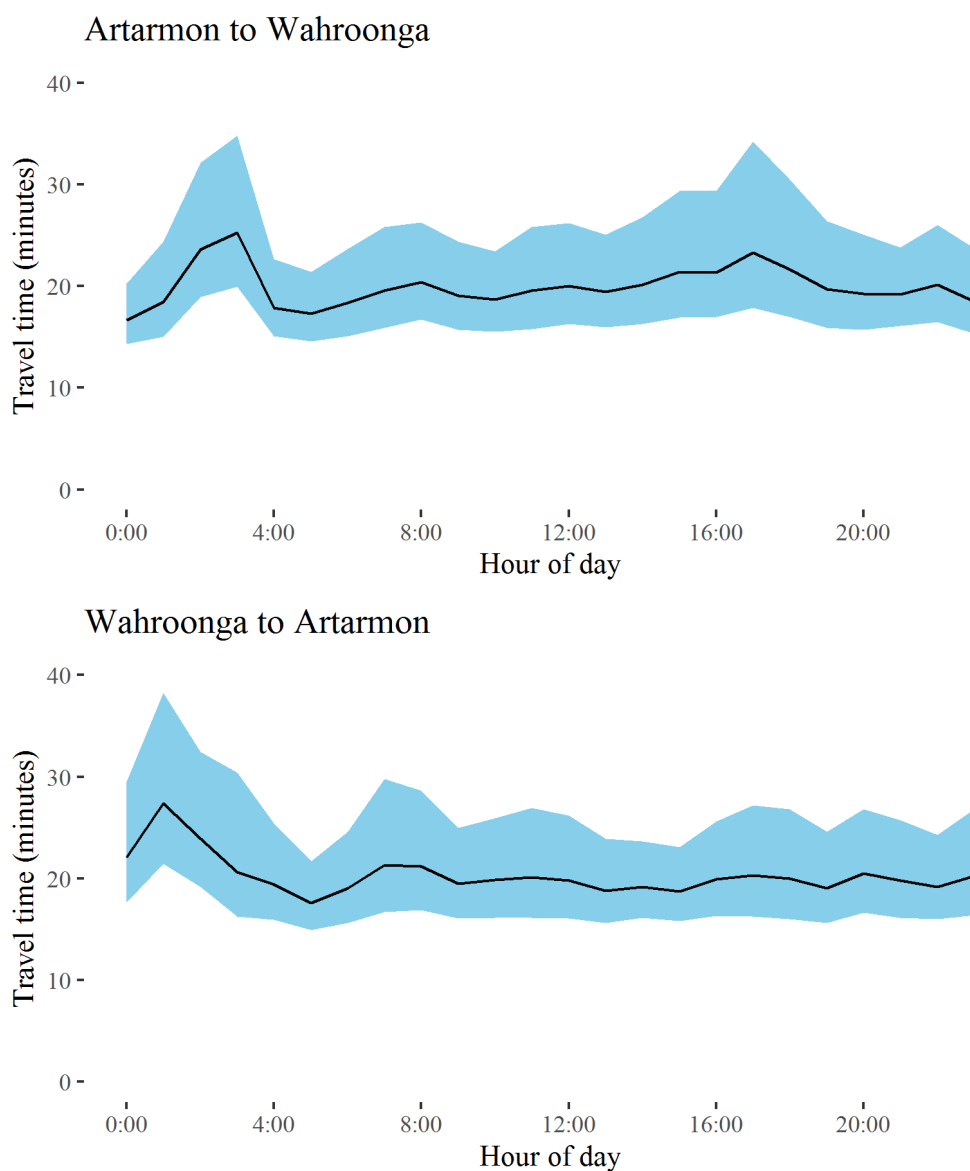
Source: BITRE estimates.



The best median travel times and least uncertainty for journeys from Artarmon to Wahroonga were at midnight with a median travel time of 17 minutes and an interquartile range of 6 minutes. The longest median travel times were 25 minutes at 3am and the greatest uncertainty was at 5pm with an interquartile range of 16 minutes.

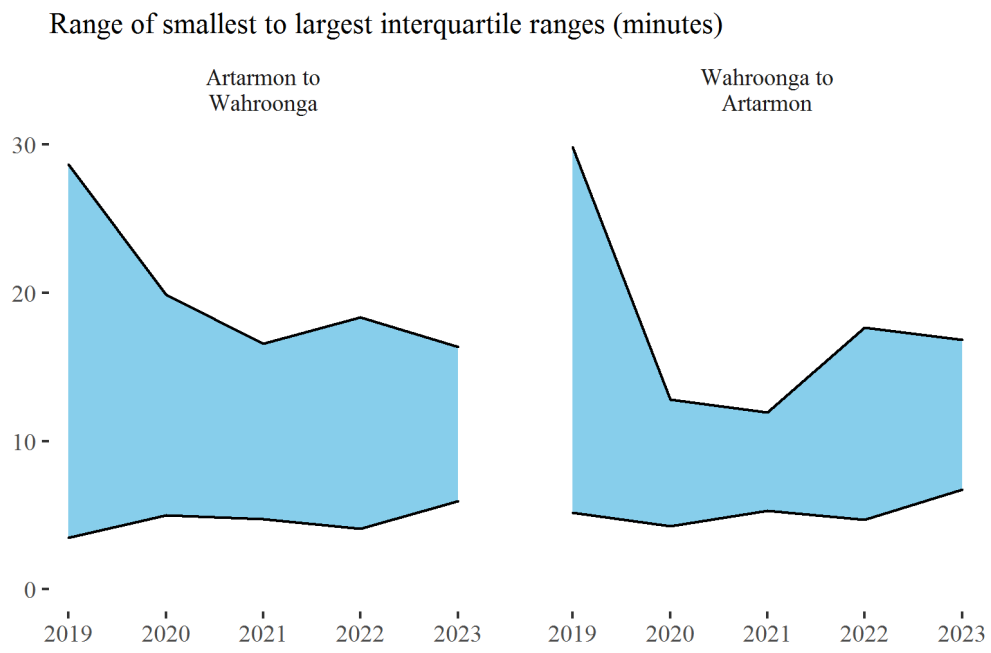
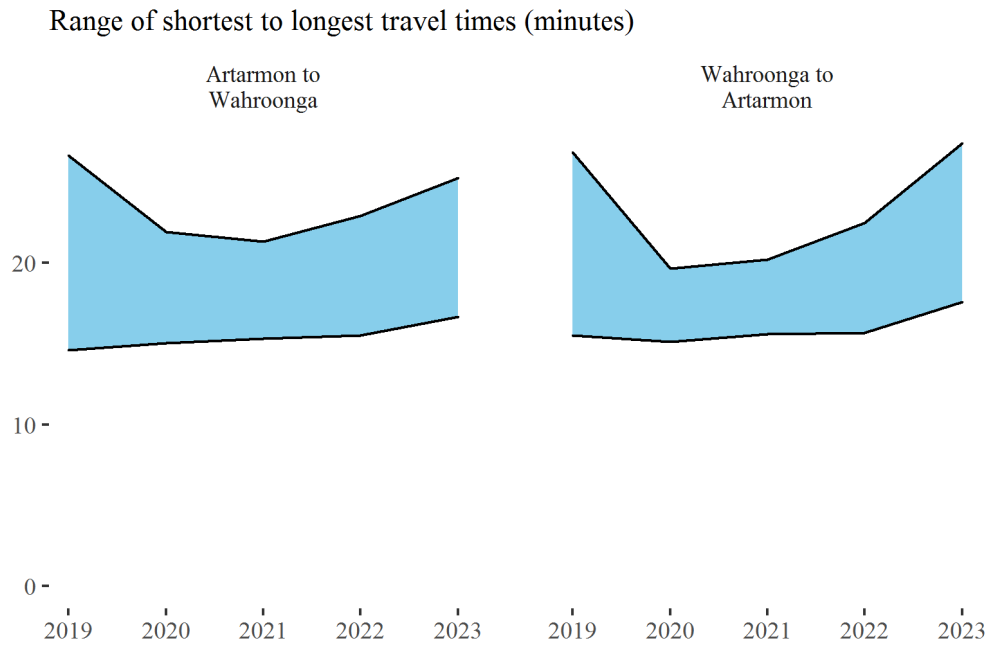
The best median travel times for journeys from Wahroonga to Artarmon were 18 minutes at 5am and the lowest uncertainty was at 5am with an interquartile range of 7 minutes. The longest median travel times and greatest uncertainty were at 1am with a median of 27 minutes and an interquartile range of 17 minutes.

**Figure A.5 A1 route median and interquartile range travel times**



Source: BITRE estimates.

**Figure A.6 A1 Performance over time**

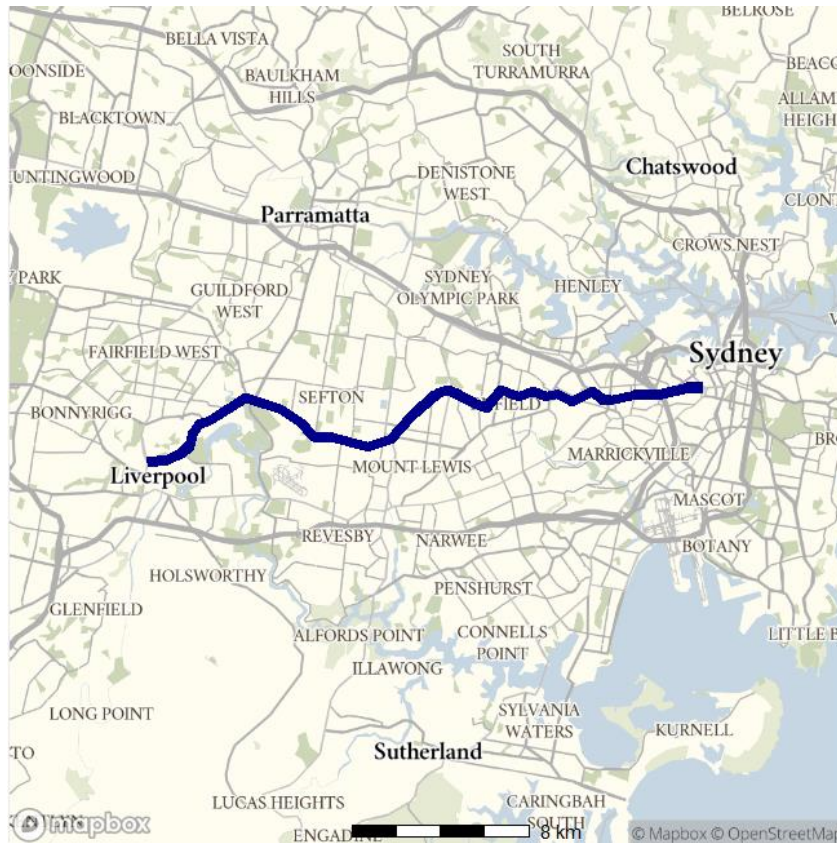


Source: BITRE estimates.

## A22 - Glebe to Liverpool / Liverpool to Glebe

This route follows surface roads between the inner city and the south west of Sydney via Ashfield and important logistics sites around Chullora. It is known by various names along its extent, including Parramatta Road, Liverpool Road and also as the Hume Highway for most of its length.

**Figure A.7 A22 route map**



Source: BITRE estimates.

**Table A.3 A22 route travel times and congestion measures, 2023**

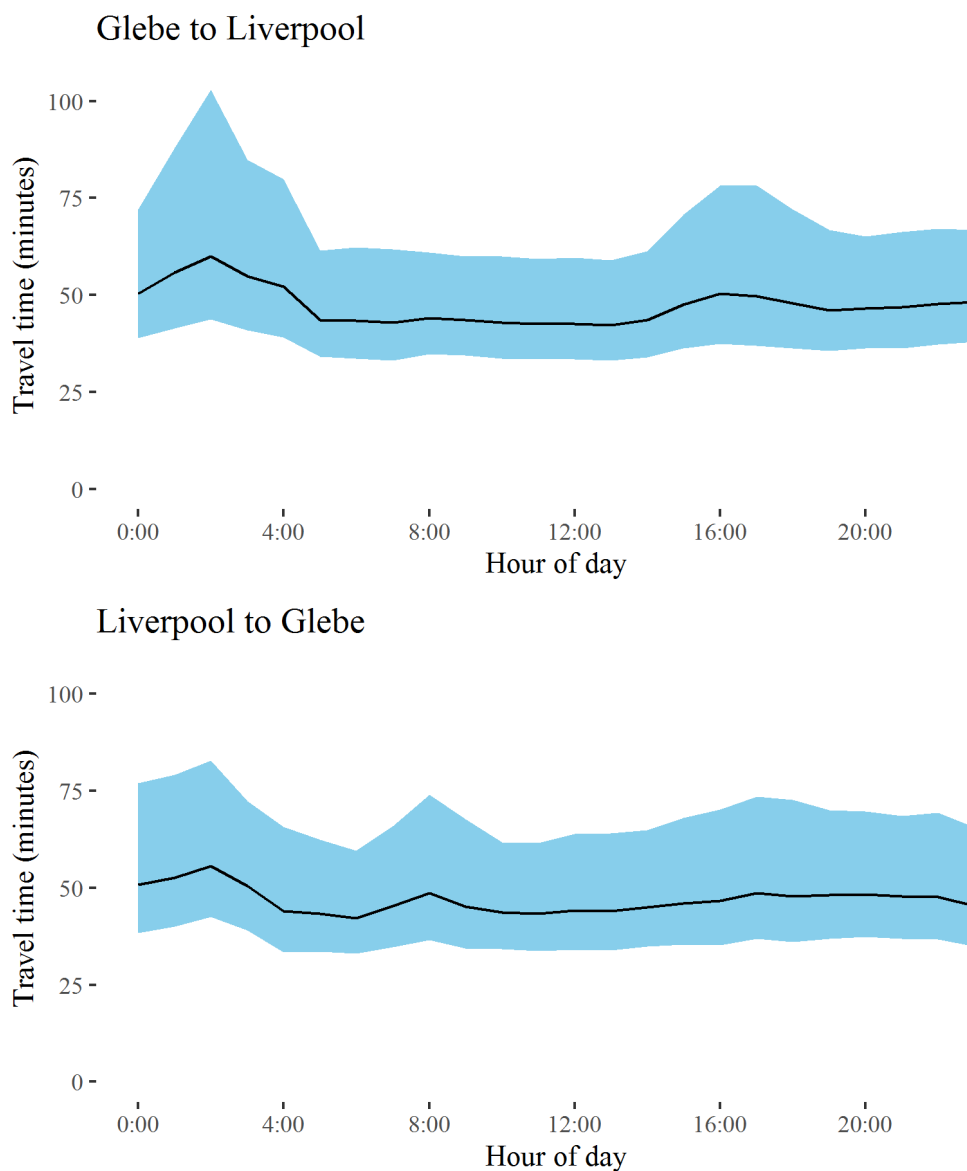
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Glebe to Liverpool	00:42:15	00:59:54	1.119	00:25:27	00:59:20	1.299	29.2
Liverpool to Glebe	00:42:15	00:55:34	1.110	00:26:28	00:40:24	1.241	29.3

Source: BITRE estimates.

The best travel times and lowest uncertainty travelling from Glebe to Liverpool were at 1pm and 9am with a median travel time of 42 minutes and an interquartile range of 25 minutes. The longest median travel times and greatest uncertainty were at 2am with a median of 1 hour and an interquartile range of 1 hour.

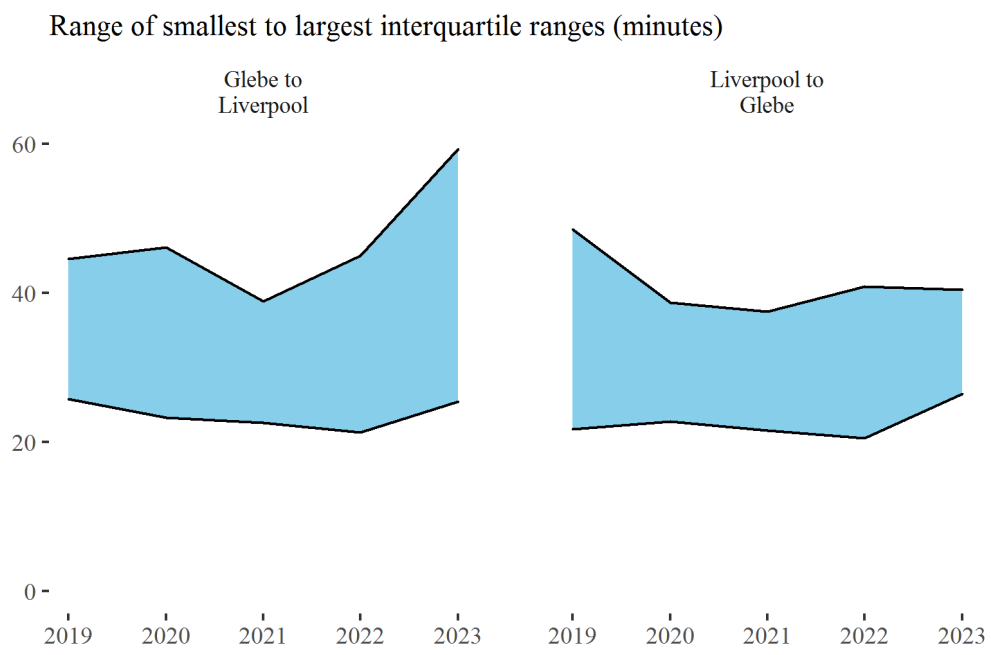
The best median travel times and lowest uncertainty for journeys from Liverpool to Glebe was at 6am with a median travel time of 42 minutes and an interquartile range of 26 minutes. The longest median travel times and greatest uncertainty was at 2am with a median of 56 minutes and an interquartile range of 40 minutes.

**Figure A.8 A22 route median and interquartile range travel times**



Source: BITRE estimates.

**Figure A.9 A22 Performance over time**

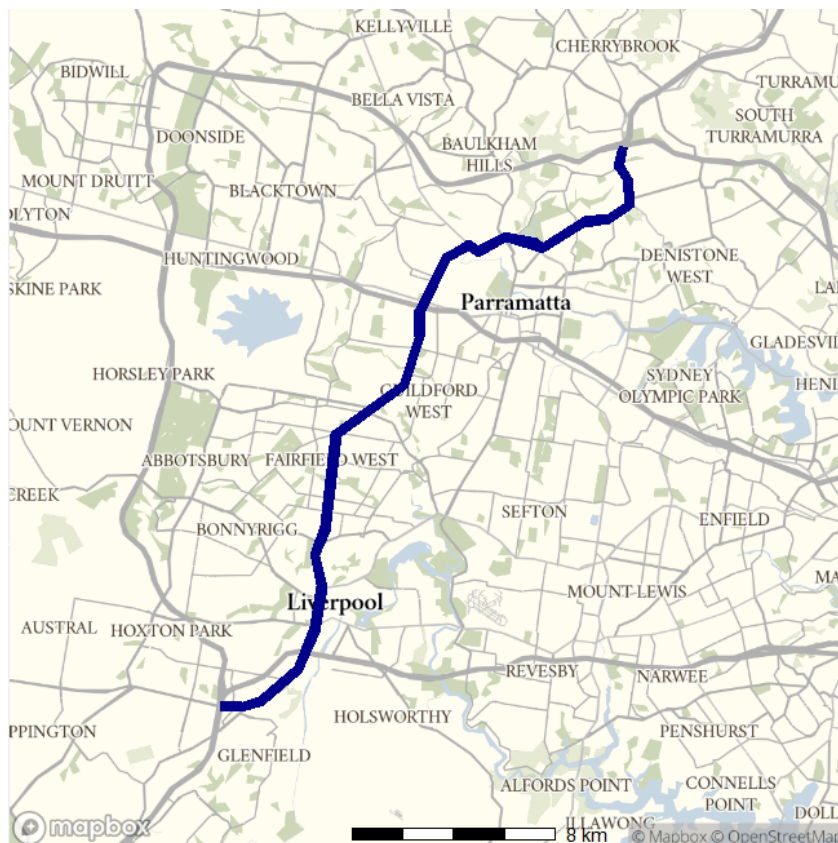


Source: BITRE estimates.

### A28 - Casula to M2 Motorway / M2 Motorway to Casula

This surface route traverses much of Western Sydney, from the intersection of the M2 and Pennant Hills Road to the intersection of the Hume Motorway and Camden Valley Way. It passes Wentworthville, Fairfield West, Liverpool and Casula and crosses the A44, M4 and M5 routes.

Figure A.10 A28 route map



Source: BITRE estimates.

Table A.4 A28 route travel times and congestion measures, 2023

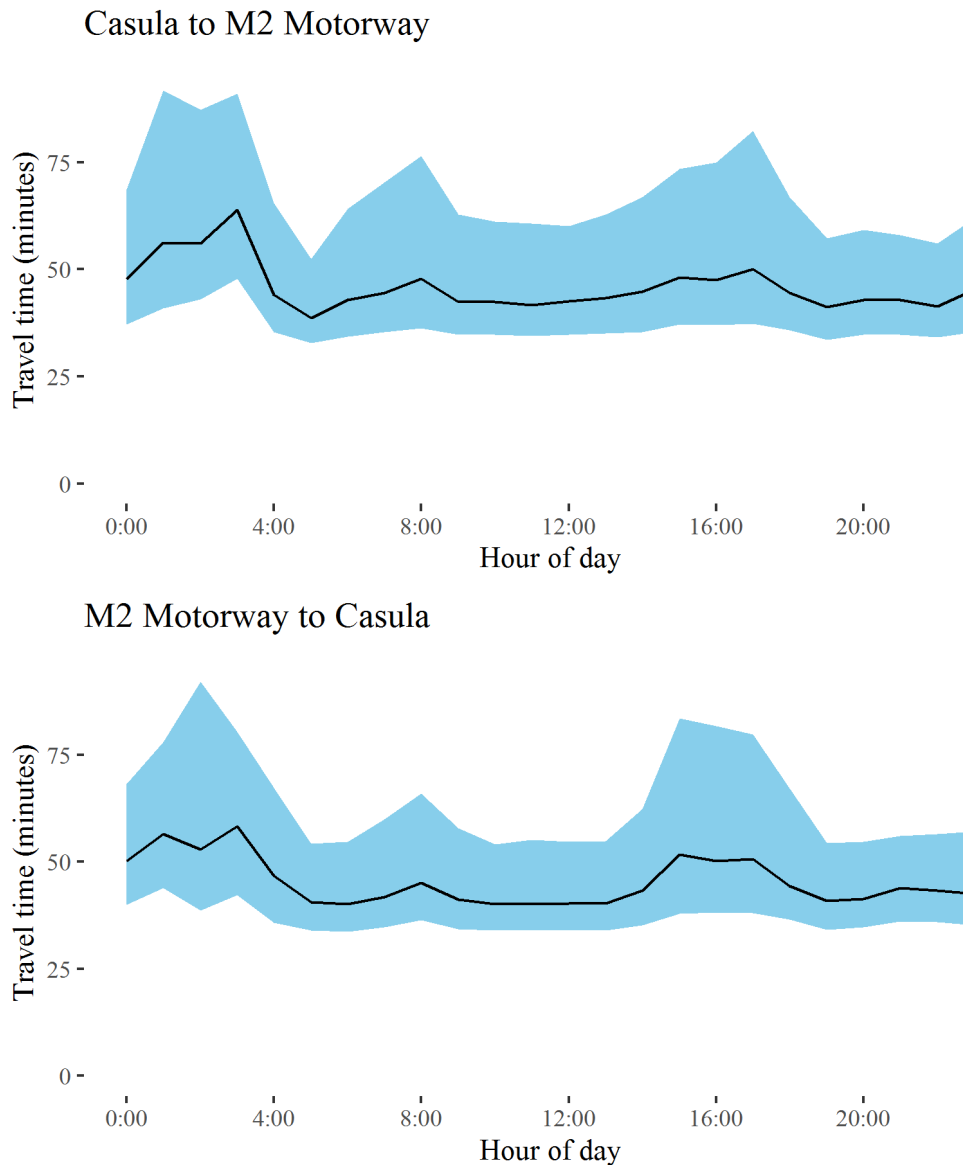
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Casula to M2 Motorway	00:38:38	01:03:57	1.190	00:19:43	00:50:52	1.608	32.8
M2 Motorway to Casula	00:40:10	00:58:17	1.127	00:19:54	00:53:19	1.422	32.9

Source: BITRE estimates

The best median travel times for journeys from Casula to M2 Motorway were 39 minutes at 5am and the lowest uncertainty was at 5am with an interquartile range of 20 minutes. The longest median travel times were 1 hour 4 minutes at 3am and the greatest uncertainty was at 1am with an interquartile range of 51 minutes.

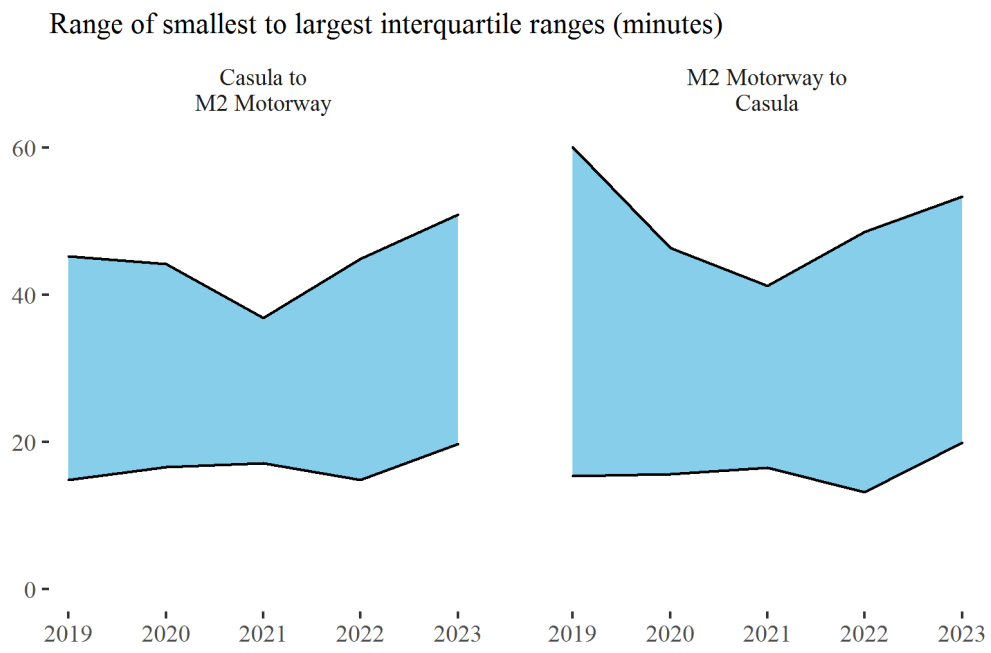
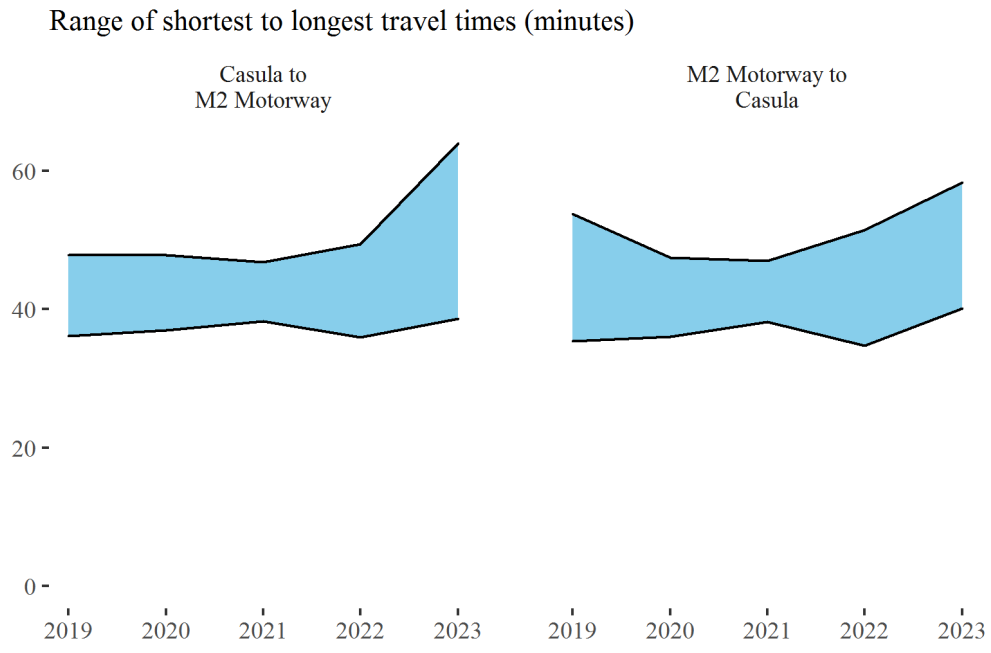
The best travel times and lowest uncertainty travelling from M2 Motorway to Casula were at 11am and 8pm with a median travel time of 40 minutes and an interquartile range of 20 minutes. The longest median travel time was at 3am with a median of 1 hour and the greatest uncertainty at 2am with an interquartile range of 53 minutes.

**Figure A.11 A28 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.12 A28 Performance over time



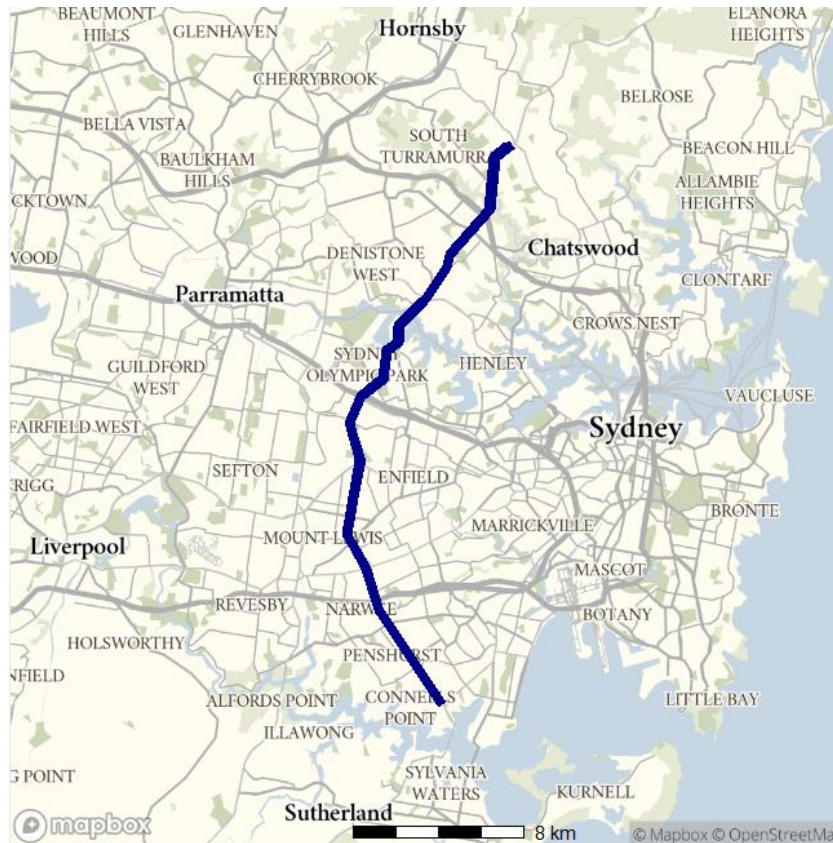
Source: BITRE estimates.



### A3 - Blakehurst to Pymble / Pymble to Blakehurst

This route traverses Sydney from the intersection of Ryde Road and the Pacific Highway at Pymble to the Princes Highway at Blakehurst. It passes through Ryde, Strathfield, Roselands and Hurstville along its extent. It intersects with a number of other routes in this report including the M2, M4 and M5 motorways and the A34, A22 and A40.

**Figure A.13 A3 route map**



Source: BITRE estimates.

**Table A.5 A3 route travel times and congestion measures, 2023**

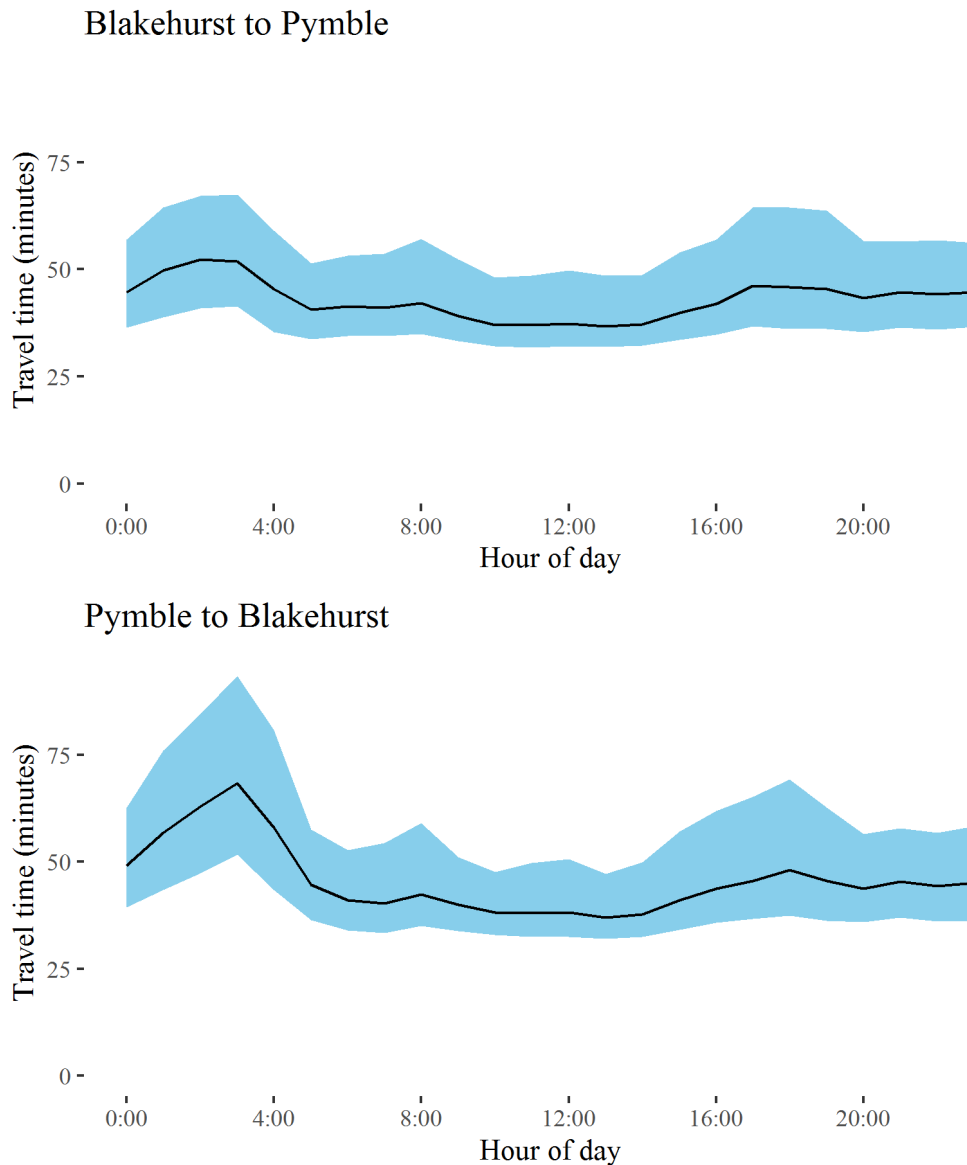
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Blakehurst to Pymble	00:36:46	00:52:20	1.167	00:16:03	00:28:22	1.328	30.5
Pymble to Blakehurst	00:36:56	01:08:24	1.235	00:14:47	00:41:51	1.626	30.8

Source: BITRE estimates.

The best travel times and lowest uncertainty travelling from Blakehurst to Pymble were at 1pm and 10am, respectively, with a median travel time of 37 minutes and an interquartile range of 16 minutes. The longest median travel times was 52 minutes at 2am and the greatest uncertainty was at 6pm with an interquartile range of 28 minutes.

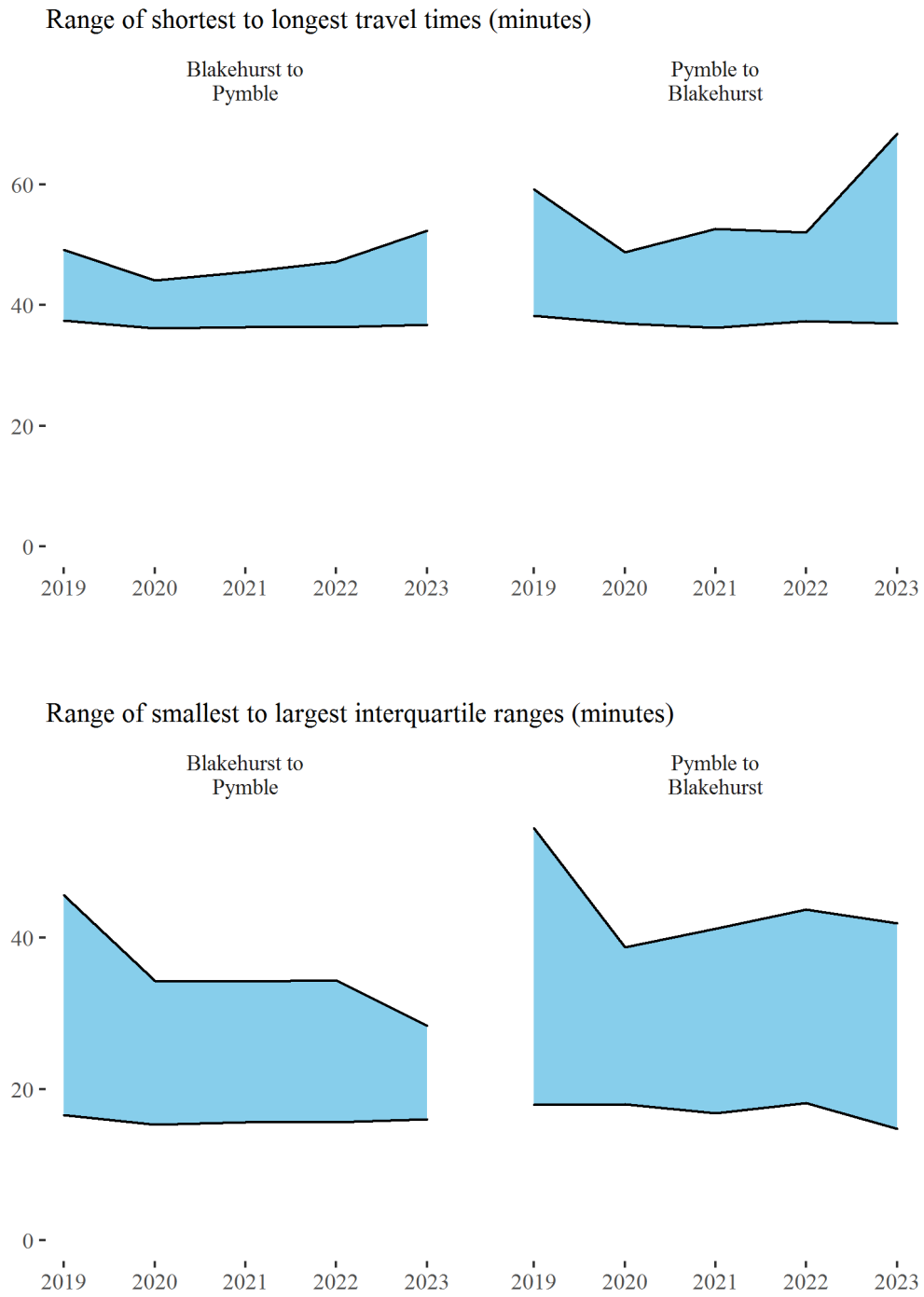
The best travel times and lowest uncertainty travelling from Pymble to Blakehurst were at 1pm and 10am, respectively, with a median travel time of 37 minutes and an interquartile range of 15 minutes. The longest median travel times and greatest uncertainty were at 3am with a median of 1 hour 8 minutes and an interquartile range of 42 minutes.

**Figure A.14 A3 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.15 A3 Performance over time

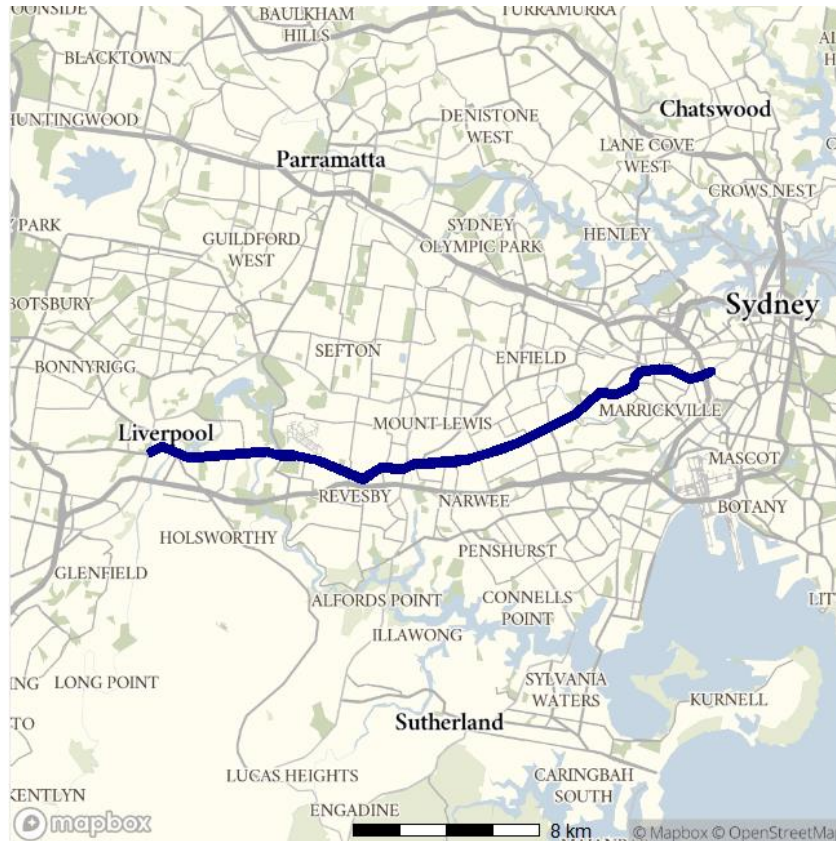


Source: BITRE estimates.

## A34 - Liverpool to Newtown / Newtown to Liverpool

This route follows a path almost parallel but more southerly to the A22, passing Marrickville, Punchbowl and Milperra. It is known by various names, including Canterbury Road and Milperra Road along its length.

**Figure A.16 A34 route map**



Source: BITRE estimates.

**Table A.6 A34 route travel times and congestion measures, 2023**

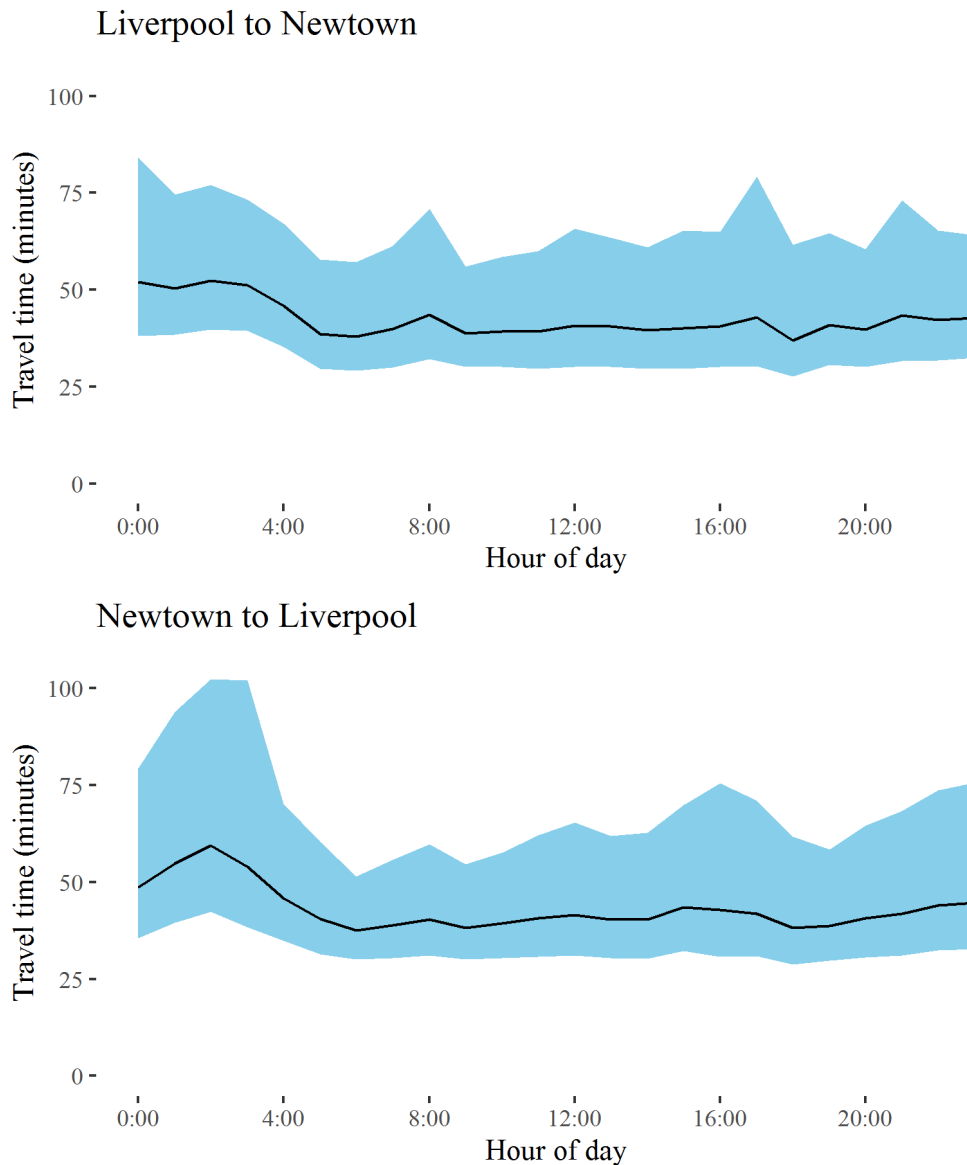
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Liverpool to Newtown	00:36:53	00:52:25	1.152	00:25:54	00:49:00	1.322	26.1
Newtown to Liverpool	00:37:34	00:59:29	1.150	00:21:26	01:03:44	1.718	26.7

Source: BITRE estimates.

The best travel times and lowest uncertainty travelling from Liverpool to Newtown were at 6pm and 9am, respectively, with a median travel time of 37 minutes and an interquartile range of 26 minutes. The longest median travel time was 52 minutes at 2am and the greatest uncertainty was at 5pm with an interquartile range of 49 minutes.

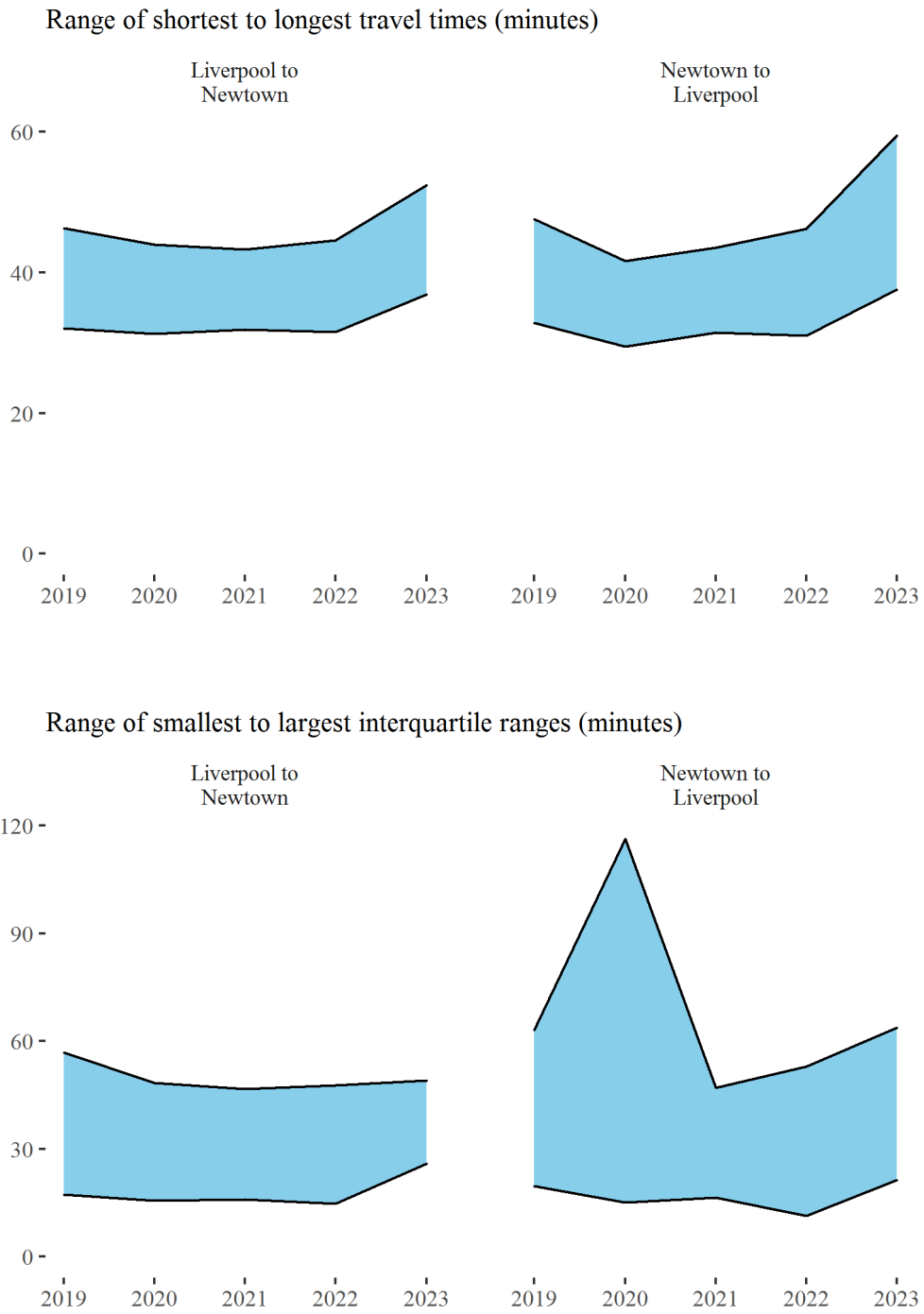
The best median travel times and least uncertainty for journeys from Newtown to Liverpool were at 6am, with a median travel time of 38 minutes and an interquartile range of 21 minutes. The longest median travel times were at 2am with a median of 1 hour and the greatest uncertainty was at 3am with an interquartile range of 1 hour 4 minutes.

**Figure A.17 A34 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.18 A34 Performance over time

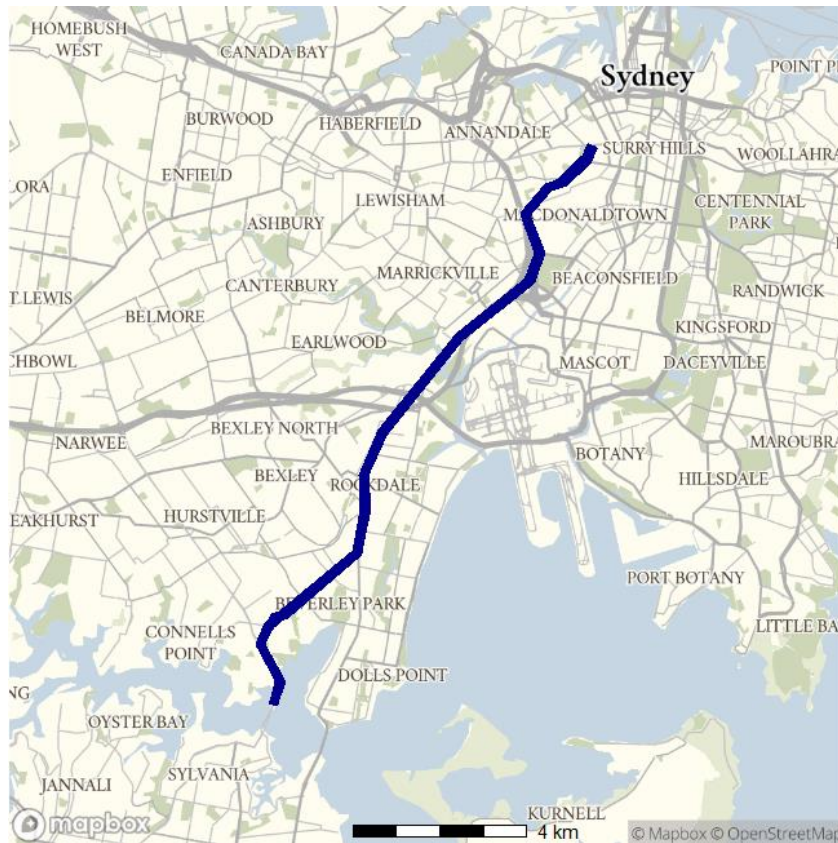


Source: BITRE estimates.

## A36 - Broadway to Georges River / Georges River to Broadway

This route travels south from the inner city at Broadway (Glebe), skirting industrial areas at Alexandria and passing through the St George region before meeting the A3 at Blakehurst. For most of its length it is known as the Princes Highway.

**Figure A.19** A36 route map



Source: BITRE estimates.

**Table A.7** A36 route travel times and congestion measures, 2023

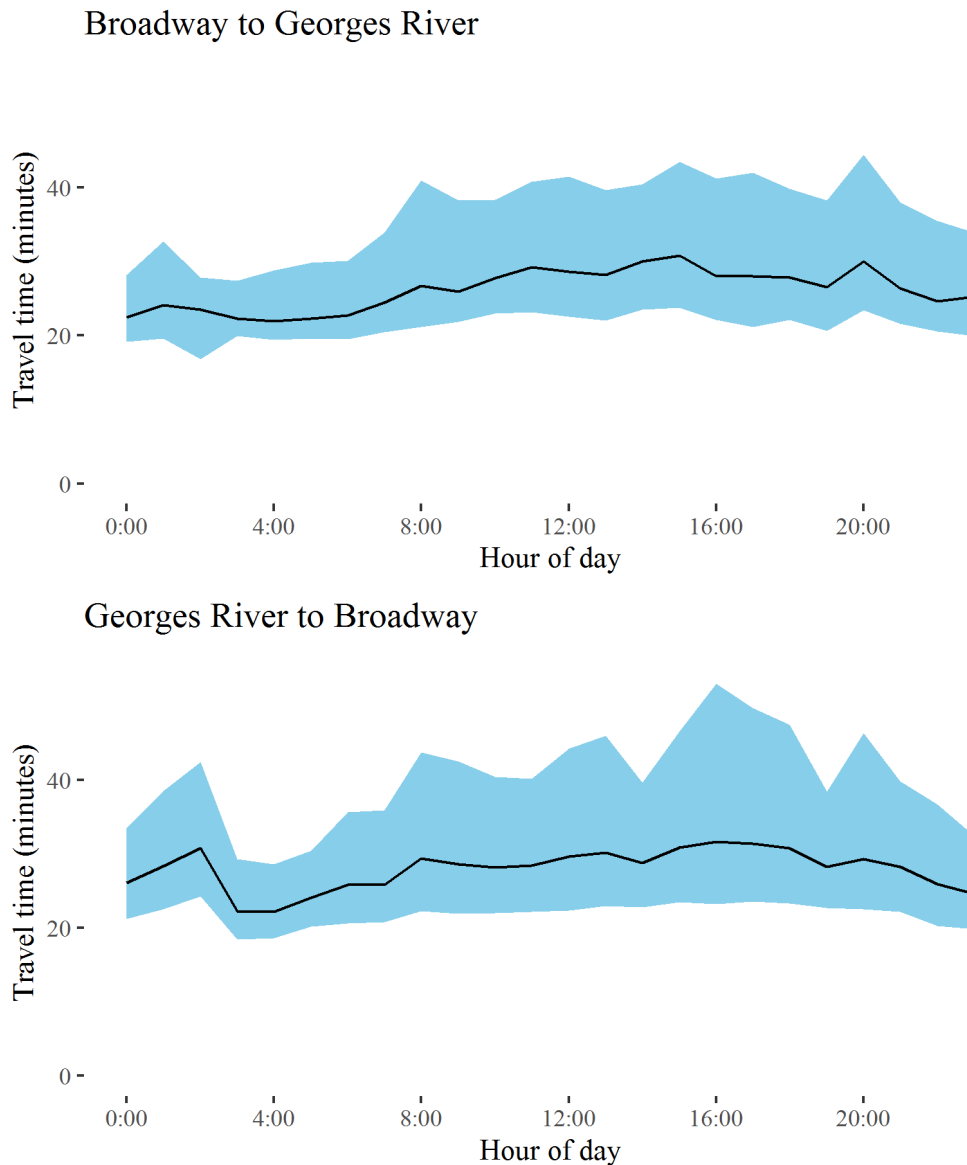
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Broadway to Georges River	00:21:59	00:30:46	1.190	00:07:27	00:21:03	2.065	16.5
Georges River to Broadway	00:22:12	00:31:37	1.257	00:09:56	00:29:49	1.833	16.5

Source: BITRE estimates.

The best travel times and lowest uncertainty travelling from Broadway to Georges River were at 4am and 3am, respectively, with a median travel time of 22 minutes and an interquartile range of 7.5 minutes. The longest median travel time was 31 minutes at 3pm and the greatest uncertainty was at 8pm, with an interquartile range of 21 minutes.

The best median travel times and lowest uncertainty for journeys from Georges River to Broadway were at 4am, with a median travel time of 22 minutes and an interquartile range of 10 minutes. The longest median travel times and greatest uncertainty were at 4pm, with a median of 32 minutes and an interquartile range of 30 minutes.

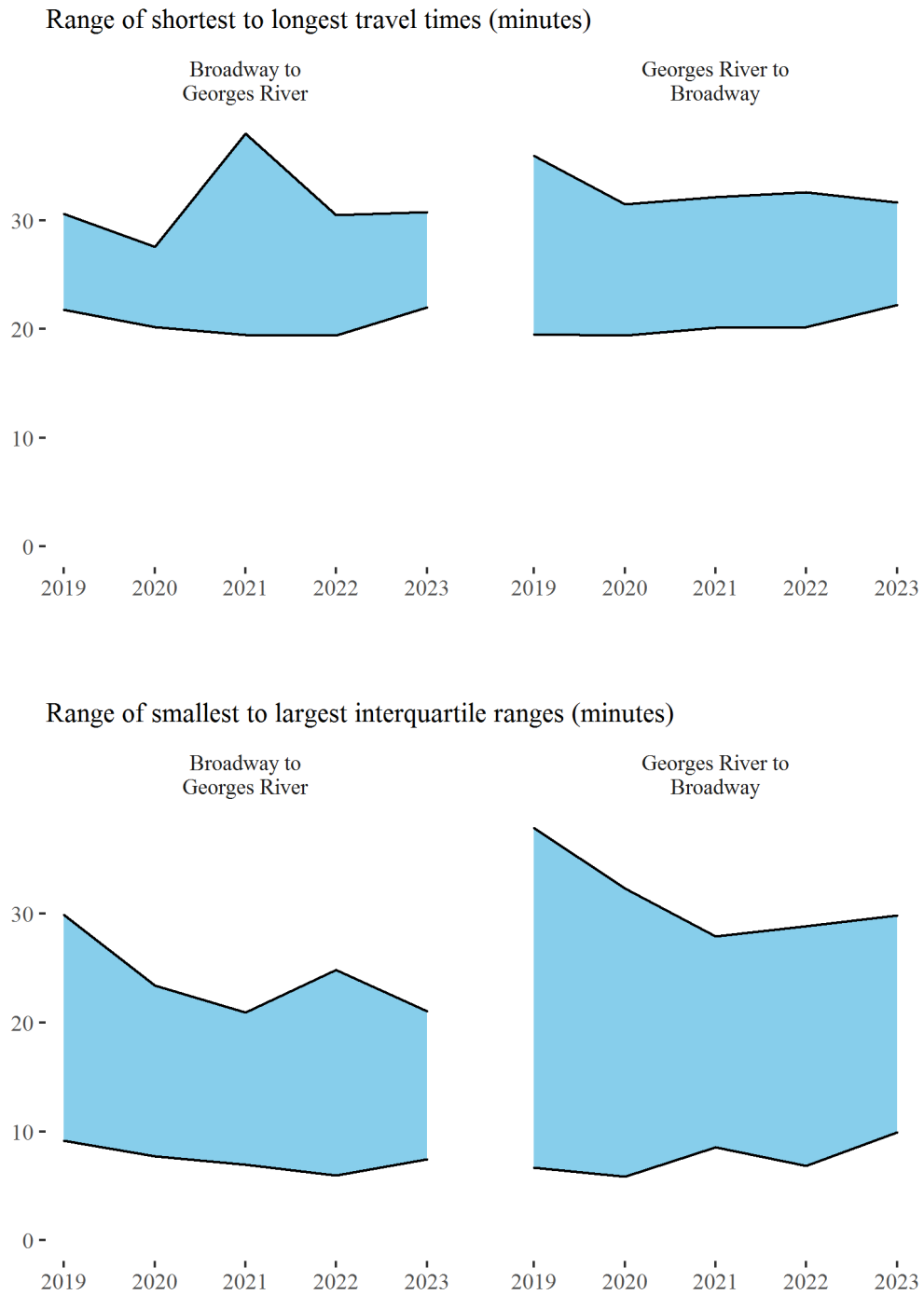
**Figure A.20 A36 route median and interquartile range travel times**



Source: BITRE estimates.



**Figure A.21 A36 Performance over time**

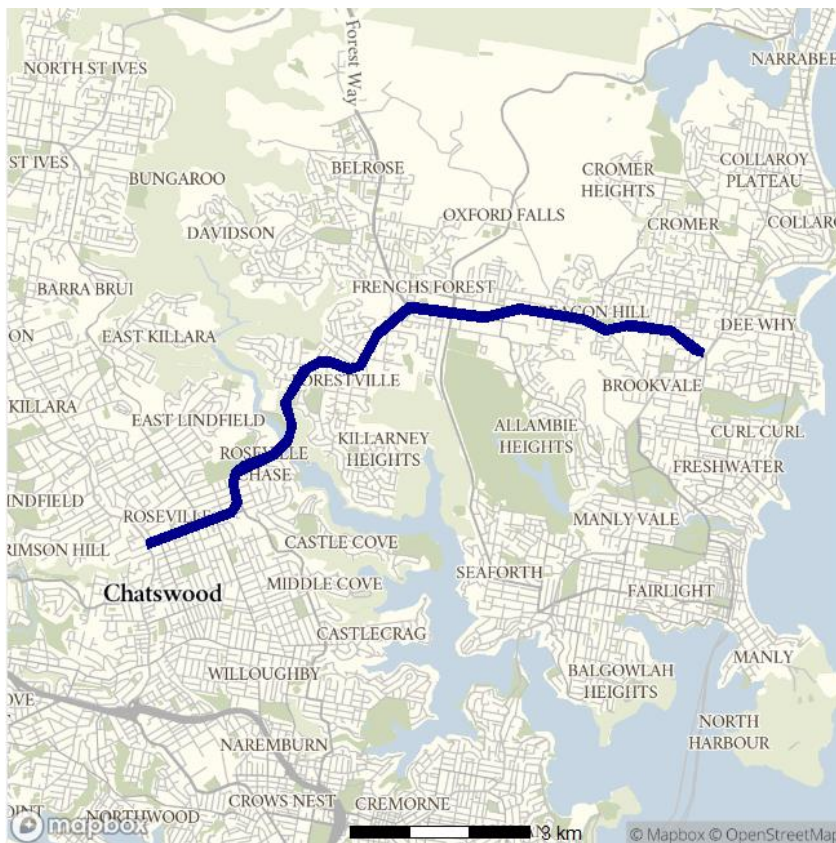


Source: BITRE estimates.

### A38 - Dee Why to Roseville / Roseville to Dee Why

This route connects the Upper North Shore and Northern Beaches regions of Sydney, from the Pacific Highway (A1) at Roseville to Pittwater Rd (A8) at Dee Why.

Figure A.22 A38 route map



Source: BITRE estimates.

Table A.8 A38 route travel times and congestion measures, 2023

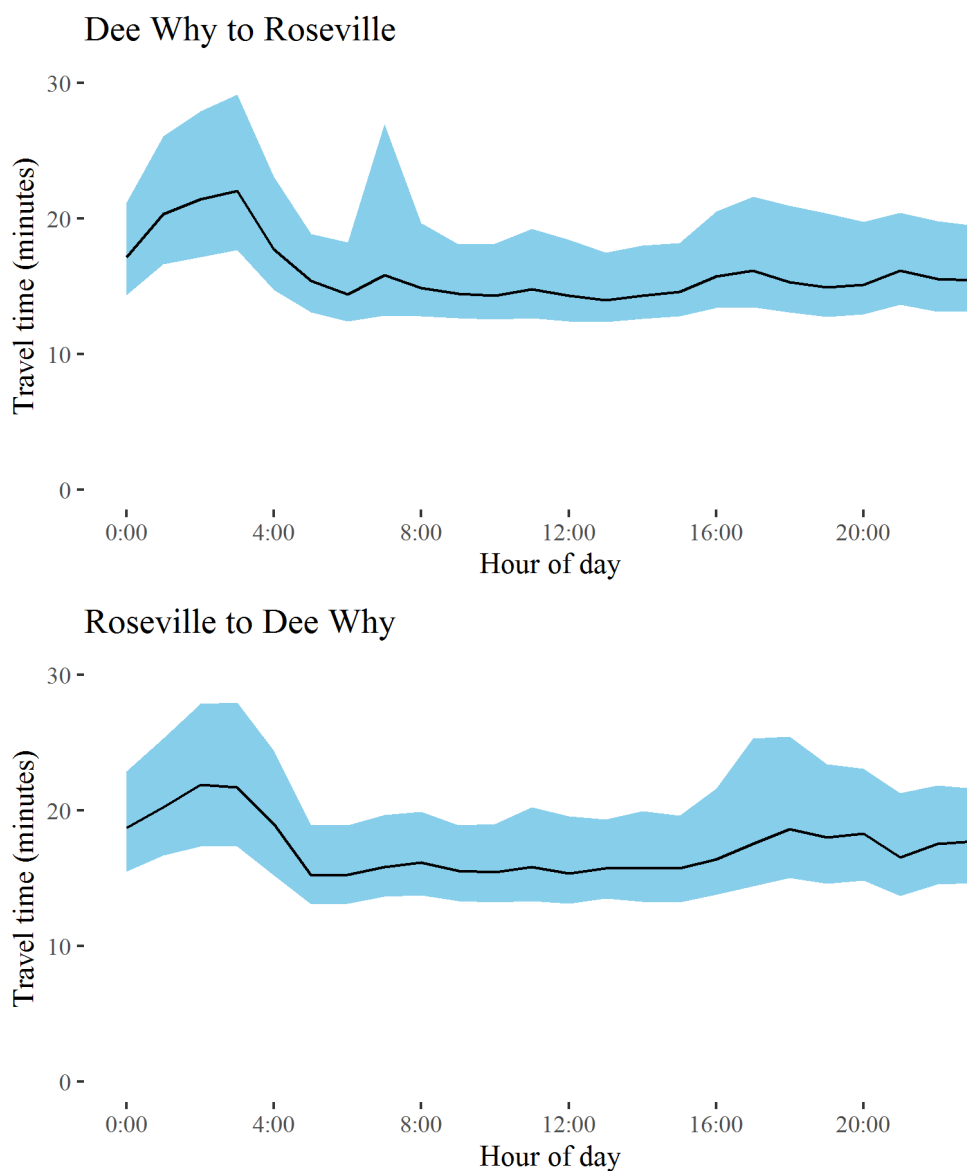
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Dee Why to Roseville	00:13:57	00:22:01	1.146	00:05:08	00:14:08	1.433	12.1
Roseville to Dee Why	00:15:13	00:21:55	1.135	00:05:36	00:10:54	1.354	12.1

Source: BITRE estimates.

The best median travel times and lowest uncertainty for journeys from Dee Why to Roseville were at 1pm, with a median travel time of 14 minutes and an interquartile range of 5 minutes. The longest median travel times was at 3am, with a median of 22 minutes, and the greatest uncertainty was at 7am, with an interquartile range of 14 minutes.

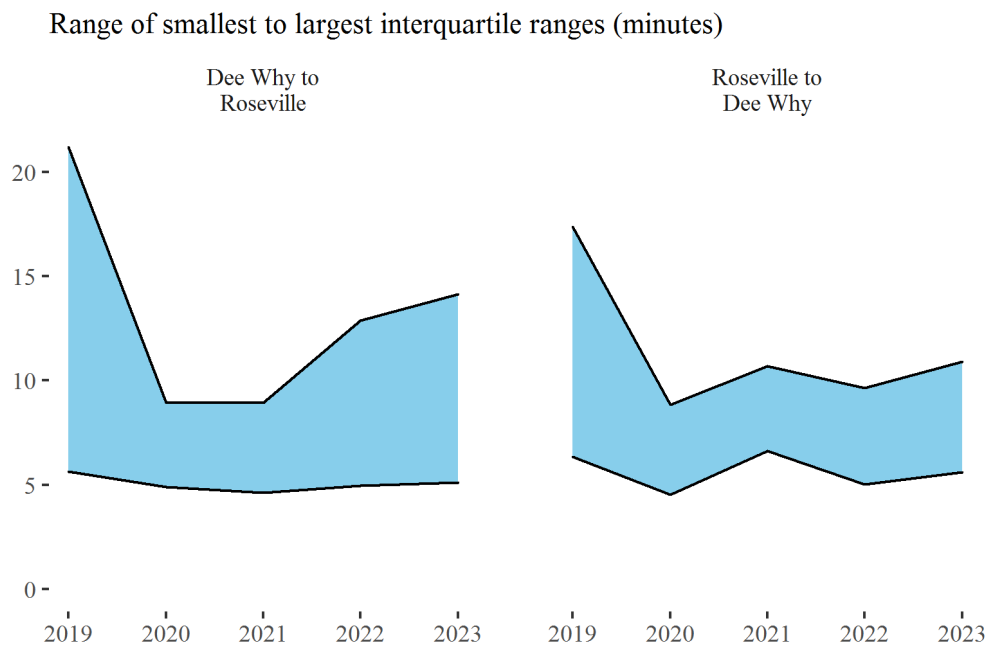
The best median travel times and least uncertainty for journeys from Roseville to Dee Why were at 5am, with a median travel time of 15 minutes and an interquartile range of 6 minutes. The longest median travel time was 22 minutes at 2am and the greatest uncertainty was at 5pm, with an interquartile range of 11 minutes.

**Figure A.23 A38 route median and interquartile range travel times**



Source: BITRE estimates.

**Figure A.24 A38 Performance over time**

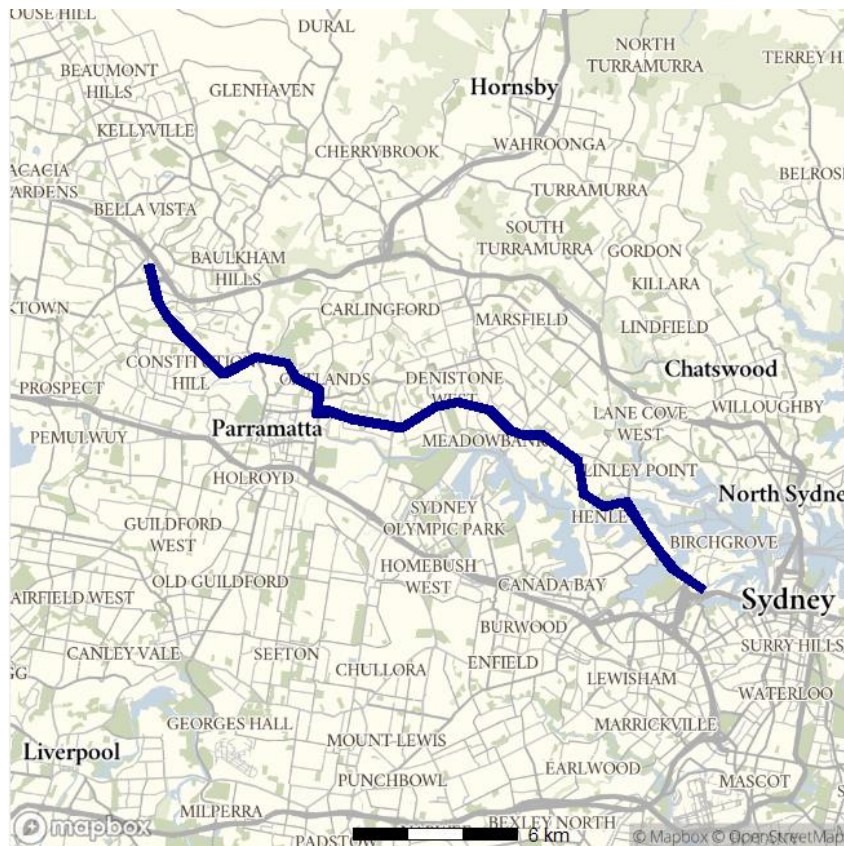


Source: BITRE estimates.

## A40 - Baulkham Hills to Rozelle / Rozelle to Baulkham Hills

This route connects the inner city (Rozelle) and the north-west of Sydney passing through Gladesville, Rydalmere and Toongabbie along its path. It is known at different points as Victoria Road, James Ruse Drive and Old Windsor Road.

**Figure A.25 A40 route map**



Source: BITRE estimates.

**Table A.9 A40 route travel times and congestion measures, 2023**

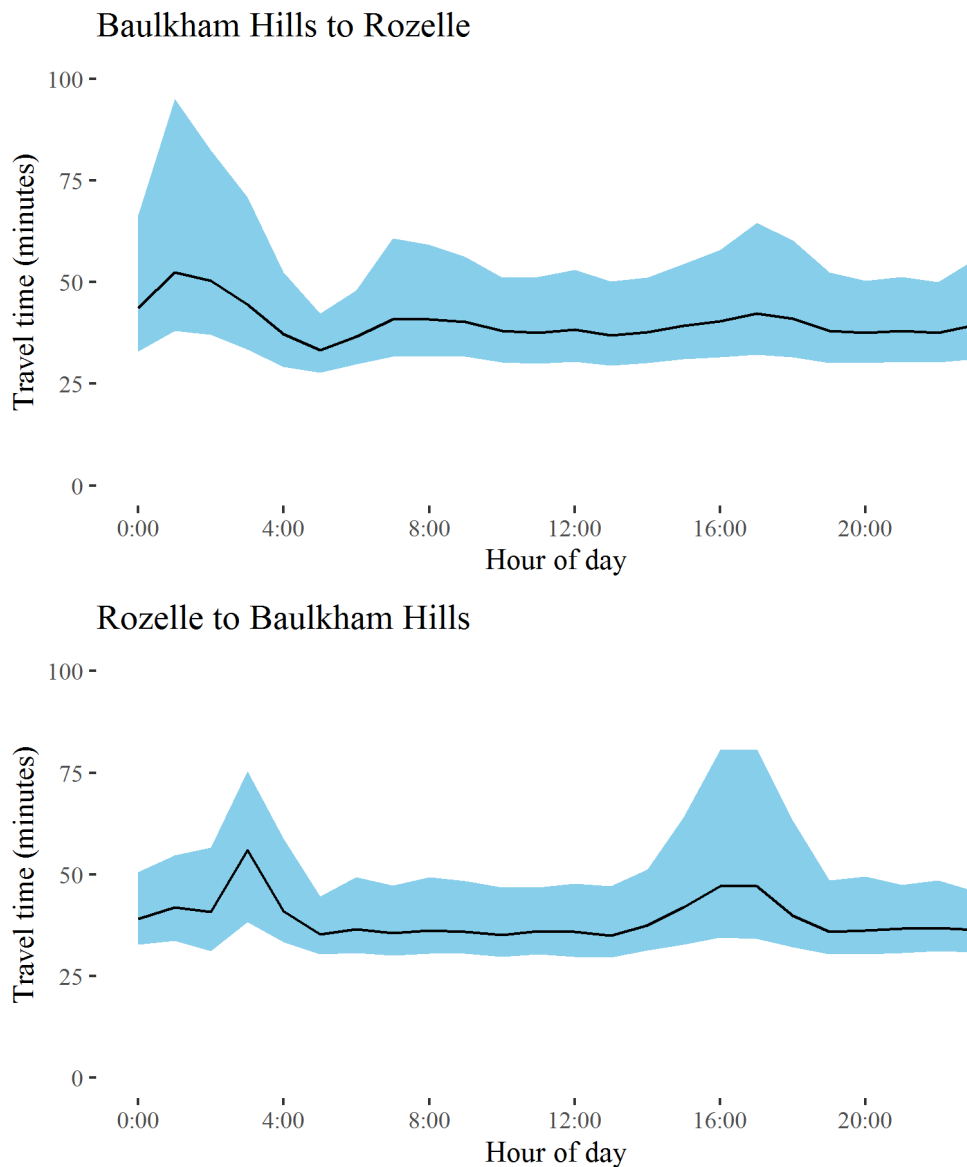
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Baulkham Hills to Rozelle	00:33:15	00:52:19	1.205	00:14:35	00:57:01	1.816	27.8
Rozelle to Baulkham Hills	00:34:59	00:55:59	1.115	00:14:16	00:46:35	1.590	28.1

Source: BITRE estimates.

The best median travel times for journeys from Baulkham Hills to Rozelle was 33 minutes at 5am and the lowest uncertainty was at 5am with an interquartile range of 15 minutes. The longest median travel times and greatest uncertainty were at 1am, with a median of 52 minutes and an interquartile range of 1 hour.

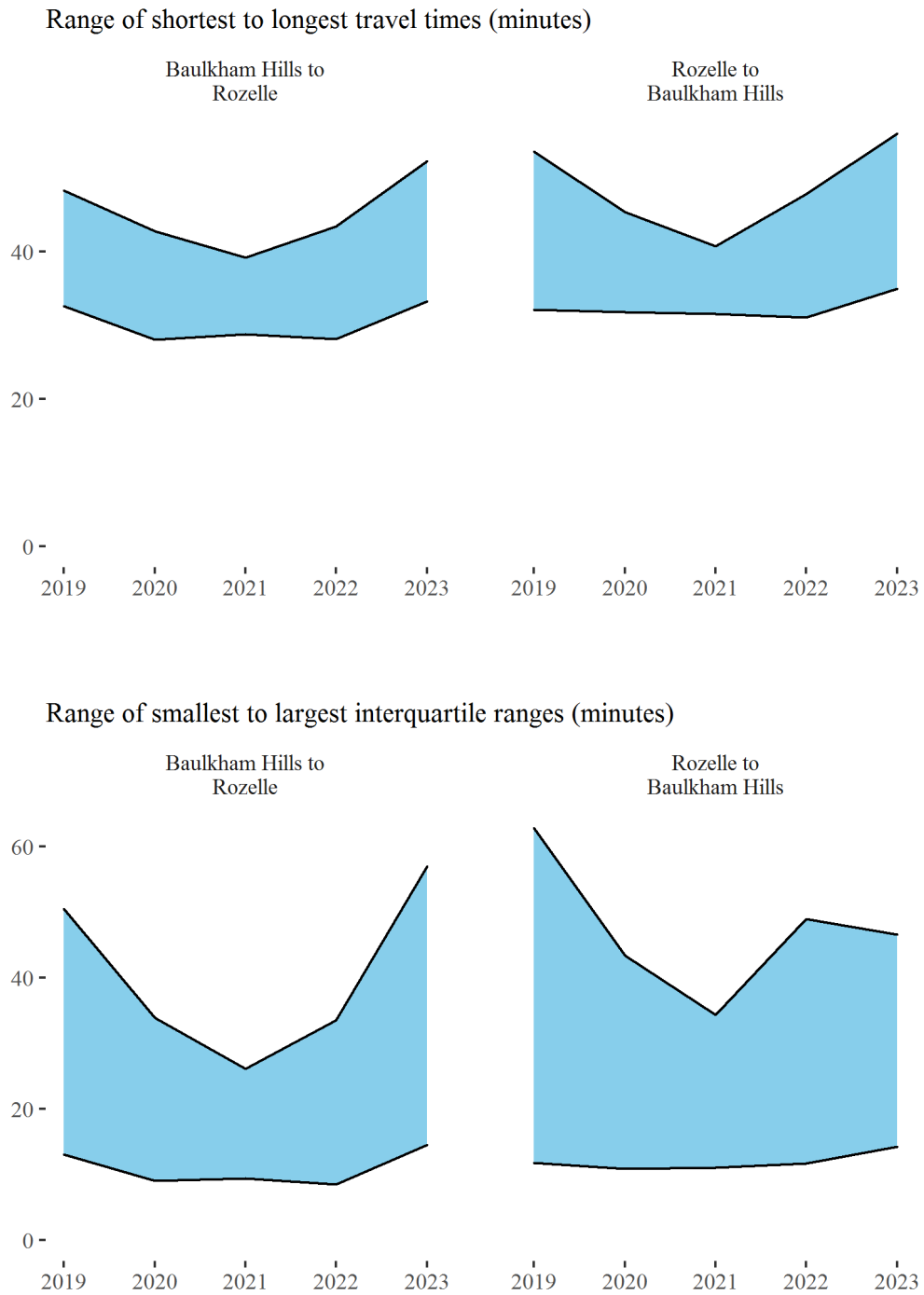
The best travel times and lowest uncertainty travelling from Rozelle to Baulkham Hills were at 1pm and 5am, respectively, with a median travel time of 35 minutes and an interquartile range of 14 minutes. The longest median travel time was at 3am, with a median of 56 minutes, and the greatest uncertainty at 5pm, with an interquartile range of 47 minutes.

**Figure A.26 A40 route median and interquartile range travel times**



Source: BITRE estimates.

**Figure A.27 A40 Performance over time**

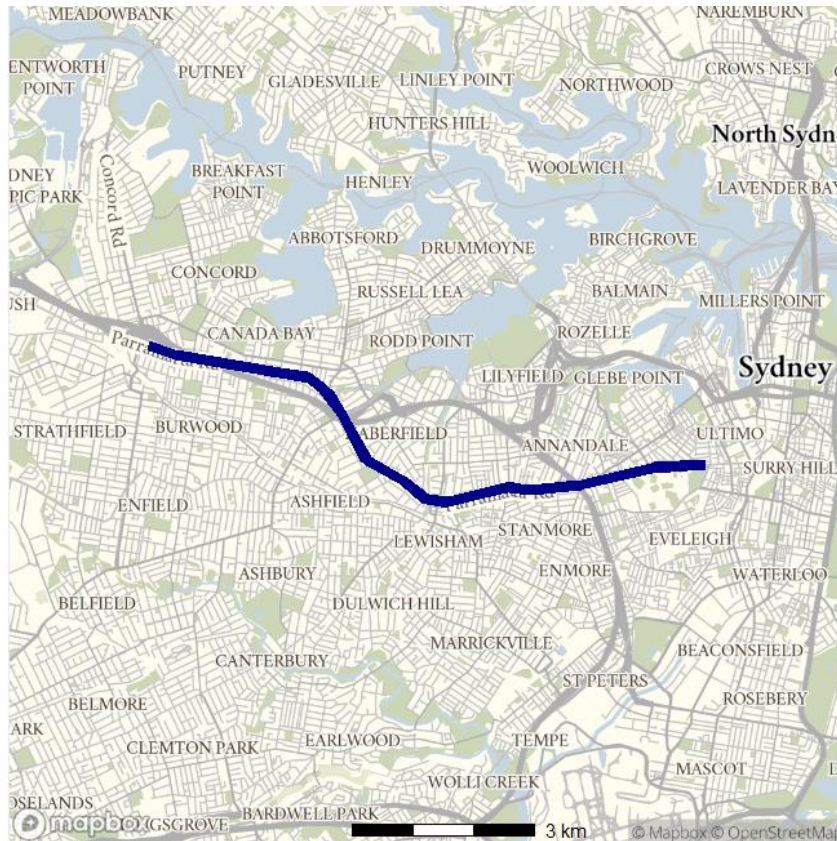


Source: BITRE estimates.

## A44 - Camperdown to Strathfield / Strathfield to Camperdown

This route runs from the former end of the M4 Motorway at Strathfield to Camperdown in the inner city and services the Inner West Region of Sydney.

**Figure A.28 A44 route map**



Source: BITRE estimates.

**Table A.10 A44 route travel times and congestion measures, 2023**

Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Camperdown to Strathfield	00:13:30	00:18:13	1.188	00:06:05	00:15:42	1.541	10.2
Strathfield to Camperdown	00:11:46	00:17:29	1.265	00:02:54	00:24:15	2.849	10.2

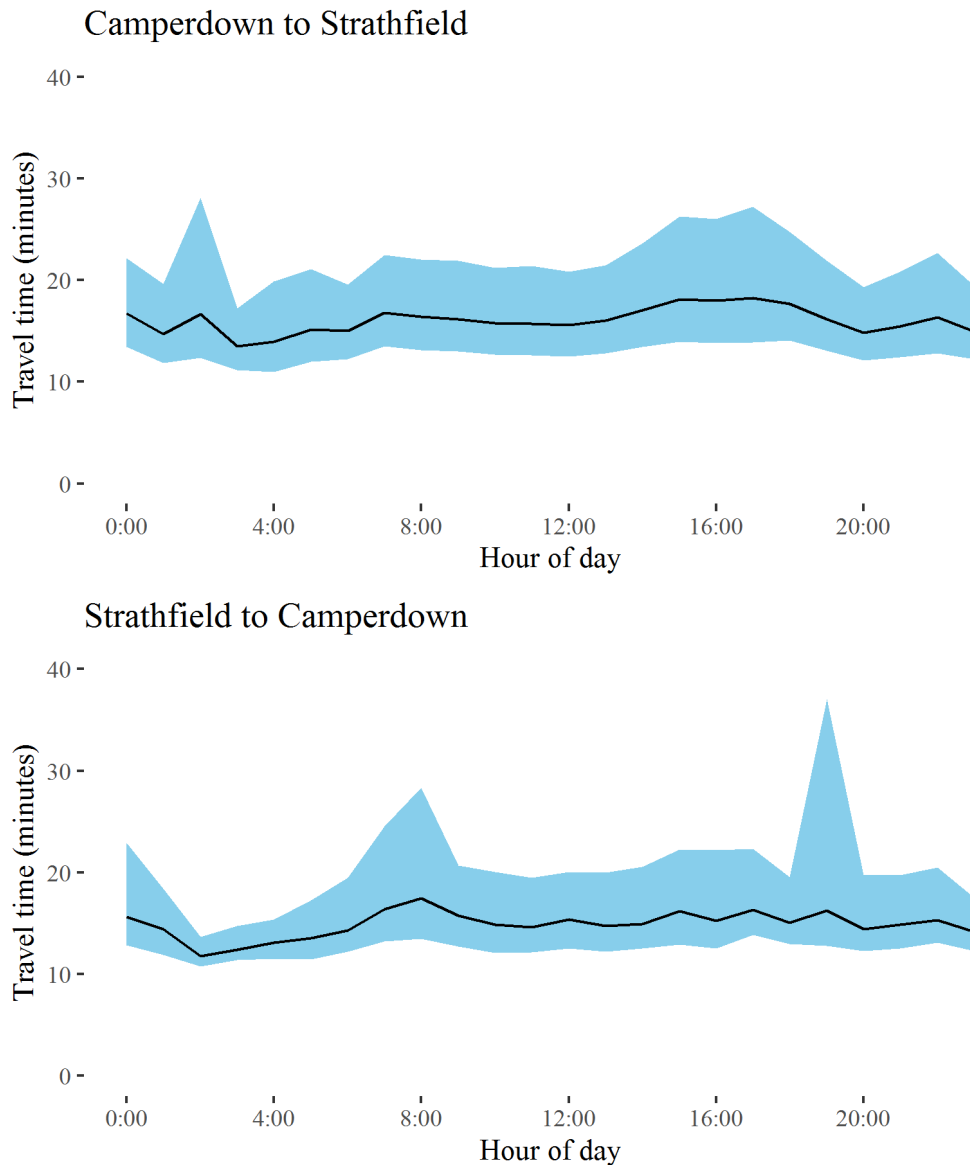
Source: BITRE estimates.



The best median travel times and lowest uncertainty for journeys from Camperdown to Strathfield were at 3am, with a median travel time of 14 minutes and an interquartile range of 6 minutes. The longest median travel times were at 5pm, with a median of 18 minutes and the greatest uncertainty at 2am with an interquartile range of 16 minutes.

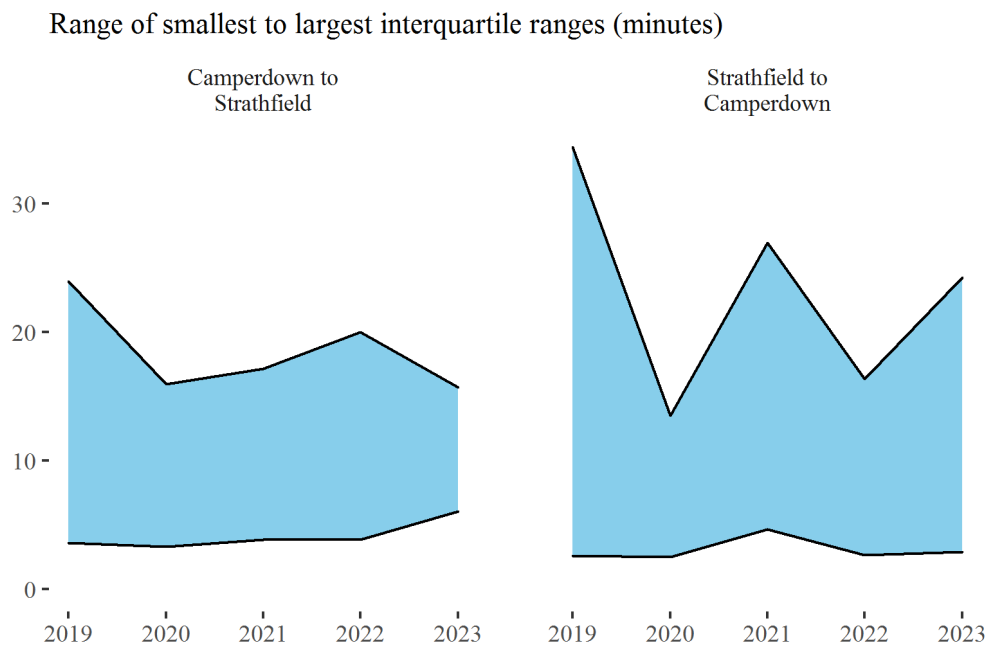
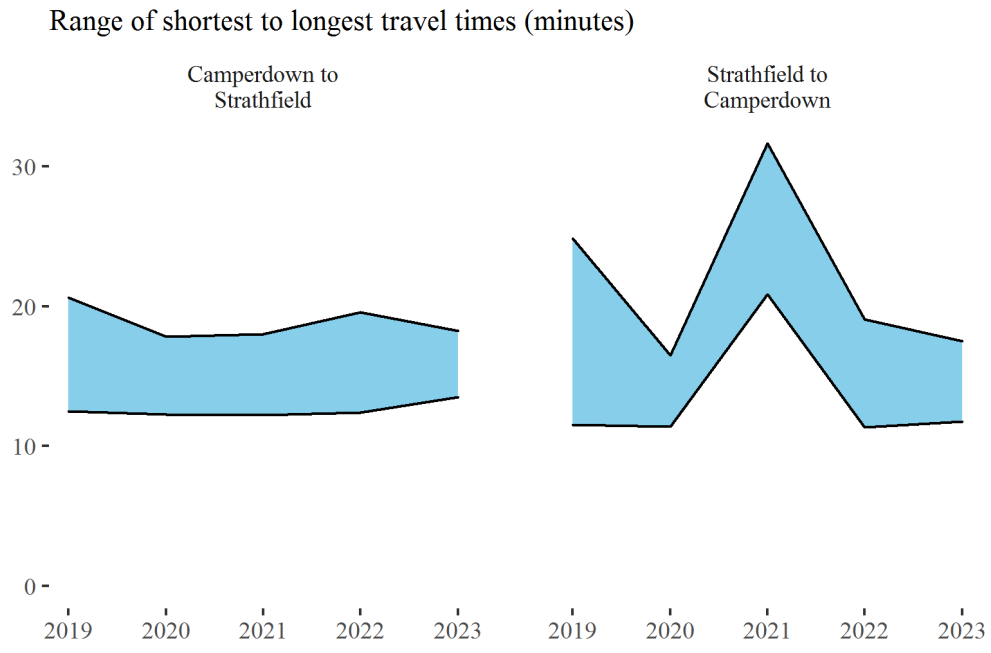
The best median travel time for journeys from Strathfield to Camperdown was 12 minutes at 2am and the lowest uncertainty was at 2am with an interquartile range of 3 minutes. The longest median travel time were at 8am, with a median of 17 minutes, and the greatest uncertainty at 7pm, with an interquartile range of 24 minutes.

**Figure A.29 A44 route median and interquartile range travel times**



Source: BITRE estimates.

**Figure A.30 A44 Performance over time**

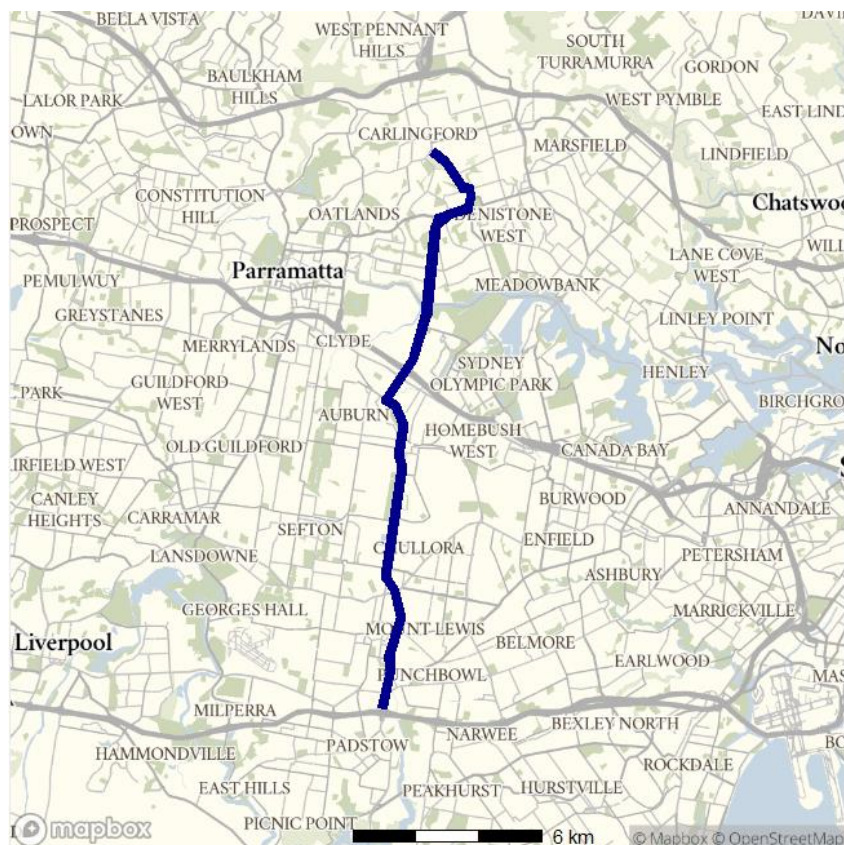


Source: BITRE estimates.

## A6 - Carlingford to Padstow / Padstow to Carlingford

This route traverses Sydney linking Carlingford and Padstow, and roughly parallels the A3 route to the west. It passes through Rydalmere, Lidcombe, Bankstown and the Chullora precinct. This route intersects with the M2, M4 and M7 motorways.

**Figure A.31 A6 route map**



Source: BITRE estimates.

**Table A.11 A6 route travel times and congestion measures, 2023**

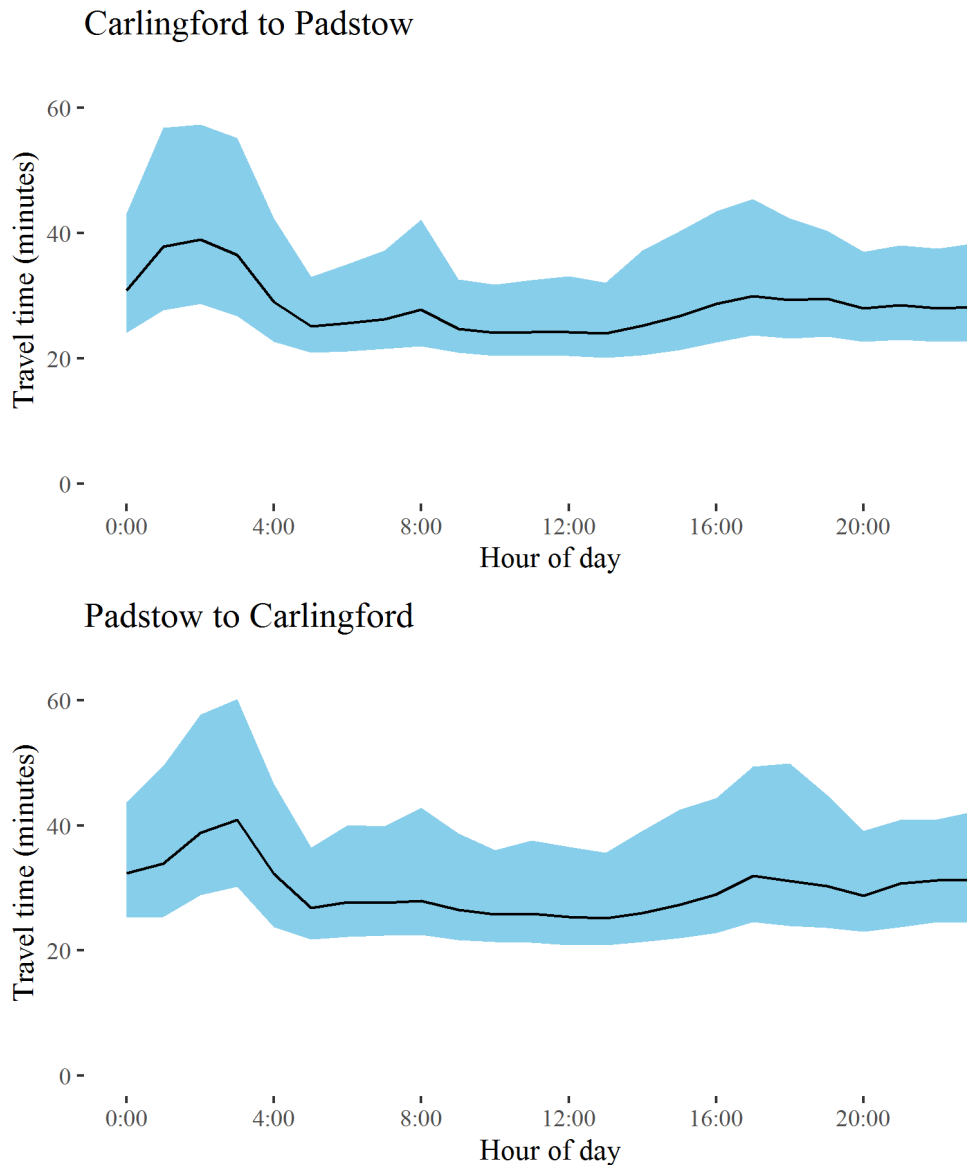
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Carlingford to Padstow	00:23:58	00:38:56	1.184	00:11:24	00:29:09	1.541	19.9
Padstow to Carlingford	00:25:12	00:40:54	1.183	00:14:42	00:30:00	1.340	20.0

Source: BITRE estimates.

The best median travel times and lowest uncertainty for journeys from Carlingford to Padstow were at 1pm, with a median travel time of 24 minutes and an interquartile range of 11 minutes. The longest median travel time was at 2am, with a median of 39 minutes, and the greatest uncertainty at 1am, with an interquartile range of 29 minutes.

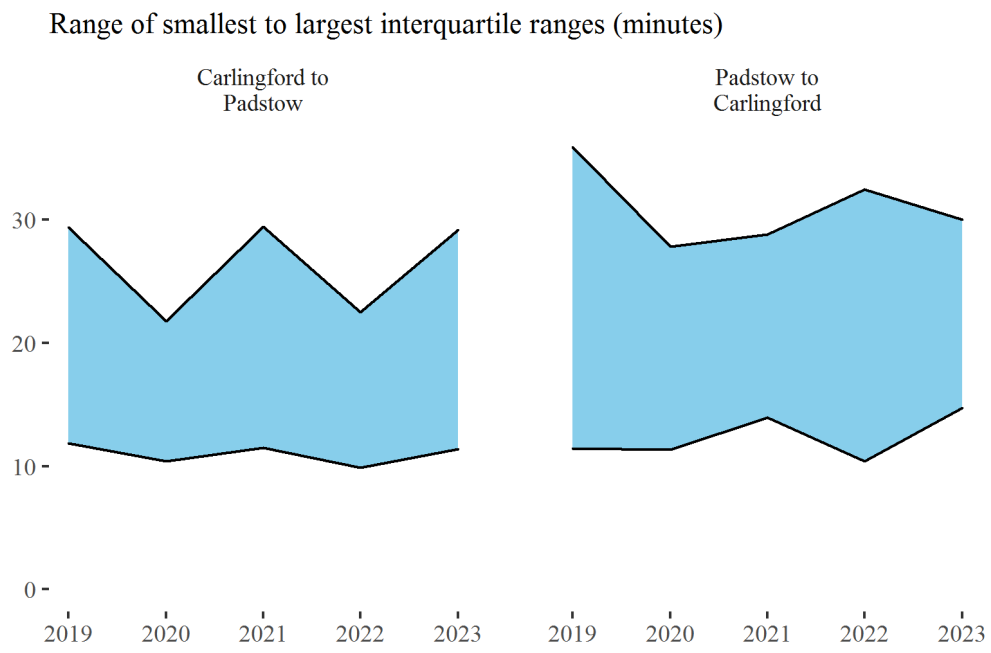
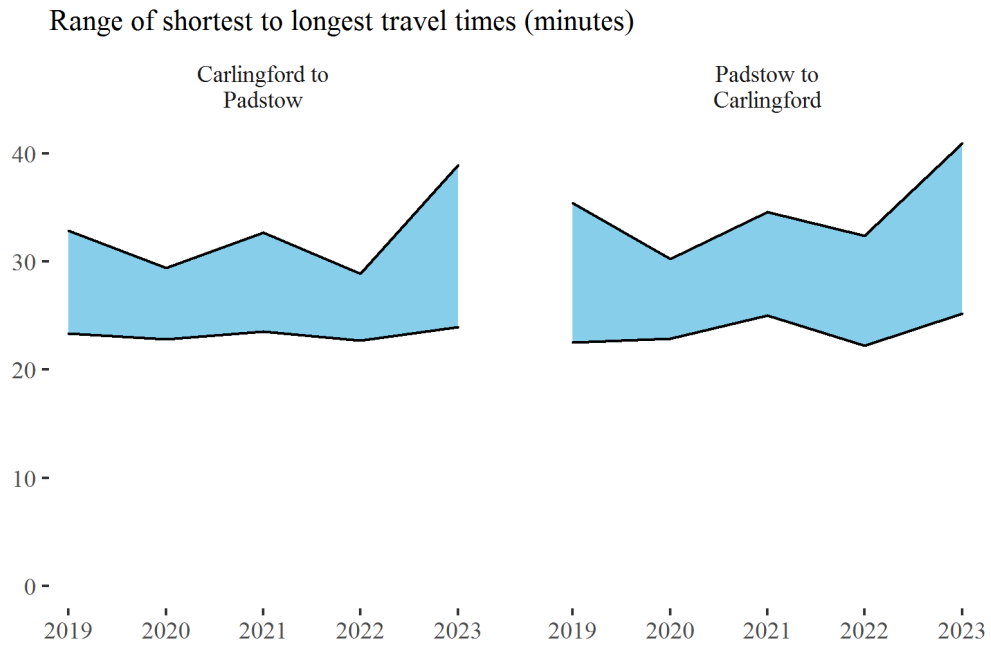
The best median travel times and lowest uncertainty for journeys from Padstow to Carlingford were at 1pm, with a median travel time of 25 minutes and an interquartile range of 15 minutes. The longest median travel times and greatest uncertainty were at 3am, with a median of 41 minutes and an interquartile range of 30 minutes.

**Figure A.32 A6 route median and interquartile range travel times**



Source: BITRE estimates.

**Figure A.33 A6 Performance over time**

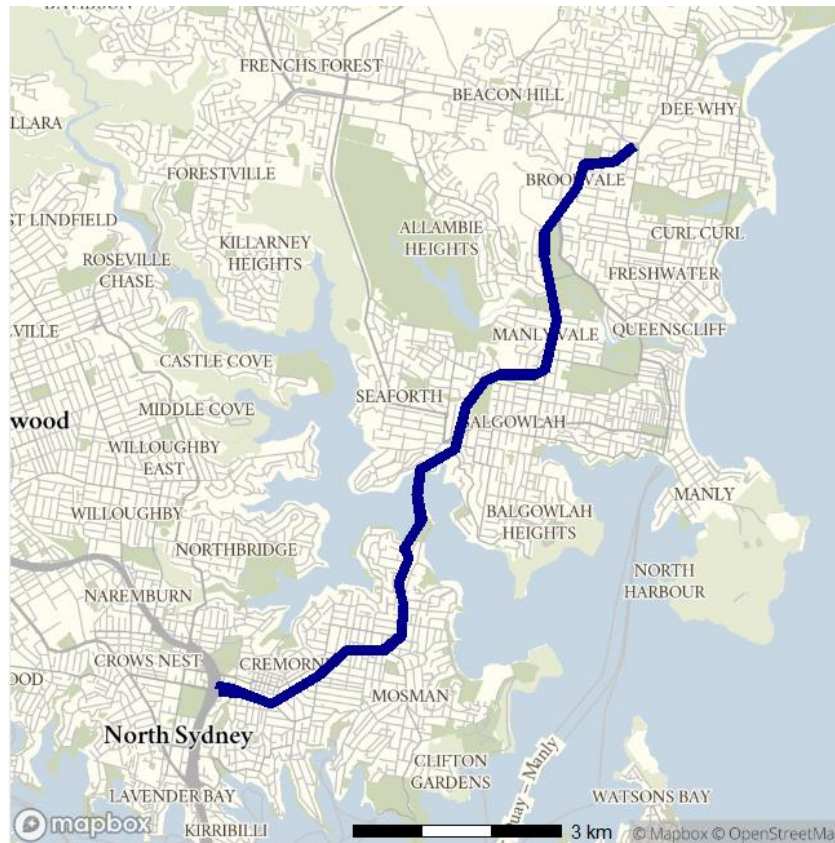


Source: BITRE estimates.

### A8 - Dee Why to M1 / M1 to Dee Why

This route connects the Northern Beaches to the Gore Hill Expressway (and the orbital network) until it meets Warringah Road (A8) at Dee Why. It services suburbs including Neutral Bay, Balgowlah and Manly and is known by names including Military Road, Spit Road, Burnt Bridge Deviation and Condamine Street.

Figure A.34 A8 route map



Source: BITRE estimates.

Table A.12 A8 route travel times and congestion measures, 2023

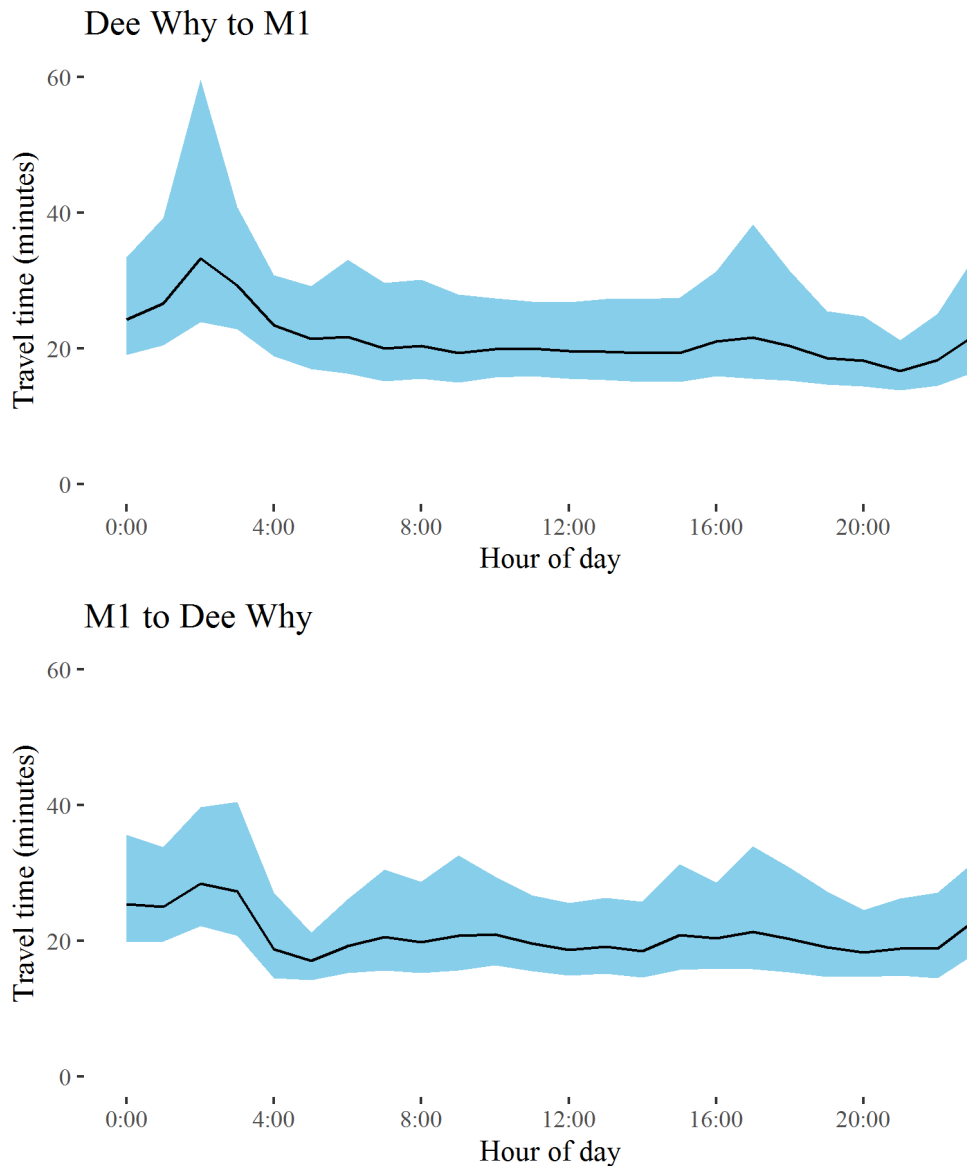
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Dee Why to M1	00:16:41	00:33:16	1.282	00:07:29	00:35:42	1.953	12.3
M1 to Dee Why	00:17:04	00:28:29	1.223	00:06:58	00:19:39	1.925	12.3

Source: BITRE estimates.

The best median travel times and least uncertainty for journeys from Dee Why to M1 were at 9pm, with a median travel time of 17 minutes and an interquartile range of 7.5 minutes. The longest median travel times and greatest uncertainty were at 2am, with a median of 33 minutes and an interquartile range of 36 minutes.

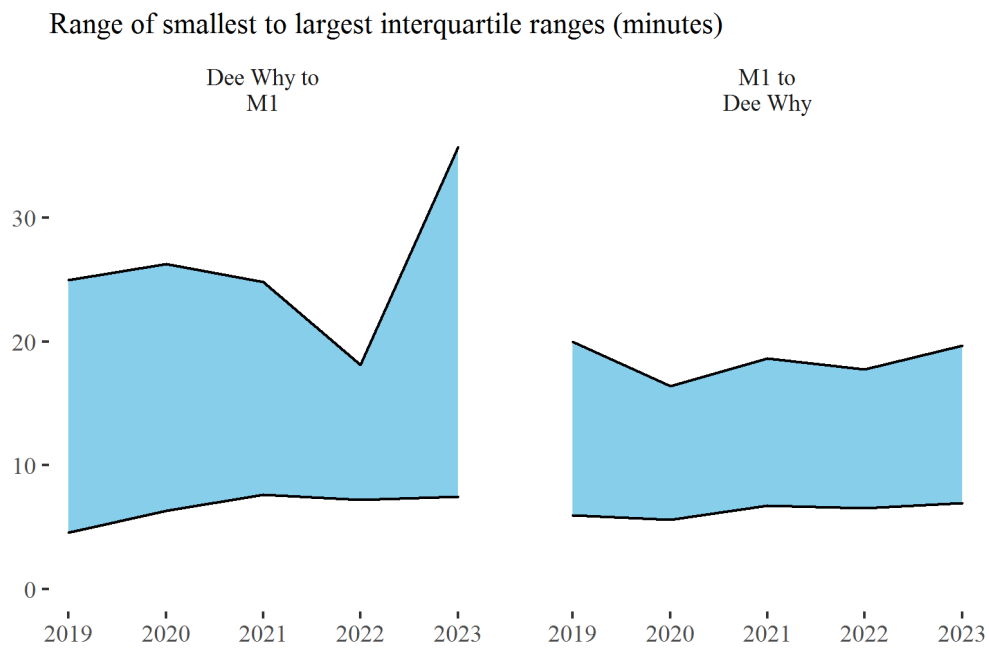
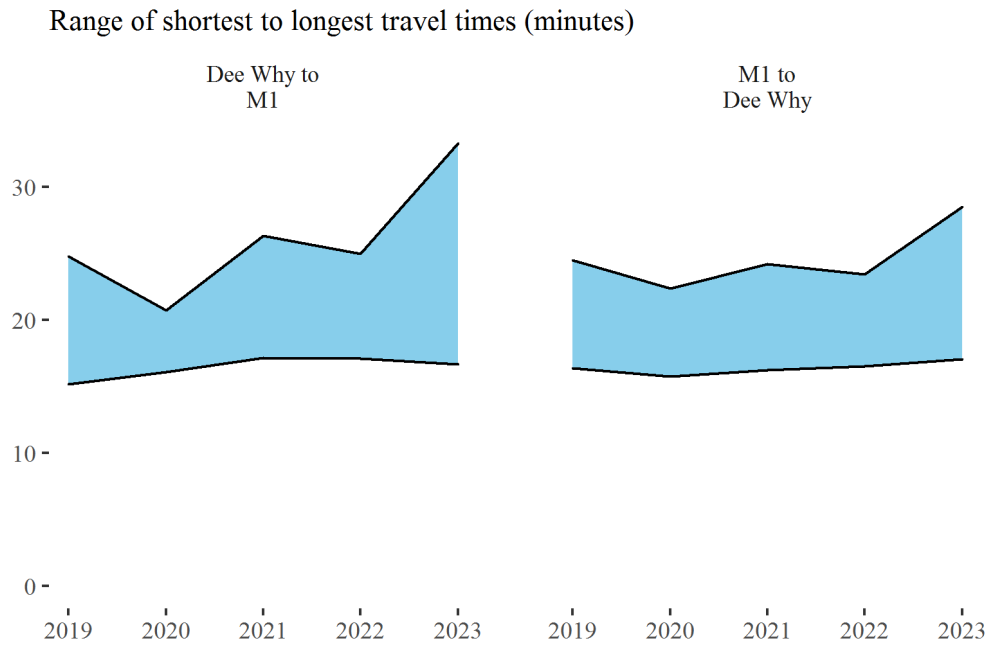
The best median travel times and least uncertainty for journeys from M1 to Dee Why were at 5am, with a median travel time of 17 minutes and an interquartile range of 7 minutes. The longest median travel time was 28 minutes at 2am and the greatest uncertainty was at 3am, with an interquartile range of 20 minutes.

**Figure A.35 A8 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.36 A8 Performance over time



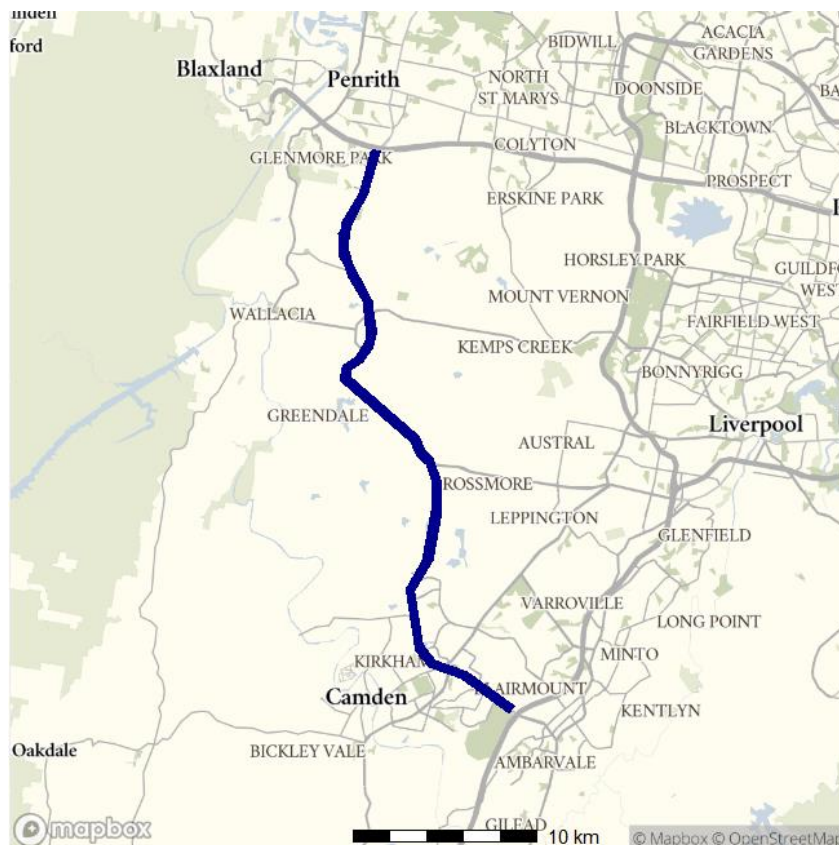
Source: BITRE estimates.



## A9 - Hume Freeway to M4 / M4 to Hume Freeway

This route skirts Western Sydney from the Hume Motorway at Mount Annan to the Great Western Highway (M4) at Glenmore Park. It services areas adjacent to the new Western Sydney Airport and is also known as the Northern Road.

**Figure A.37** A9 route map



Source: BITRE estimates.

**Table A.13** A9 route travel times and congestion measures, 2023

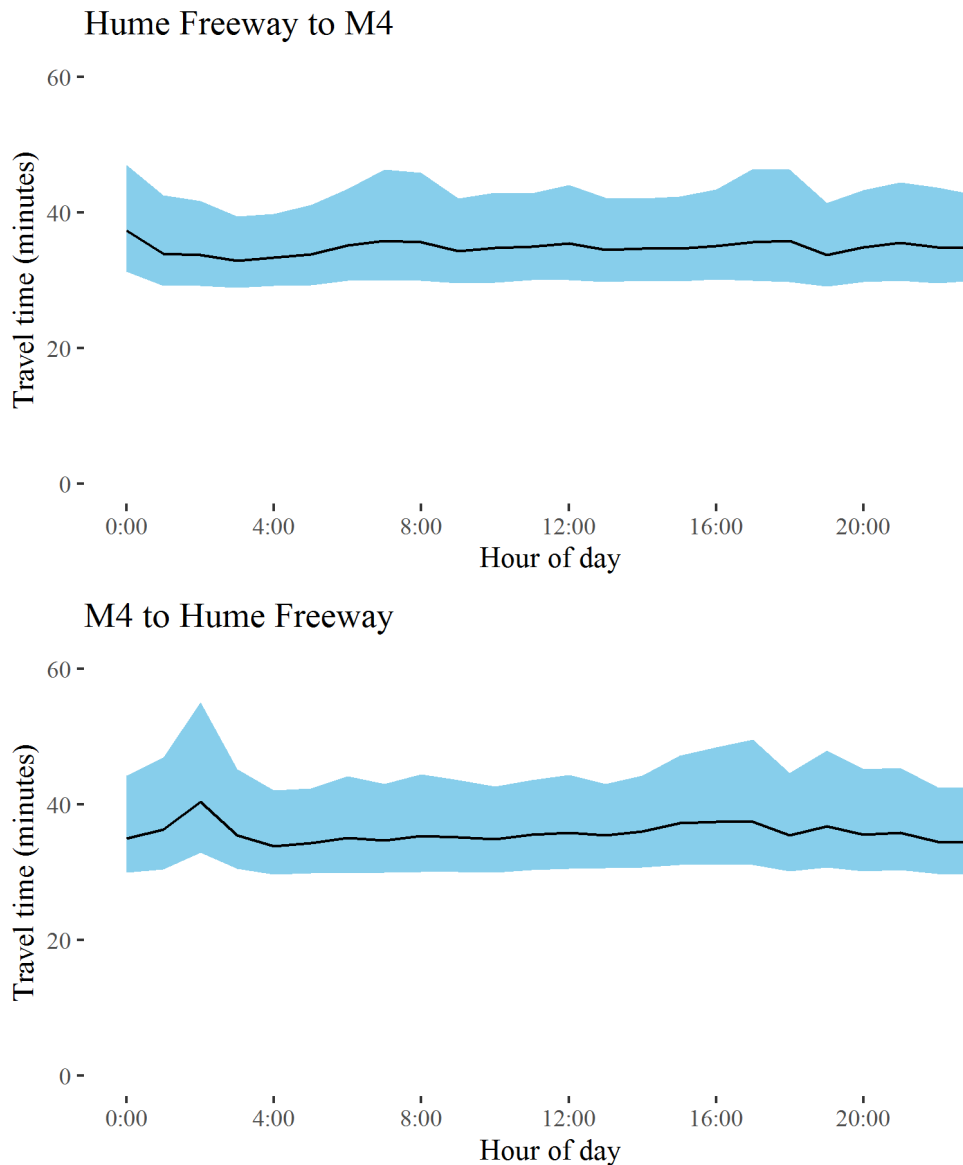
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Hume Freeway to M4	00:32:49	00:37:16	1.060	00:10:28	00:16:31	1.288	37.4
M4 to Hume Freeway	00:33:50	00:40:21	1.057	00:12:28	00:22:12	1.181	37.4

Source: BITRE estimates.

The best median travel time for journeys from the Hume Freeway to the M4 was 33 minutes at 3am and the lowest uncertainty was also at 3am with an interquartile range of 10 minutes. The longest median travel times were at midnight, with a median of 37 minutes, and the greatest uncertainty at 6pm, with an interquartile range of 17 minutes.

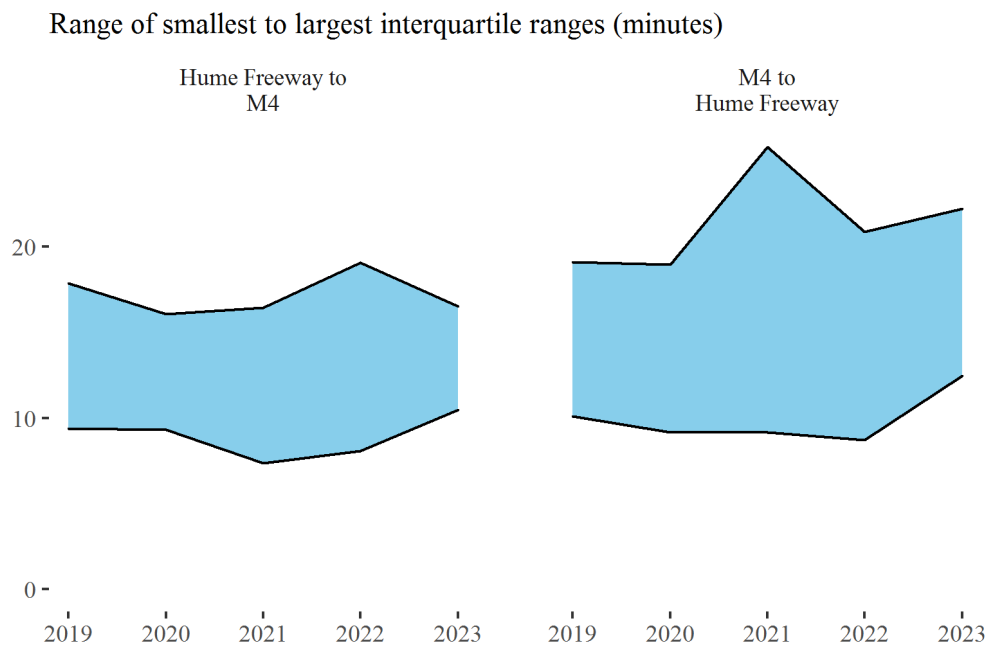
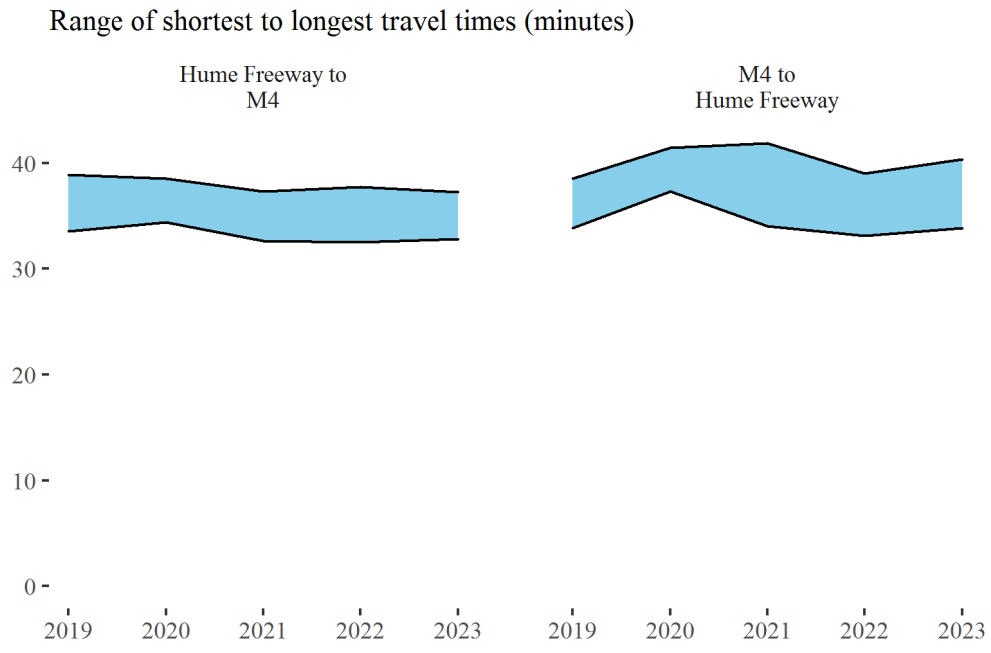
The best travel times and lowest uncertainty travelling from M4 to Hume Freeway were at 4am and 1pm, respectively, with a median travel time of 34 minutes and an interquartile range of 12 minutes. The longest median travel times and greatest uncertainty were at 2am, with a median of 40 minutes and an interquartile range of 22 minutes.

**Figure A.38 A9 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.39 A9 Performance over time

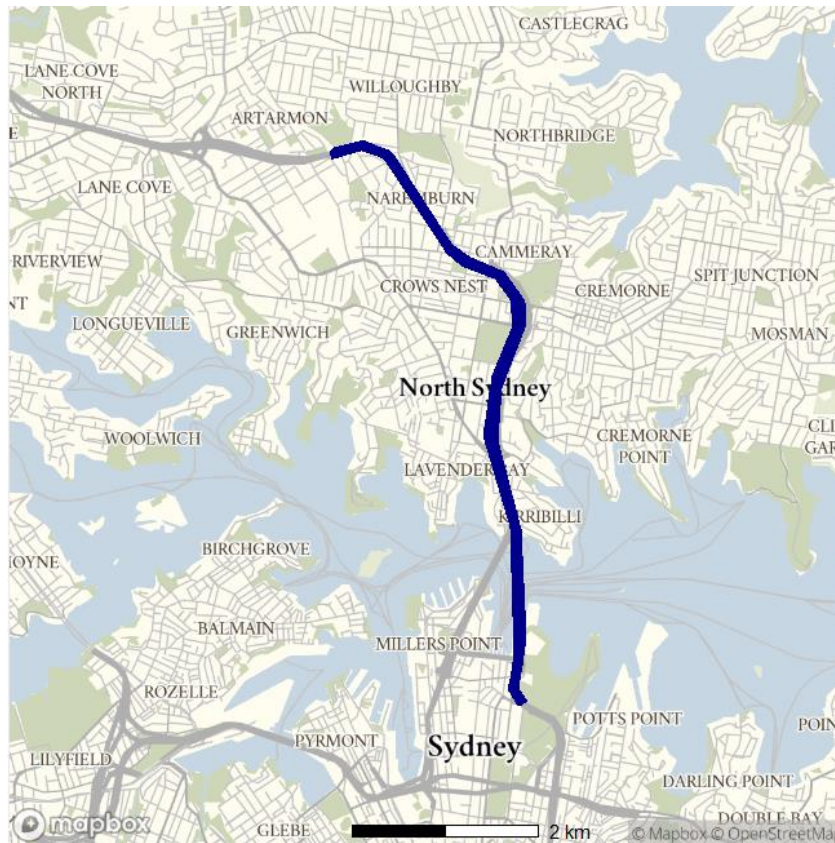


Source: BITRE estimates.

## M1 (North) - Cahill Expressway to M2 / M2 to Cahill Expressway

This route links the Sydney CBD to the Lane Cove Tunnel at the beginning of the M2 via the Sydney Harbour Tunnel, the Warringah Freeway and the Gore Hill Freeway. It is a major commuter route but somewhat less important for freight.

**Figure A.40 M1 (North) route map**



Source: BITRE estimates.

**Table A.14 M1 (North) route travel times and congestion measures, 2023**

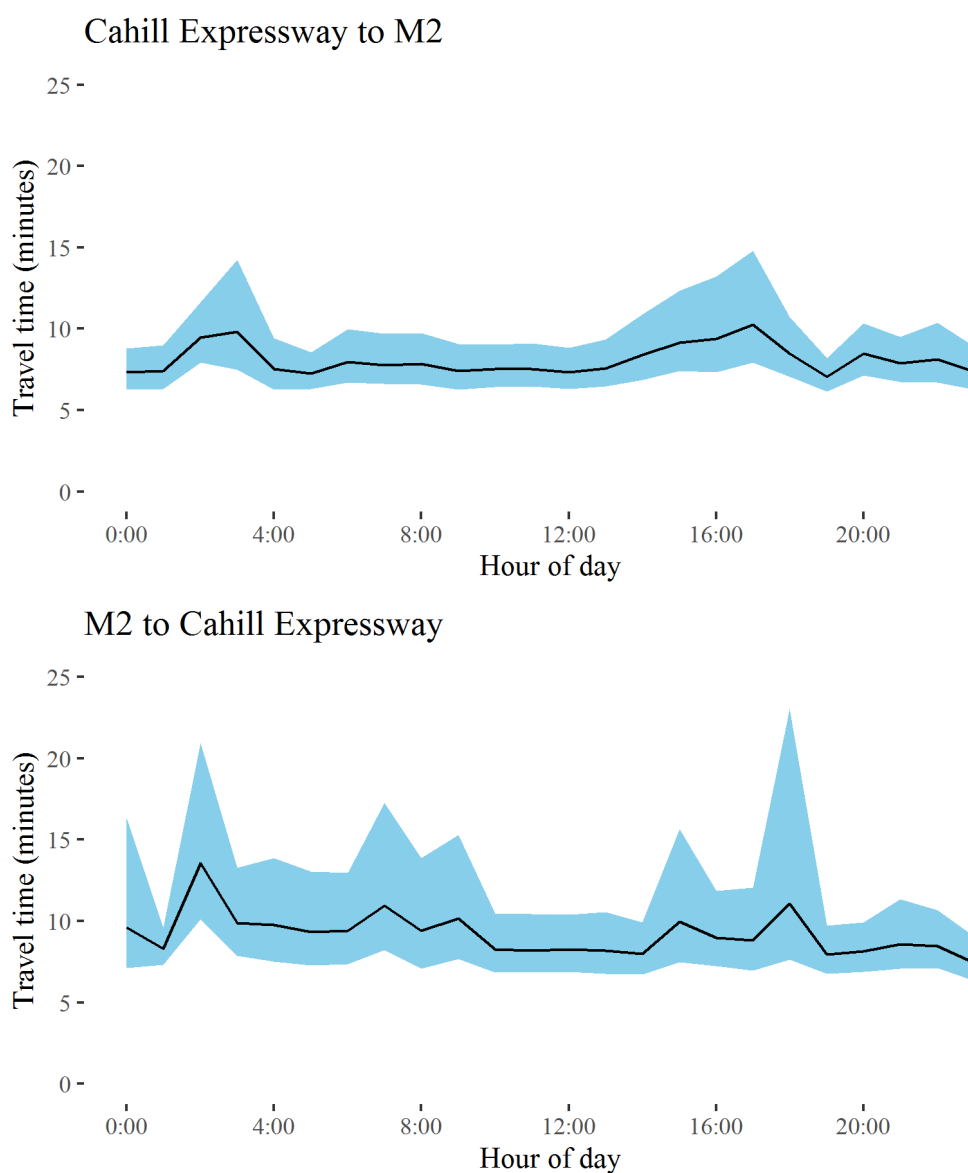
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Cahill Expressway to M2	00:07:03	00:10:14	1.148	00:02:03	00:06:54	1.705	7.3
M2 to Cahill Expressway	00:07:27	00:13:34	1.234	00:02:17	00:15:24	2.497	7.3

Source: BITRE estimates.

The best median travel time for journeys from Cahill Expressway to M2 was 7 minutes at 7pm and the lowest uncertainty was at 7pm, with an interquartile range of 2 minutes. The longest median travel times and greatest uncertainty were at 5pm, with a median of 10 minutes and an interquartile range of 7 minutes.

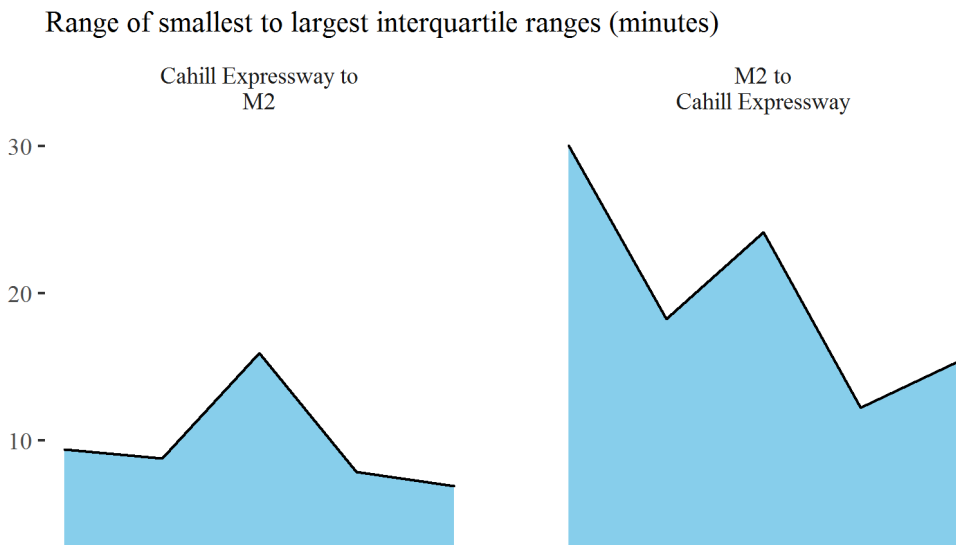
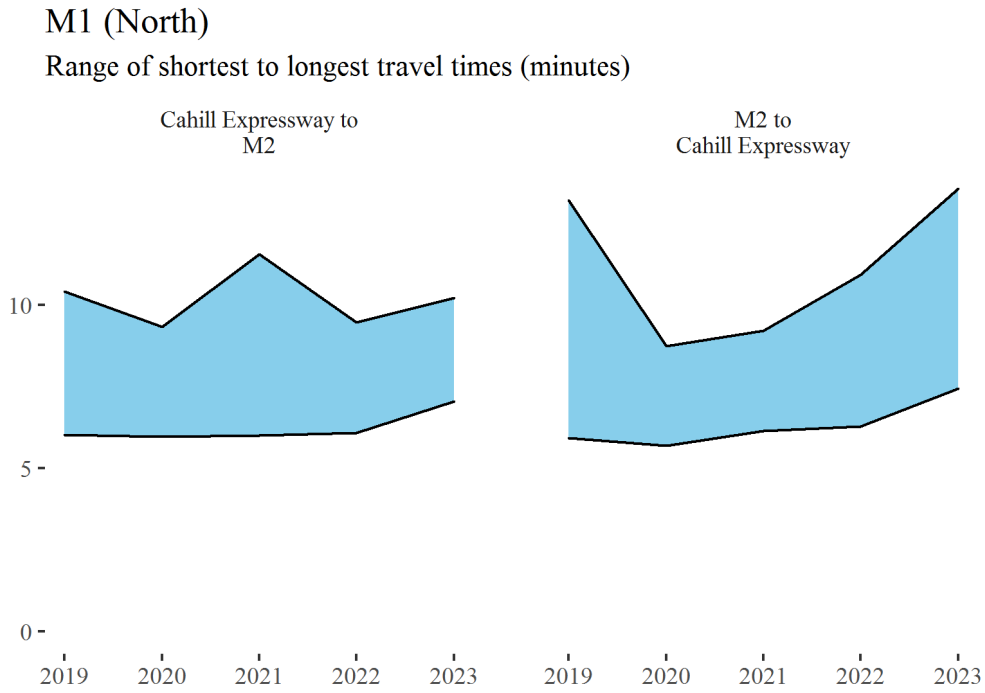
The best median travel times and least uncertainty for journeys from M2 to Cahill Expressway were at 11pm, with a median travel time of 7.5 minutes and an interquartile range of 2 minutes. The longest median travel time was 14 minutes at 2am and the greatest uncertainty was at 6pm, with an interquartile range of 15 minutes.

**Figure A.41 M1 (North) route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.42 M1 (North) Performance over time

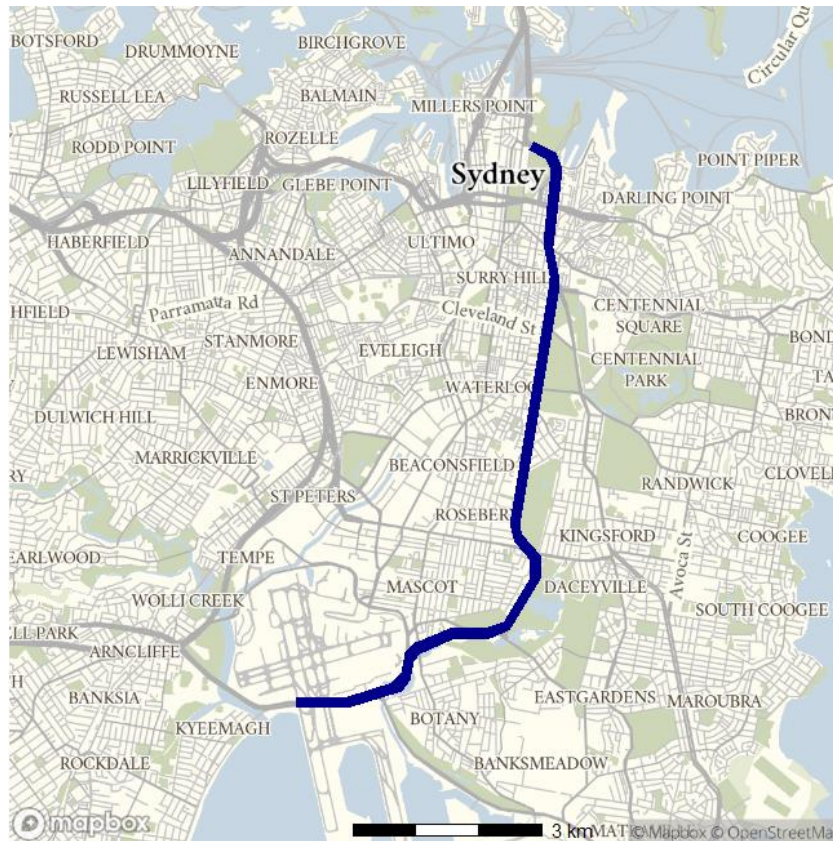


Source: BITRE estimates.

## M1 (South) - Cahill Expressway to M5 / M5 to Cahill Expressway

This route travels between just east of the Sydney CBD and the M5 near Sydney Airport via the Eastern Distributor, South Dowling Street and General Holmes Drive.

**Figure A.43 M1 (South) route map**



Source: BITRE estimates.

**Table A.15 M1 (South) route travel times and congestion measures, 2023**

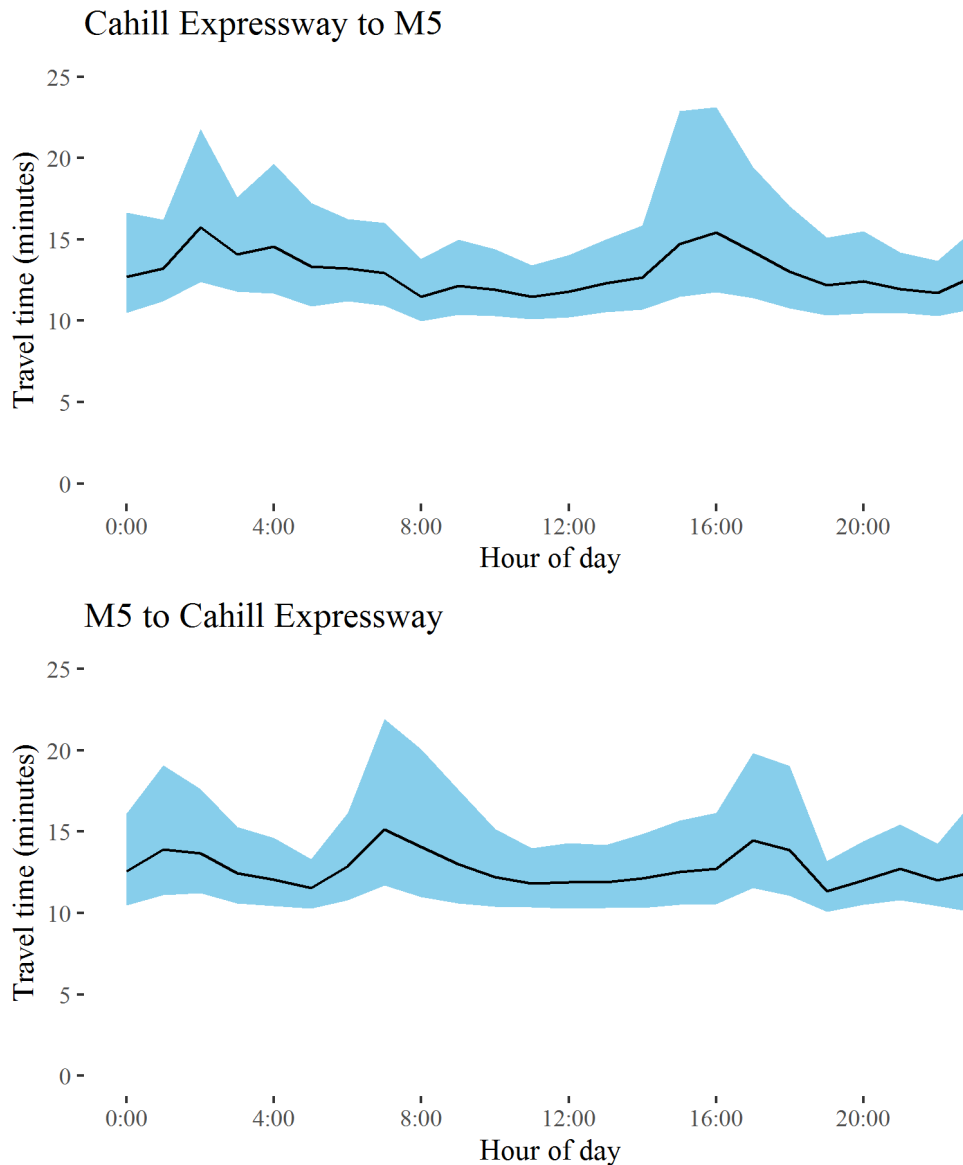
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Cahill Expressway to M5	00:11:28	00:15:45	1.133	00:03:20	00:11:25	1.744	12.1
M5 to Cahill Expressway	00:11:22	00:15:08	1.121	00:03:02	00:10:14	1.837	12.0

Source: BITRE estimates.

The best median travel times and least uncertainty for journeys from Cahill Expressway to M5 were at 8am, with a median travel time of 11 minutes and an interquartile range of 3 minutes. The longest median travel times was 16 minutes at 2am and the greatest uncertainty was at 3pm with an interquartile range of 11 minutes.

The best median travel times and lowest uncertainty for journeys from M5 to Cahill Expressway were at 7pm, with a median travel time of 11 minutes and an interquartile range of 3 minutes. The longest median travel times and greatest uncertainty were at 7am, with a median of 15 minutes and an interquartile range of 10 minutes.

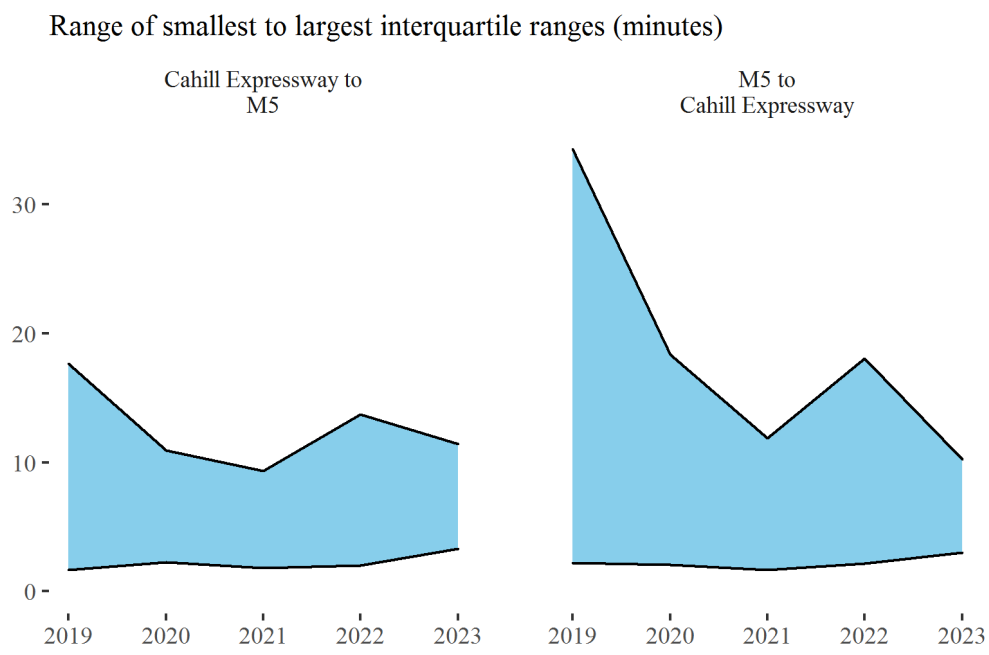
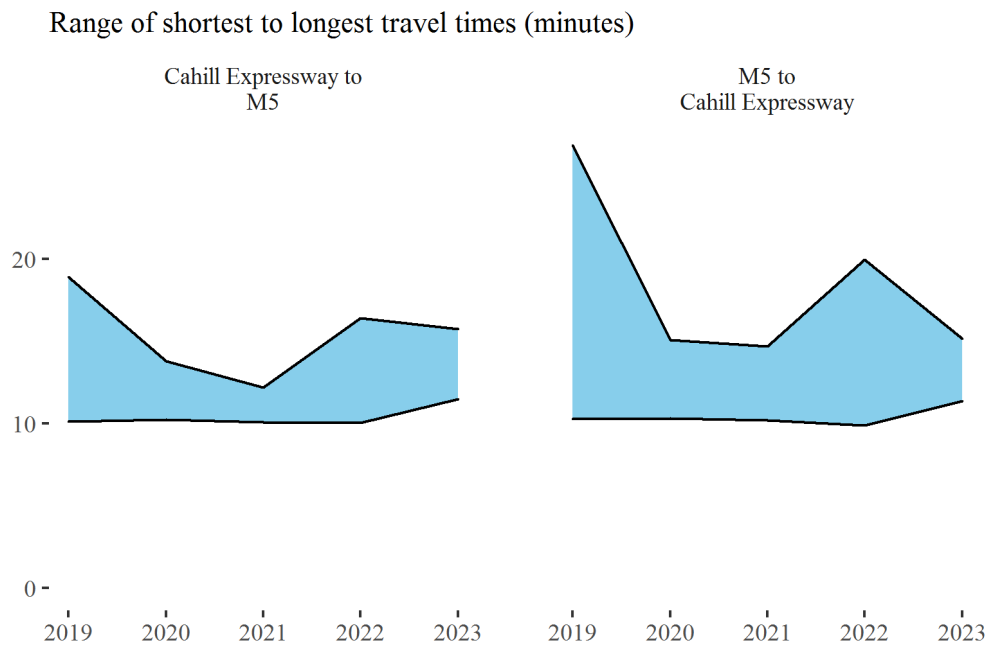
**Figure A.44 M1 (South) route median and interquartile range travel times**



Source: BITRE estimates.



**Figure A.45 M1 (South) Performance over time**

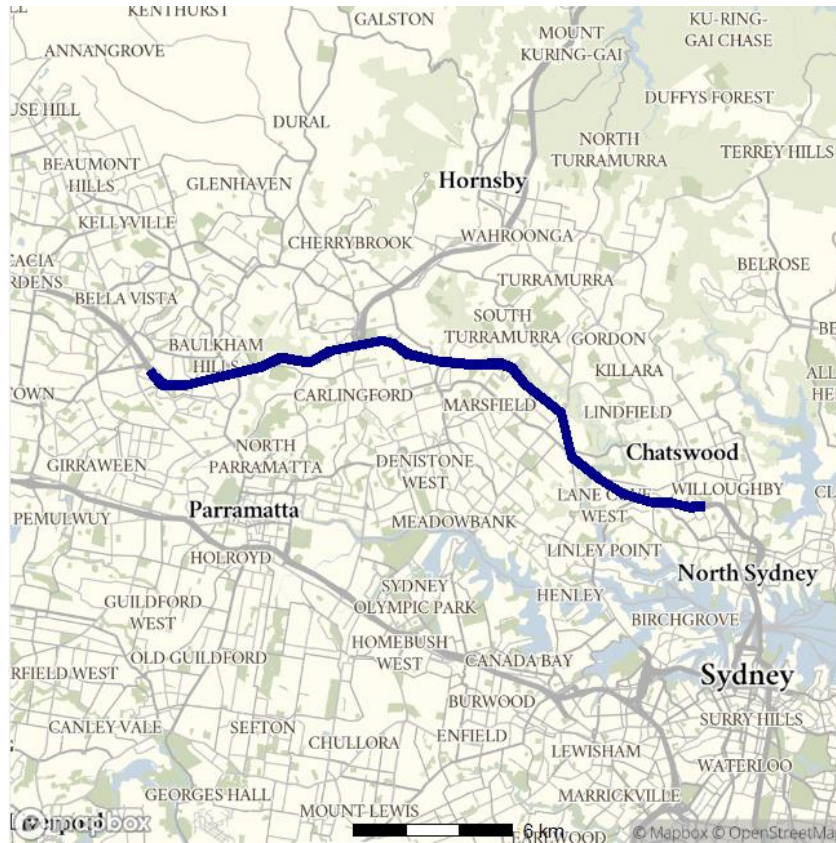


Source: BITRE estimates.

## M2 - M1 to M7 / M7 to M1

This route runs between the Hills District and Lane Cove connecting the M7 and the M1 via the M2 motorway and the Lane Cove Tunnel. It is an important route for both commuter and freight traffic.

**Figure A.46 M2 route map**



Source: BITRE estimates.

**Table A.16 M2 route travel times and congestion measures, 2023**

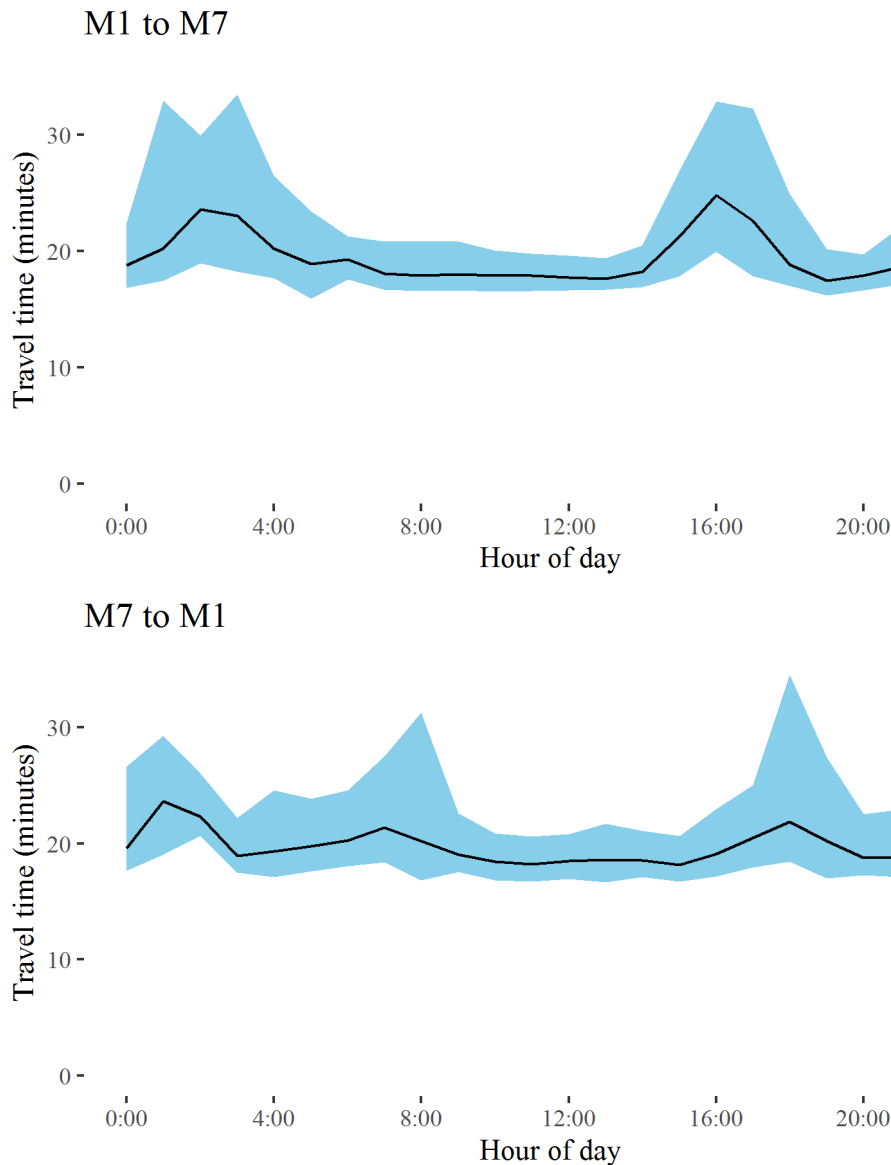
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
M1 to M7	00:17:26	00:24:50	1.119	00:02:42	00:15:29	2.543	24.5
M7 to M1	00:18:10	00:23:39	1.090	00:03:51	00:16:05	1.836	24.3

Source: BITRE estimates.

The best travel times and lowest uncertainty travelling from the M1 to the M7 were at 7pm and 1pm, respectively, with a median travel time of 17 minutes and an interquartile range of 3 minutes. The longest median travel time was 25 minutes at 4pm and the greatest uncertainty was at 1am with an interquartile range of 15 minutes.

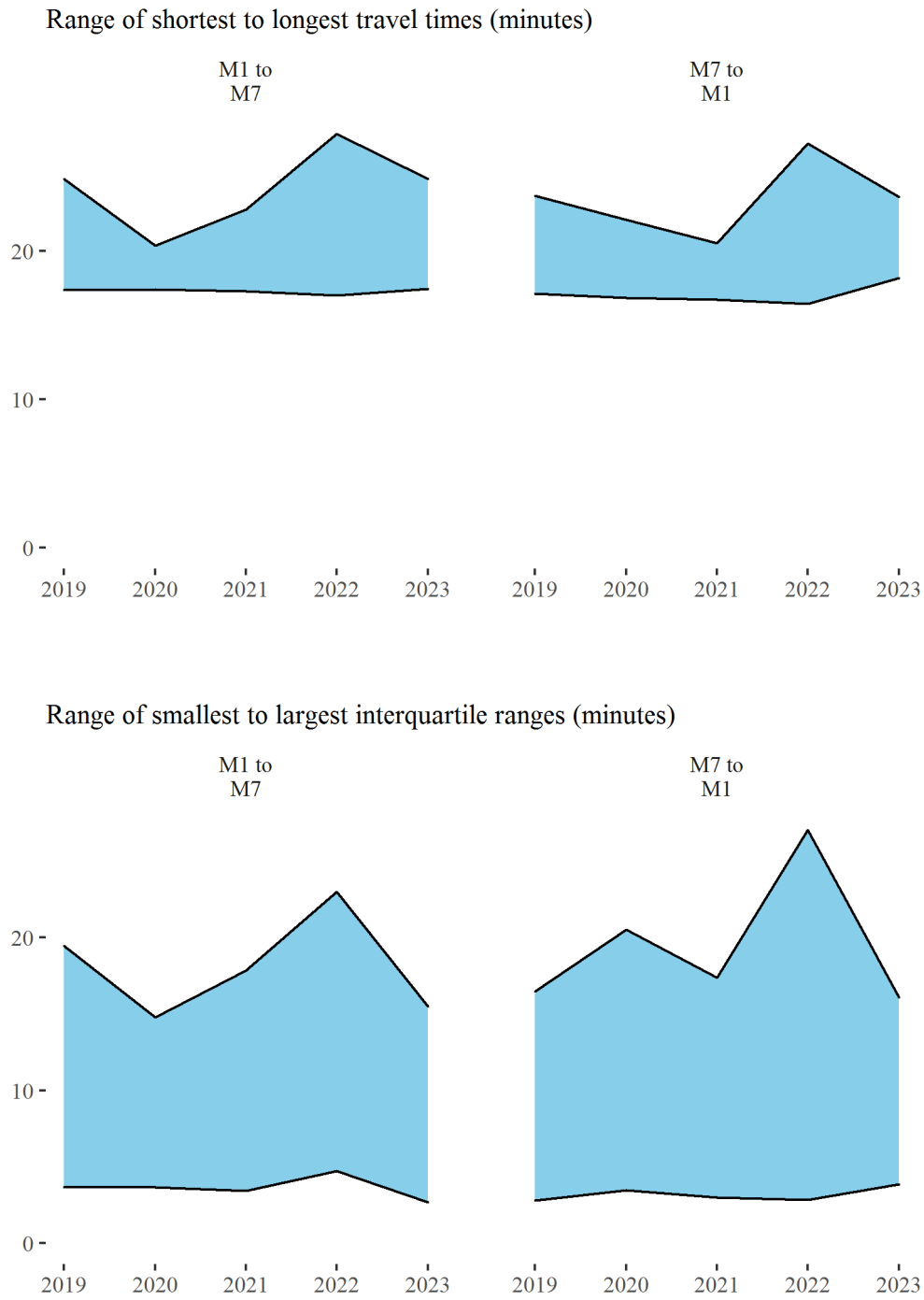
The best travel times and lowest uncertainty travelling from M7 to M1 were at 3pm and 11am, respectively, with a median travel time of 18 minutes and an interquartile range of 4 minutes. The longest median travel times was at 1am with a median of 24 minutes and the greatest uncertainty at 6pm with an interquartile range of 16 minutes.

**Figure A.47 M2 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.48 M2 Performance over time

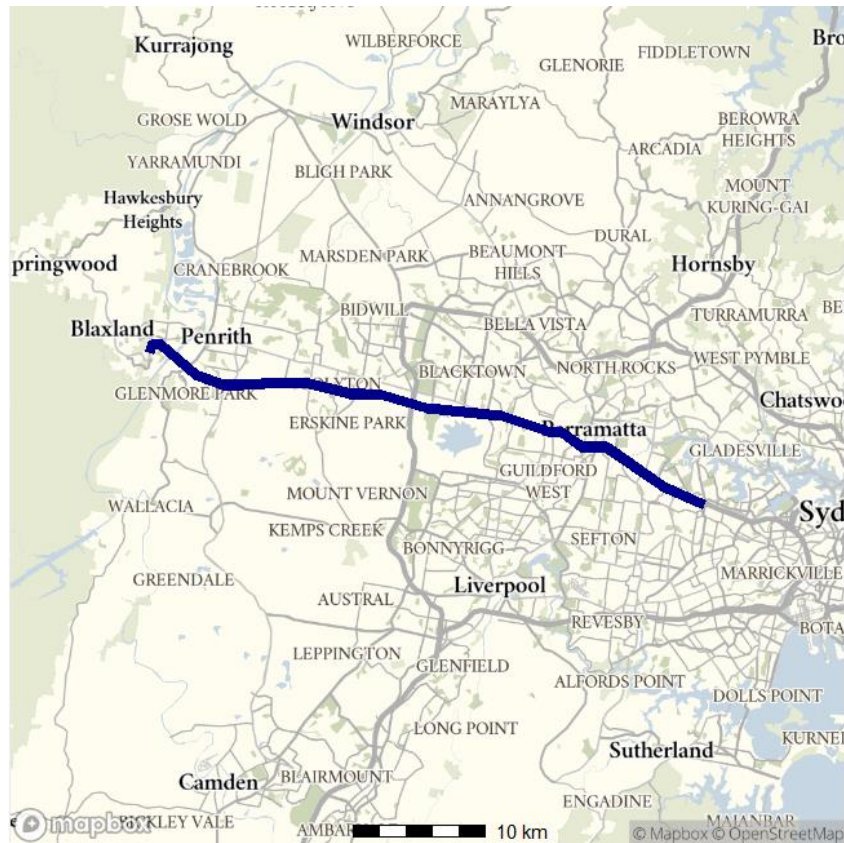


Source: BITRE estimates.

## M4 - Glenbrook to Strathfield / Strathfield to Glenbrook

This route connects the A32 at Glenbrook with the former terminus of the M4 at Strathfield. It intersects with several north–south routes presented in this report, including the M7, A28 and A6. It does not incorporate Parramatta Road or the City West Link, nor the M4 East tunnel that opened in July 2020.

Figure A.49 M4 route map



Source: BITRE estimates.

Table A.17 M4 route travel times and congestion measures, 2023

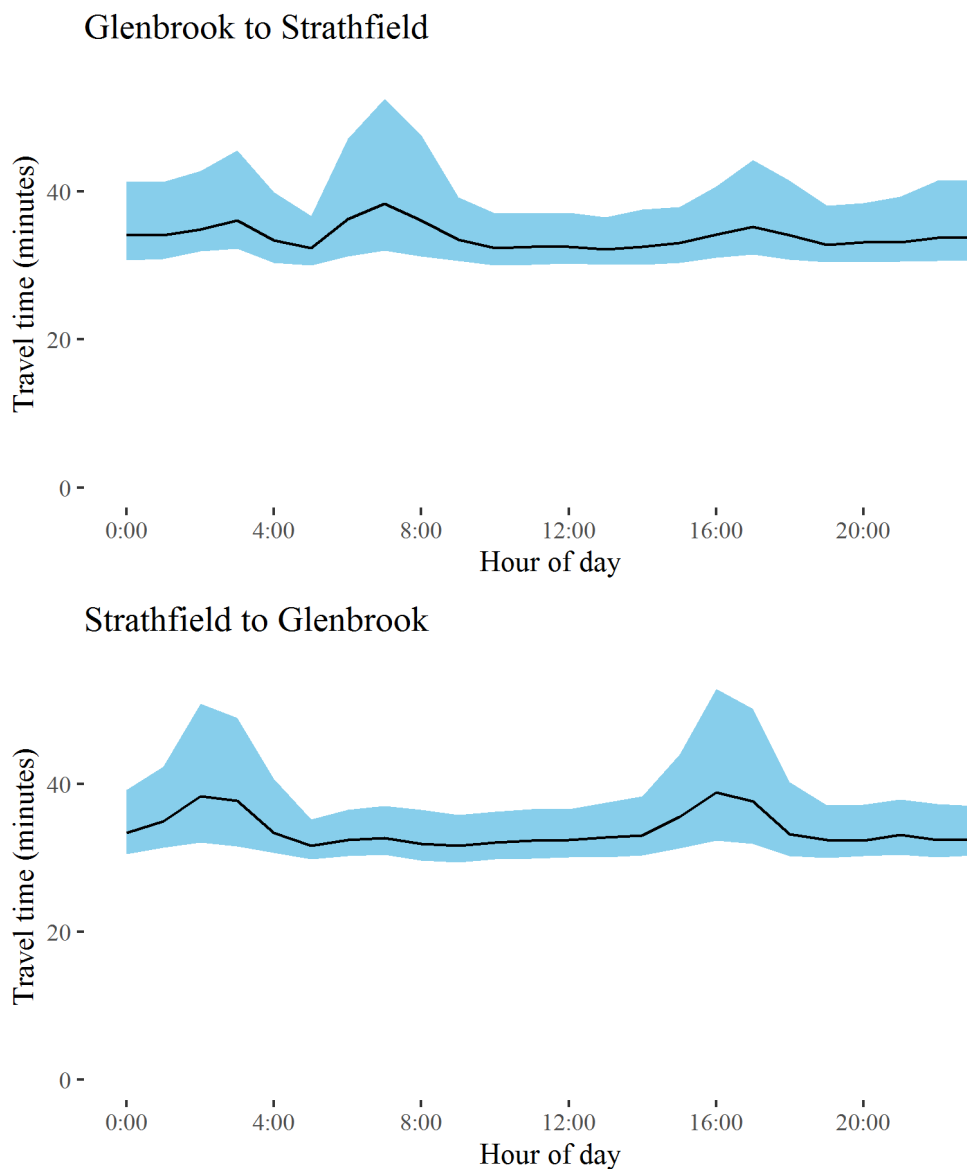
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Glenbrook to Strathfield	00:32:14	00:38:20	1.053	00:06:30	00:20:32	1.568	45.8
Strathfield to Glenbrook	00:31:37	00:38:52	1.066	00:05:24	00:20:30	1.769	45.8

Source: BITRE estimates.

The best median travel times and lowest uncertainty for journeys from Glenbrook to Strathfield were at 1pm with a median travel time of 32 minutes and an interquartile range of 6.5 minutes. The longest median travel times and greatest uncertainty was at 7am with a median of 38 minutes and an interquartile range of 21 minutes.

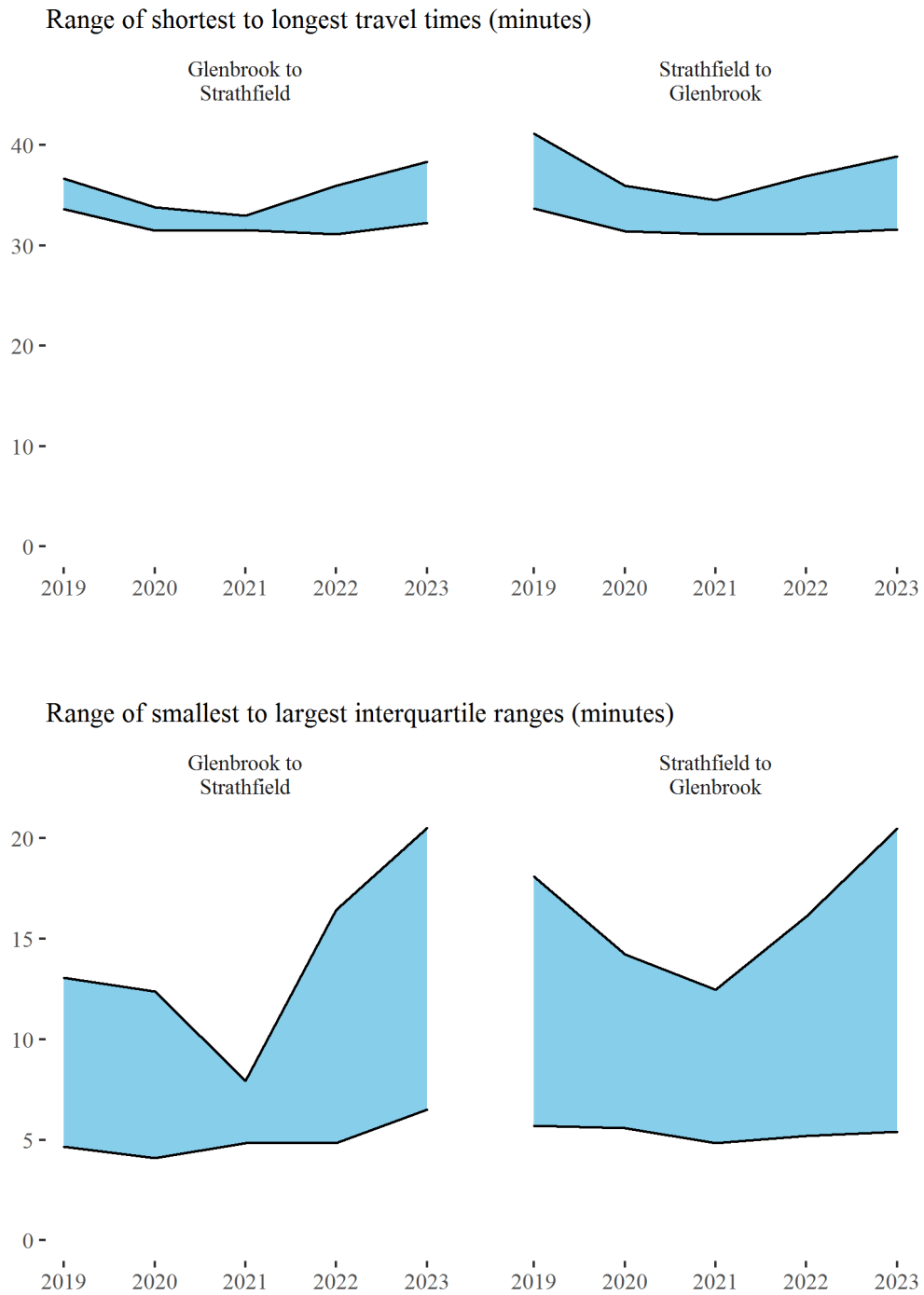
The best median travel times and least uncertainty for journeys from Strathfield to Glenbrook were at 5am with a median travel time of 32 minutes and an interquartile range of 5 minutes. The longest median travel times and greatest uncertainty were at 4pm with a median of 39 minutes and an interquartile range of 20 minutes.

**Figure A.50 M4 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.51 M4 Performance over time

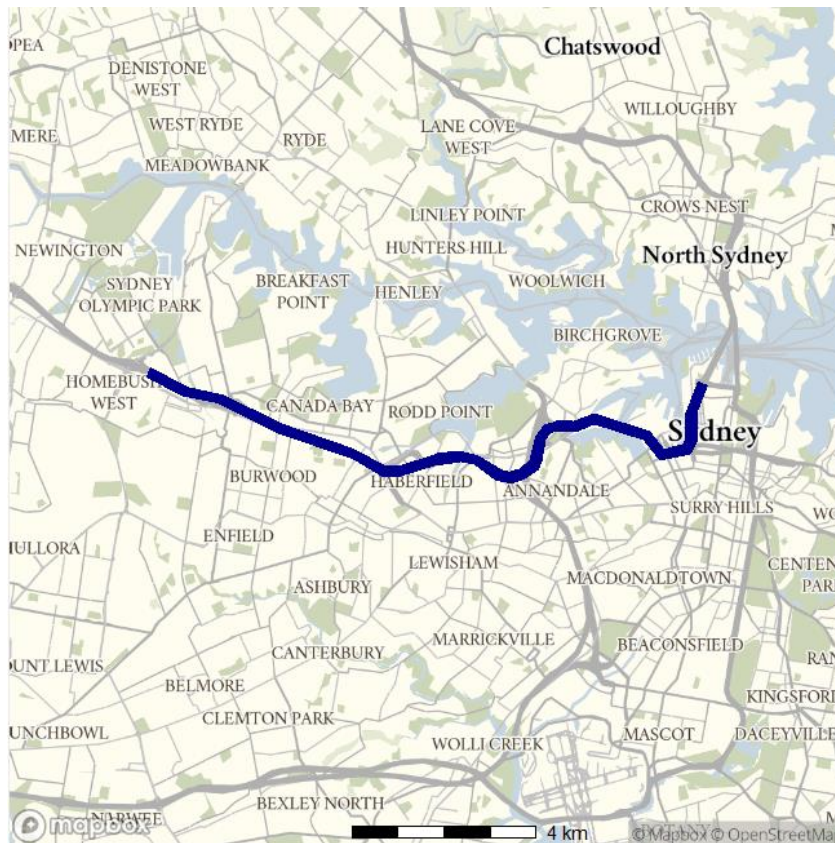


Source: BITRE estimates.

## M4 (East)-A4 - Cahill Expressway to Strathfield / Strathfield to Cahill Expressway

This route follows the M4 tunnel from the former terminus of the M4 Motorway at Strathfield to Ashfield and then the A4 (also known as the City West Link) to the Cahill Expressway near the Sydney CBD. It extends the M4 route with roads that were not built in 2019 and has been included as a separate route so data remains consistent.

**Figure A.52 M4 (East)-A4 route map**



Source: BITRE estimates.

**Table A.18 M4 (East)-A4 route travel times and congestion measures, 2023**

Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Cahill Expressway to Strathfield	00:10:16	00:14:58	1.213	00:01:08	00:07:15	2.557	14.9
Strathfield to Cahill Expressway	00:12:15	00:18:38	1.228	00:05:28	00:14:48	1.997	14.8

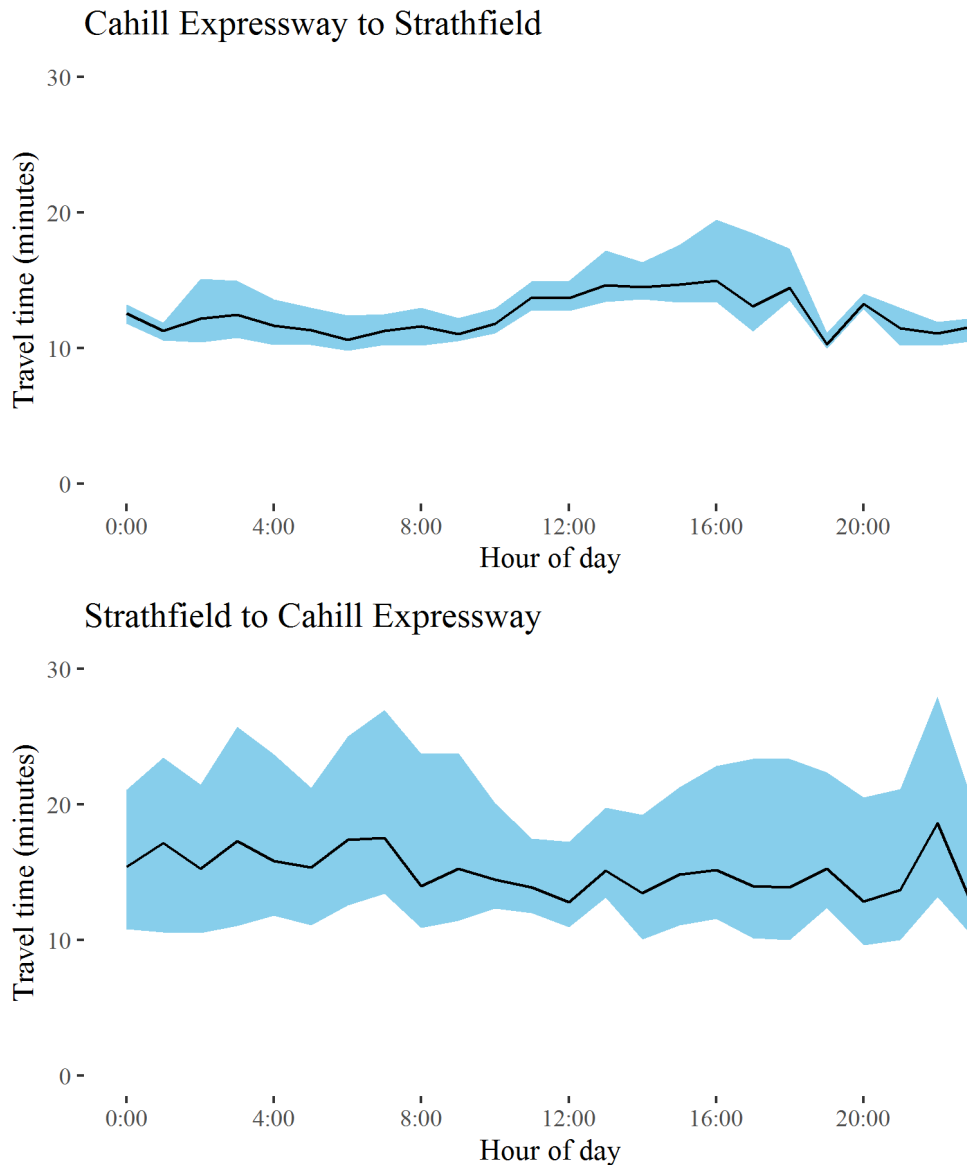
Source: BITRE estimates.



The best travel times and lowest uncertainty travelling from Cahill Expressway to Strathfield were at 7pm and 8pm, respectively, with a median travel time of 10 minutes and an interquartile range of 68 seconds. The longest median travel time was 15 minutes at 4pm and the greatest uncertainty was at 5pm with an interquartile range of 7 minutes.

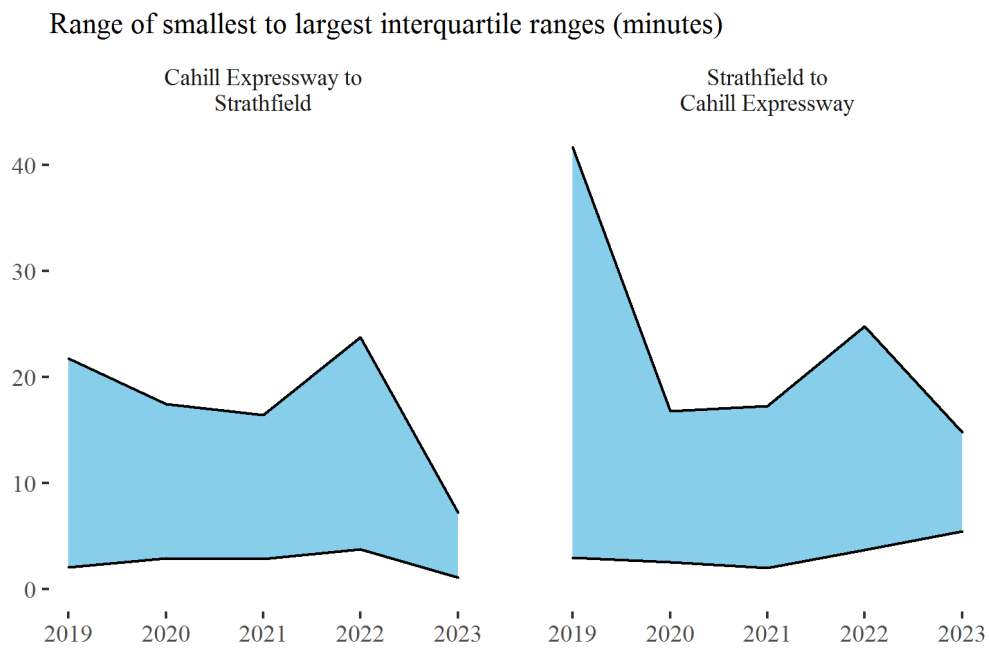
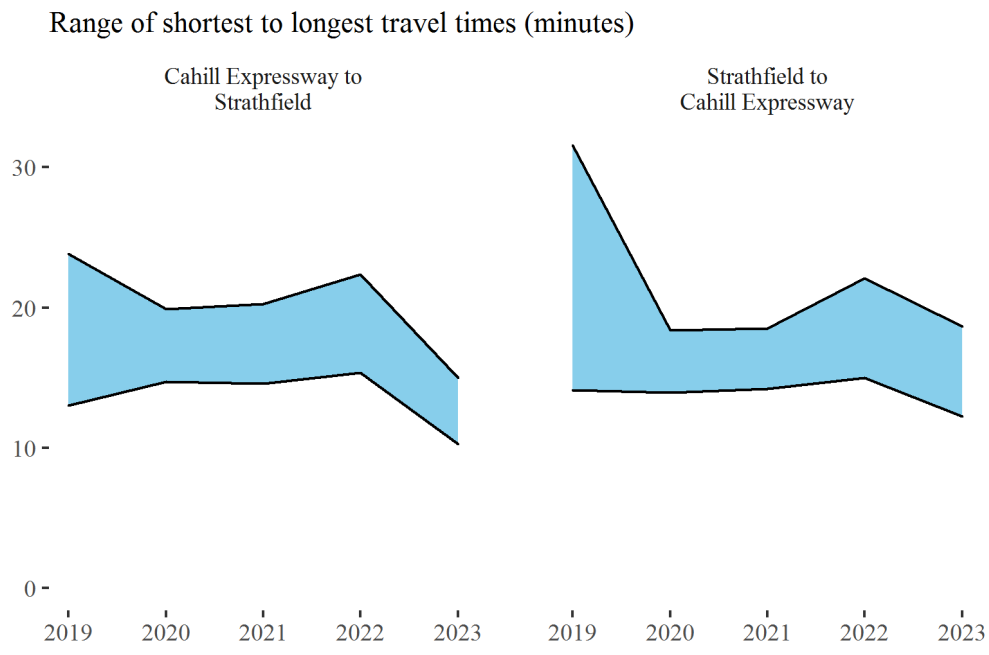
The best travel times and lowest uncertainty travelling from Strathfield to Cahill Expressway were at 11pm and 11am, respectively, with a median travel time of 12 minutes and an interquartile range of 5.5 minutes. The longest median travel times and greatest uncertainty were at 10pm, with a median of 19 minutes and an interquartile range of 15 minutes.

**Figure A.53 M4 (East)-A4 route median and interquartile range travel times**



Source: BITRE estimates.

**Figure A.54 M4 (East)-A4 Performance over time**

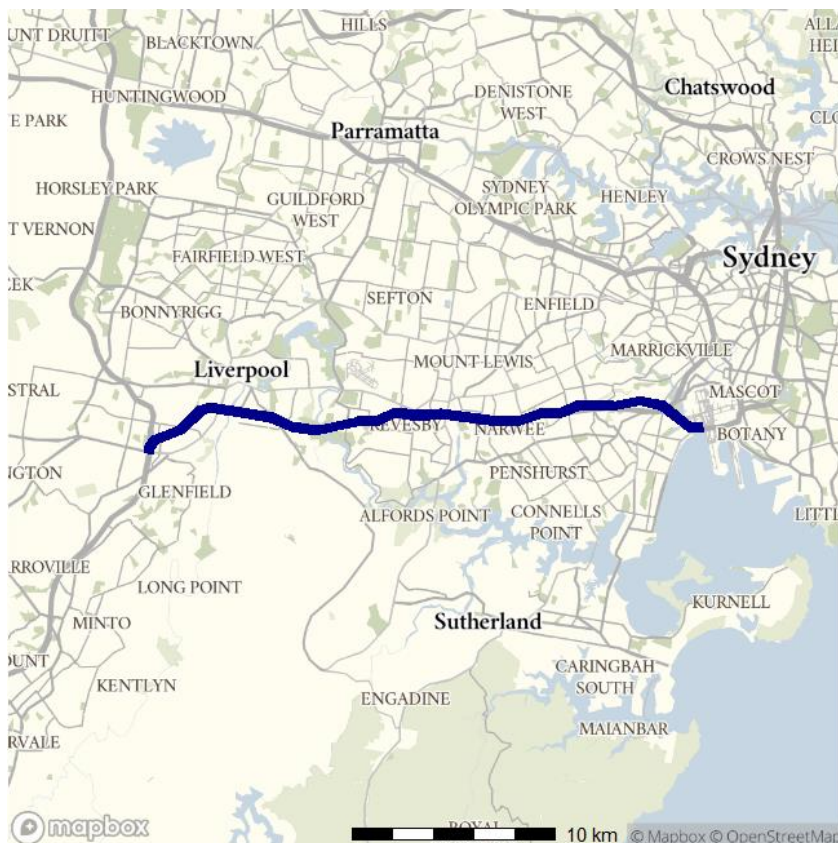


Source: BITRE estimates.

### M5 - Hume Motorway to M1 / M1 to Hume Motorway

This route follows the M5 Motorway between the Hume Motorway at Casula and the M1 at General Holmes Drive. It is a major commuter route and also services freight traffic in areas around the Airport and Port Botany.

Figure A.55 M5 route map



Source: BITRE estimates.

Table A.19 M5 route travel times and congestion measures, 2023

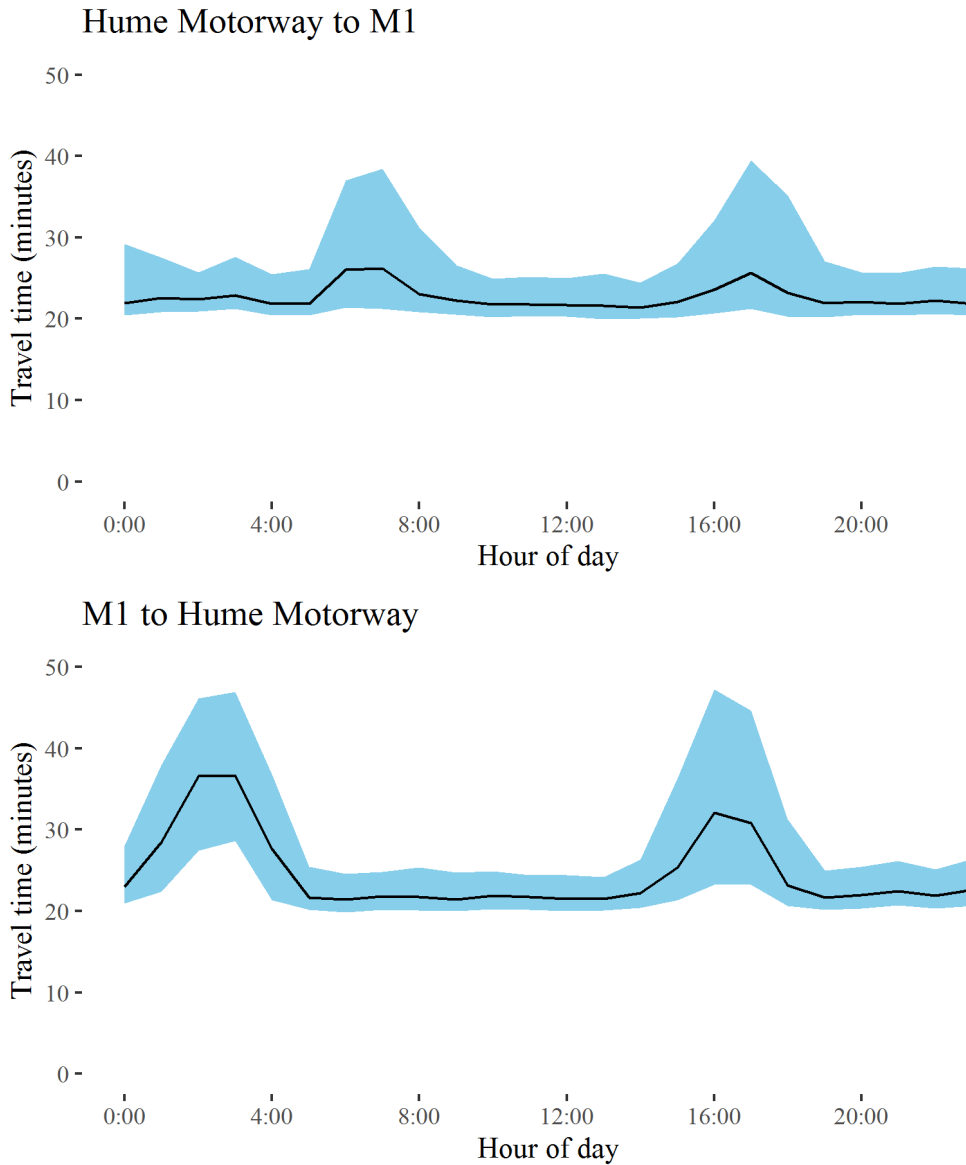
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Hume Motorway to M1	00:21:24	00:26:14	1.058	00:04:28	00:18:15	1.783	29.3
M1 to Hume Motorway	00:21:26	00:36:42	1.150	00:04:07	00:24:01	2.226	29.3

Source: BITRE estimates.

The best median travel time for journeys from the Hume Motorway to the M1 was 21 minutes at 2pm and the lowest uncertainty was at 2pm with an interquartile range of 4.5 minutes. The longest median travel time was at 7am with a median of 26 minutes and the greatest uncertainty at 5pm with an interquartile range of 18 minutes.

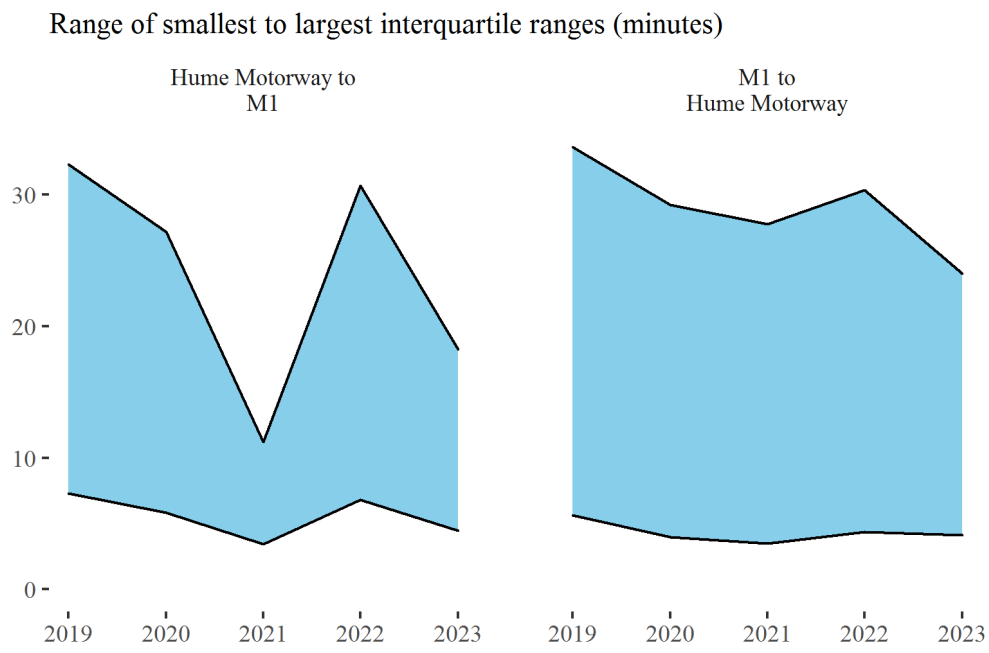
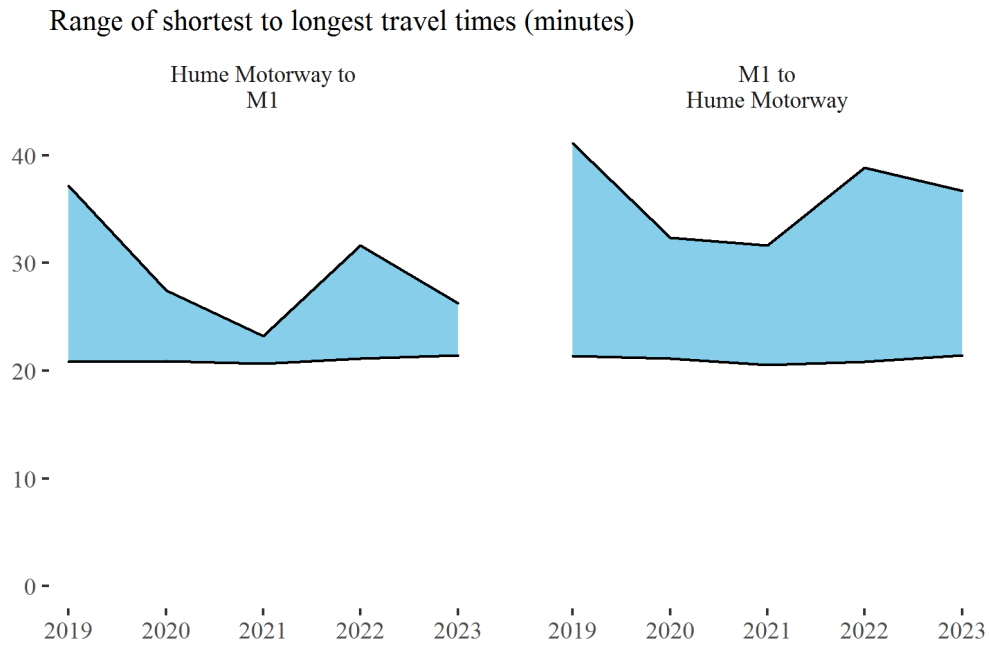
The best travel times and lowest uncertainty travelling from the M1 to the Hume Motorway were at 9am and 1pm, respectively, with a median travel time of 21 minutes and an interquartile range of 4 minutes. The longest median travel time was 37 minutes at 3am and the greatest uncertainty was at 4pm with an interquartile range of 24 minutes.

**Figure A.56 M5 route median and interquartile range travel times**



Source: BITRE estimates.

**Figure A.57 M5 Performance over time**

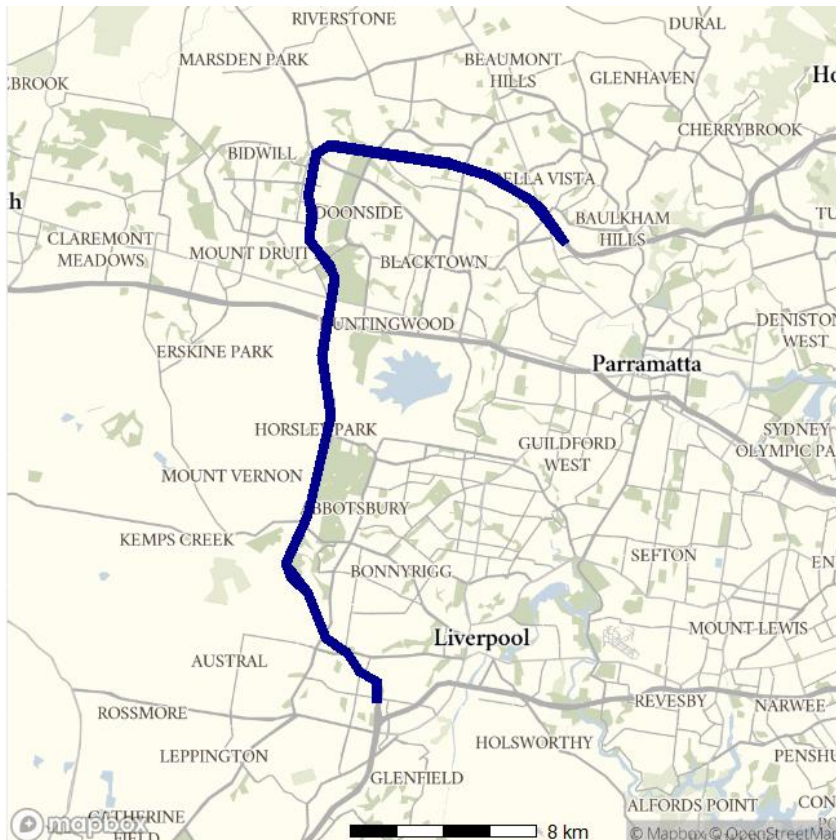


Source: BITRE estimates.

### M7 - M2 to M5 / M5 to M2

This route follows the M7 Motorway between its confluence with the M2 in the Hills District and the Hume Motorway at Casula, skirting much of Western Sydney and crossing the M4 Motorway. It is a major route for intercity freight including trips that do not start or end in Sydney.

**Figure A.58 M7 route map**



Source: BITRE estimates.

**Table A.20 M7 route travel times and congestion measures, 2023**

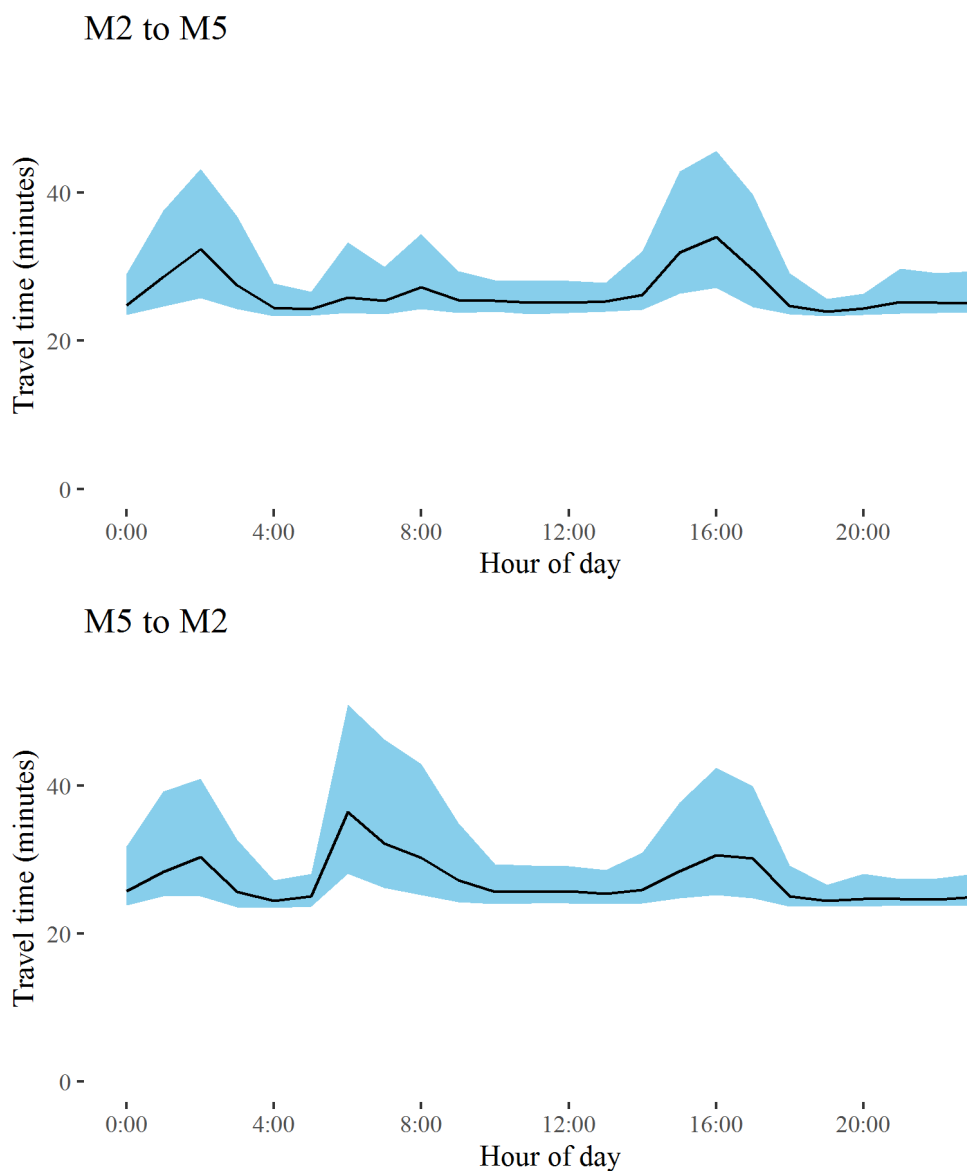
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
M2 to M5	00:23:59	00:34:00	1.108	00:02:21	00:18:29	3.382	38.4
M5 to M2	00:24:28	00:36:27	1.110	00:03:01	00:22:54	3.090	38.5

Source: BITRE estimates.

The best median travel times and least uncertainty for journeys from the M2 to the M5 were at 7pm with a median travel time of 24 minutes and an interquartile range of 2 minutes. The longest median travel times and greatest uncertainty were at 4pm with a median of 34 minutes and an interquartile range of 18 minutes.

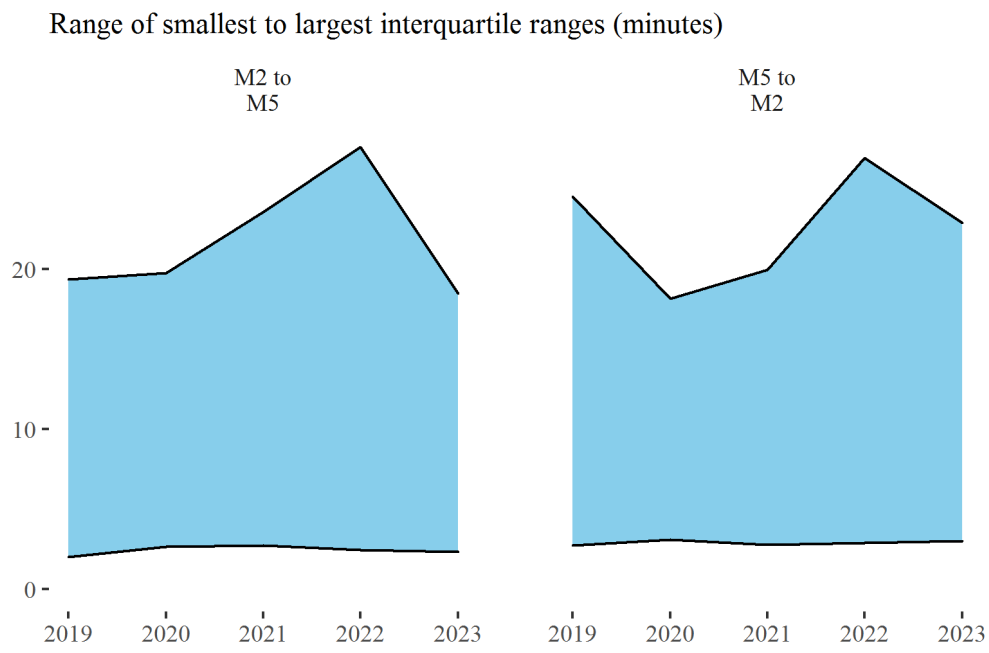
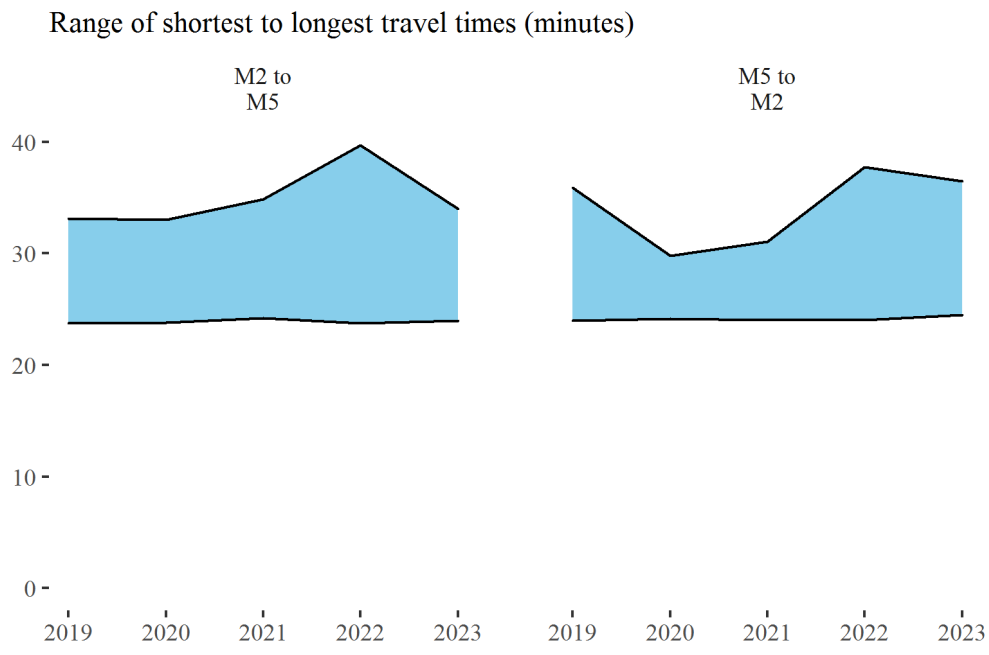
The best median travel times and lowest uncertainty for journeys from the M5 to the M2 were at 7pm with a median travel time of 24 minutes and an interquartile range of 3 minutes. The longest median travel times and greatest uncertainty were at 6am with a median of 36 minutes and an interquartile range of 23 minutes.

**Figure A.59 M7 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.60 M7 Performance over time



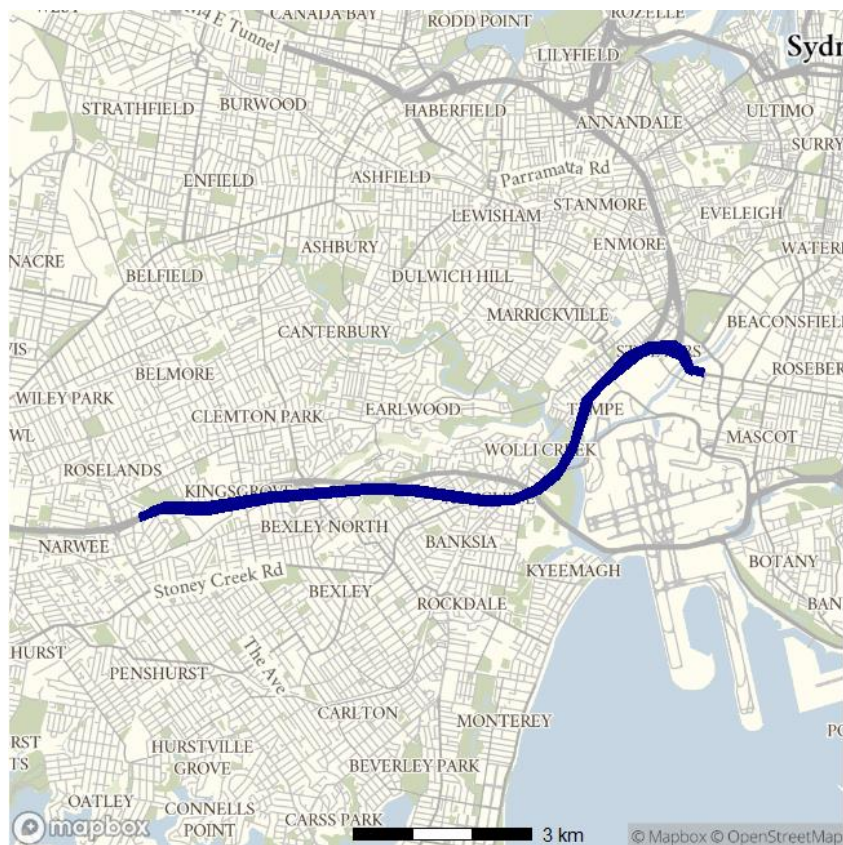
Source: BITRE estimates.



## M8 - M5 to Mascot / Mascot to M5

This route follows the recently built M8 tunnel connecting the M5 with Inner Southern Sydney. It services light industrial areas in the vicinity of Port Botany and Sydney International Airport.

**Figure A.61 M8 route map**



Source: BITRE estimates.

**Table A.21 M8 route travel times and congestion measures, 2023**

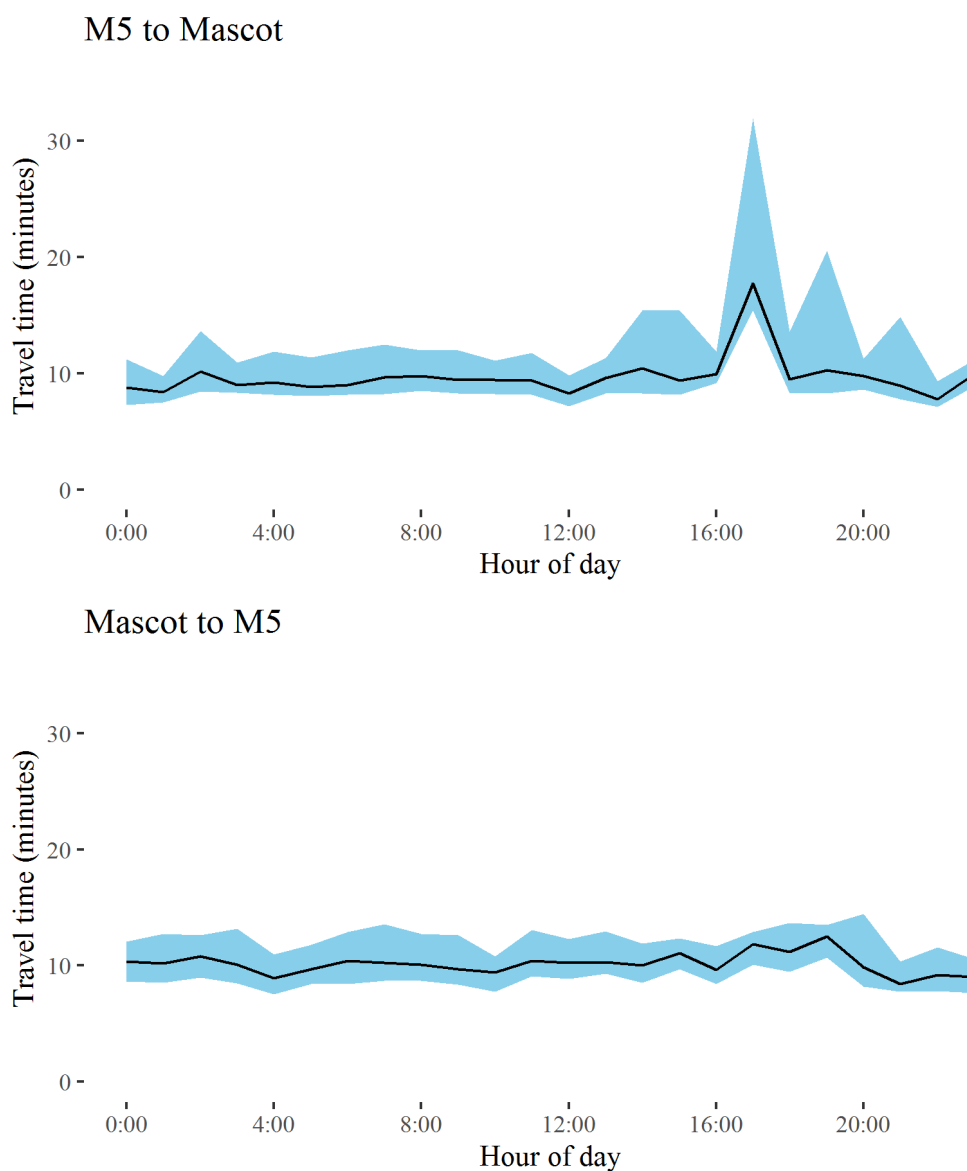
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
M5 to Mascot	00:07:46	00:17:42	1.248	00:02:13	00:16:30	2.127	11.0
Mascot to M5	00:08:27	00:12:29	1.203	00:02:35	00:06:14	1.437	10.9

Source: BITRE estimates.

The best median travel time for journeys from the M5 to Mascot was 8 minutes at 10pm and the lowest uncertainty was at 10pm with an interquartile range of 2 minutes. The longest median travel times and greatest uncertainty were at 5pm with a median of 18 minutes and an interquartile range of 16 minutes.

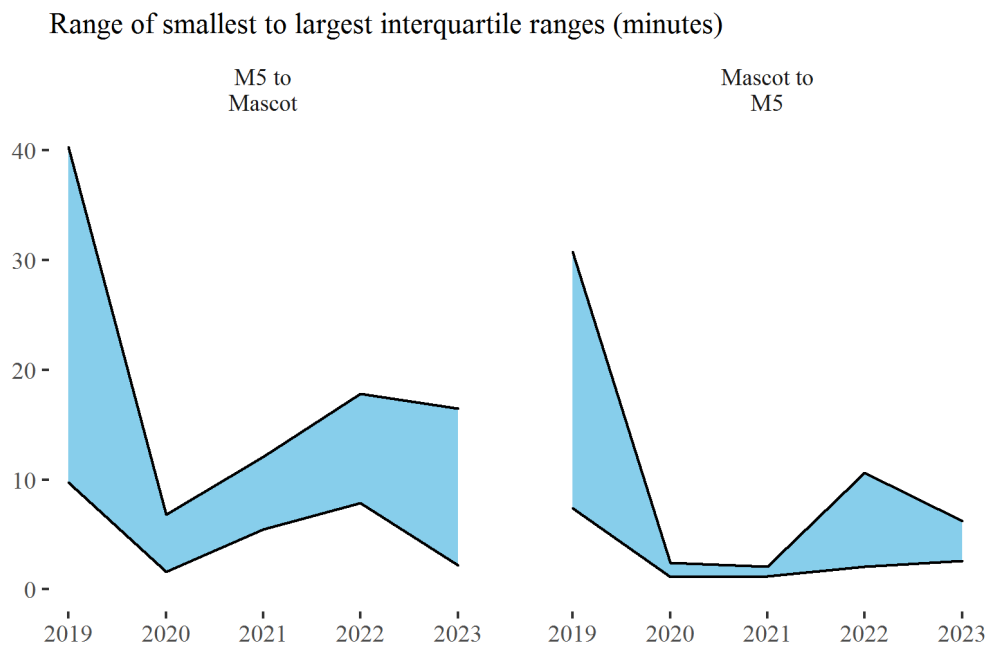
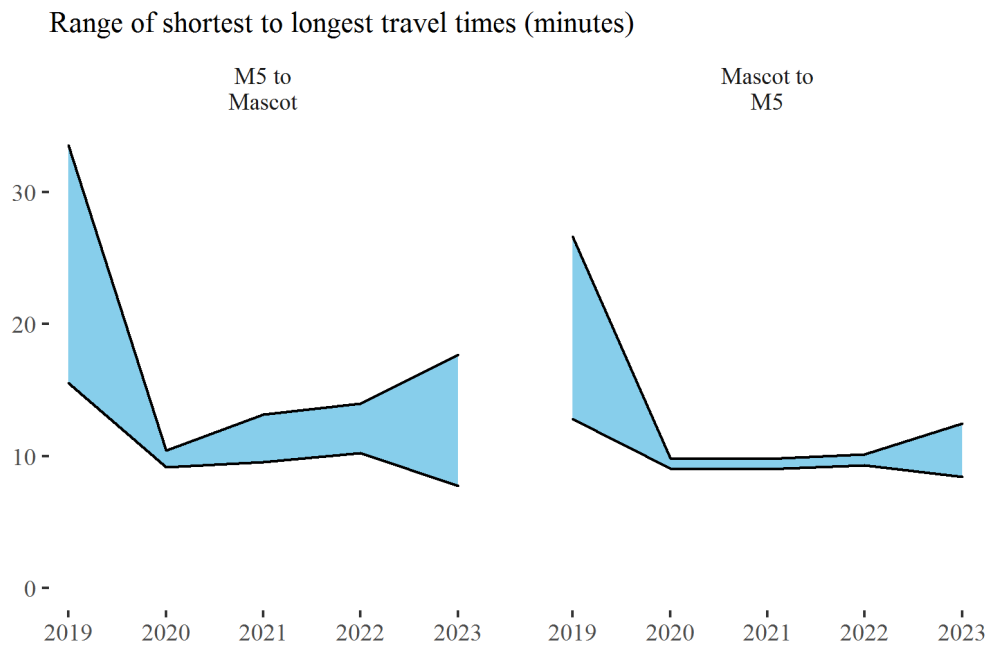
The best median travel times and lowest uncertainty for journeys from Mascot to the M5 were at 9pm with a median travel time of 8.5 minutes and an interquartile range of 3 minutes. The longest median travel times were at 7pm with a median of 12 minutes and the greatest uncertainty at 8pm with an interquartile range of 6 minutes.

**Figure A.62 M8 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.63 M8 Performance over time

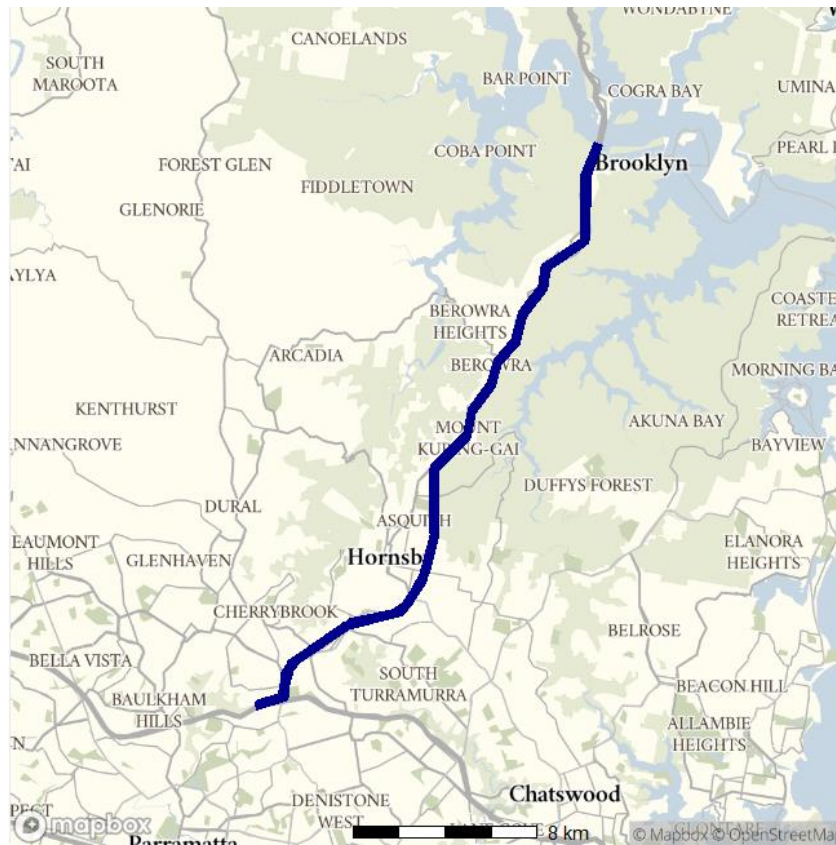


Source: BITRE estimates.

## NorthConnex-M1 - Brooklyn to M2 / M2 to Brooklyn

This route connects the Sydney orbital network to the Pacific Motorway (M1), and connects Sydney to northern NSW and Queensland. It starts at the M2 Motorway at Carlingford and uses the recently built NorthConnex tunnel to the start of the M1 Motorway (commonly referred to as the F3) at Wahroonga and continues until the Hawkesbury River at Brooklyn.

**Figure A.64 NorthConnex-M1 route map**



Source: BITRE estimates.

**Table A.22 NorthConnex-M1 route travel times and congestion measures, 2023**

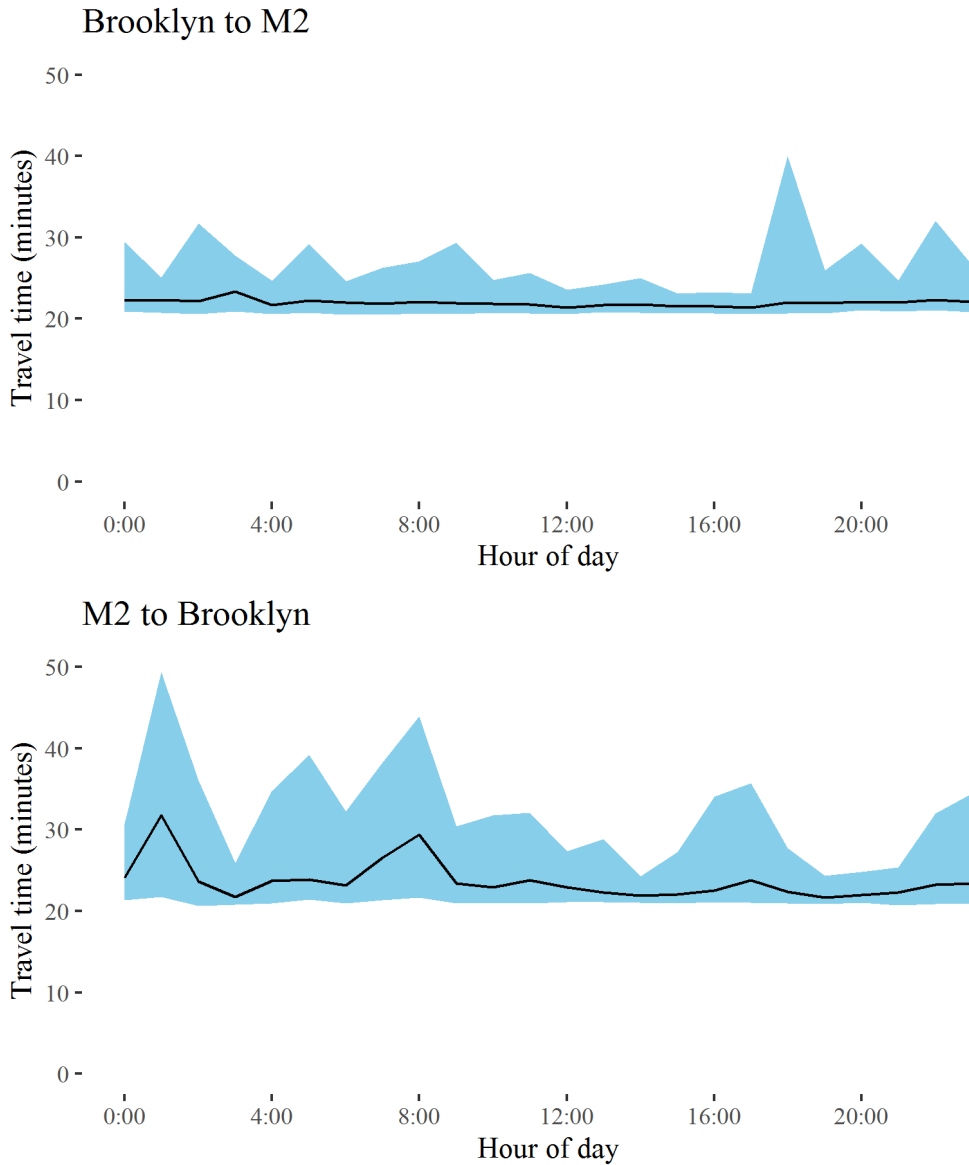
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Brooklyn to M2	00:21:24	00:23:22	1.027	00:02:27	00:19:21	2.532	31.4
M2 to Brooklyn	00:21:38	00:31:48	1.094	00:03:16	00:27:38	3.390	31.7

Source: BITRE estimates.

The best travel times and lowest uncertainty travelling from Brooklyn to the M2 were at 5pm and 3pm, respectively, with a median travel time of 21 minutes and an interquartile range of 2.5 minutes. The longest median travel time was 23 minutes at 3am and the greatest uncertainty was at 6pm with an interquartile range of 19 minutes.

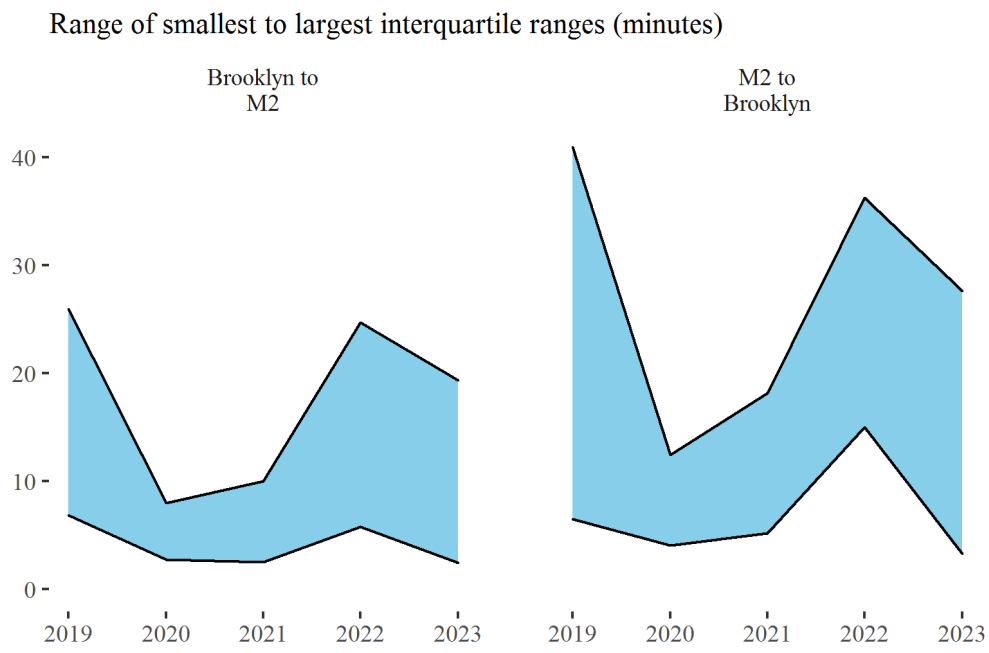
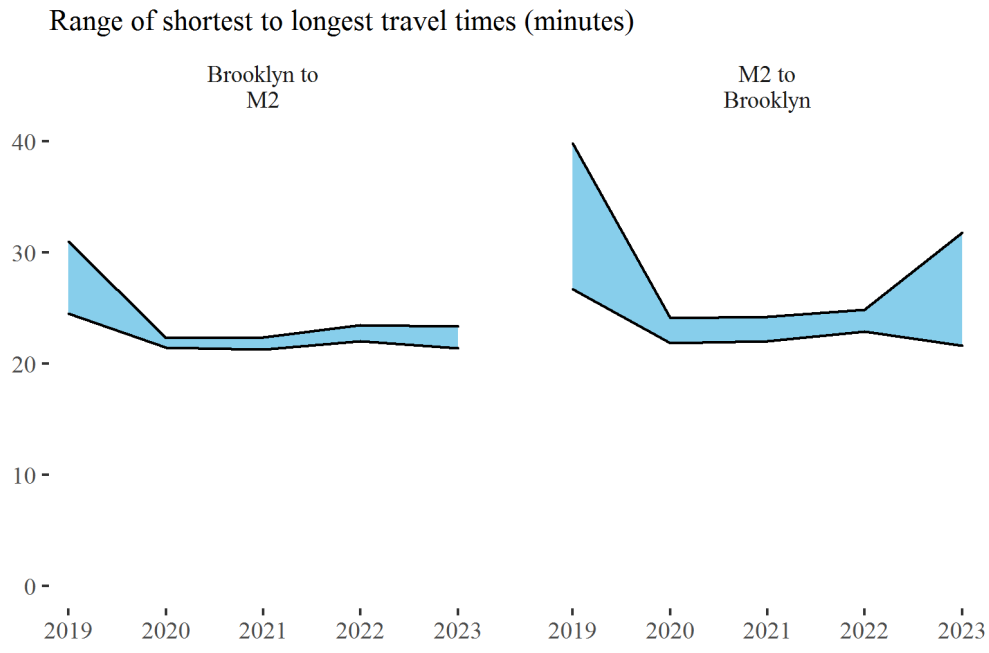
The best travel times and lowest uncertainty travelling from the M2 to Brooklyn were at 7pm and 2pm, respectively, with a median travel time of 22 minutes and an interquartile range of 3 minutes. The longest median travel times and greatest uncertainty were at 1am, with a median of 32 minutes and an interquartile range of 28 minutes.

**Figure A.65 NorthConnex-M1 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.66 NorthConnex-M1 Performance over time



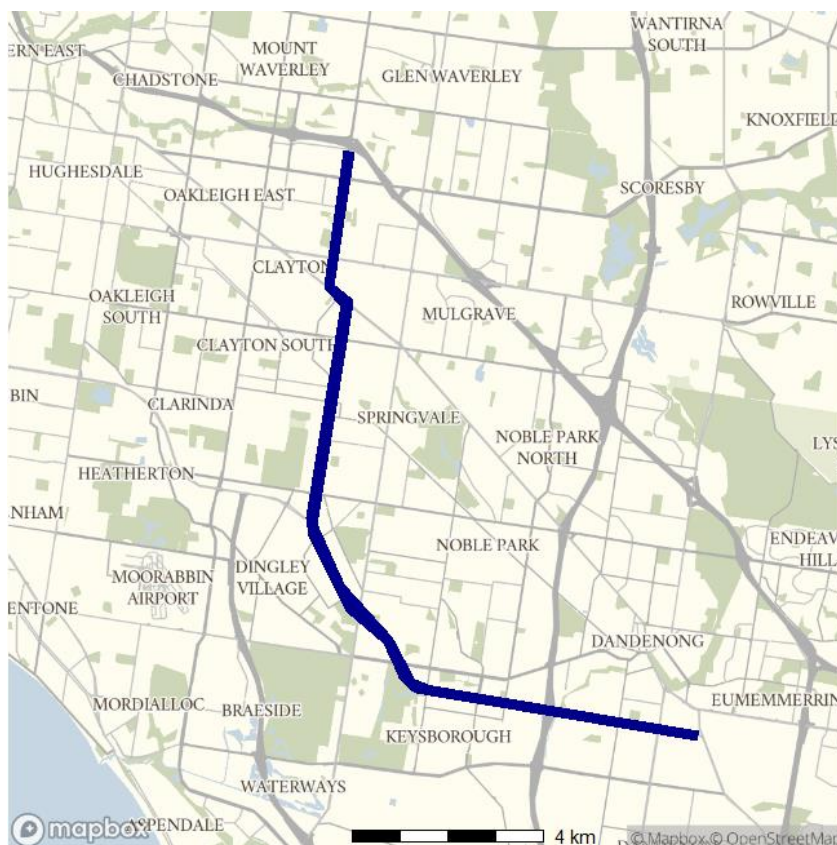
Source: BITRE estimates.

## Melbourne routes

### 13-49 - Monash Freeway to South Gippsland Highway / South Gippsland Highway to Monash Freeway

This route arcs through Melbourne's outer south eastern suburbs from the Monash Freeway at Glen Waverley to the South Gippsland Highway, just south of Dandenong. The route traverses the suburbs of Clayton, Springvale and Keysborough, and crosses the M3. It is known by names including the Dandenong Bypass, Westall Road and Clayton Road and includes a small portion of the Princes Highway.

**Figure A.67** 13-49 route map



Source: BITRE estimates.

**Table A.23** 13-49 route travel times and congestion measures, 2023

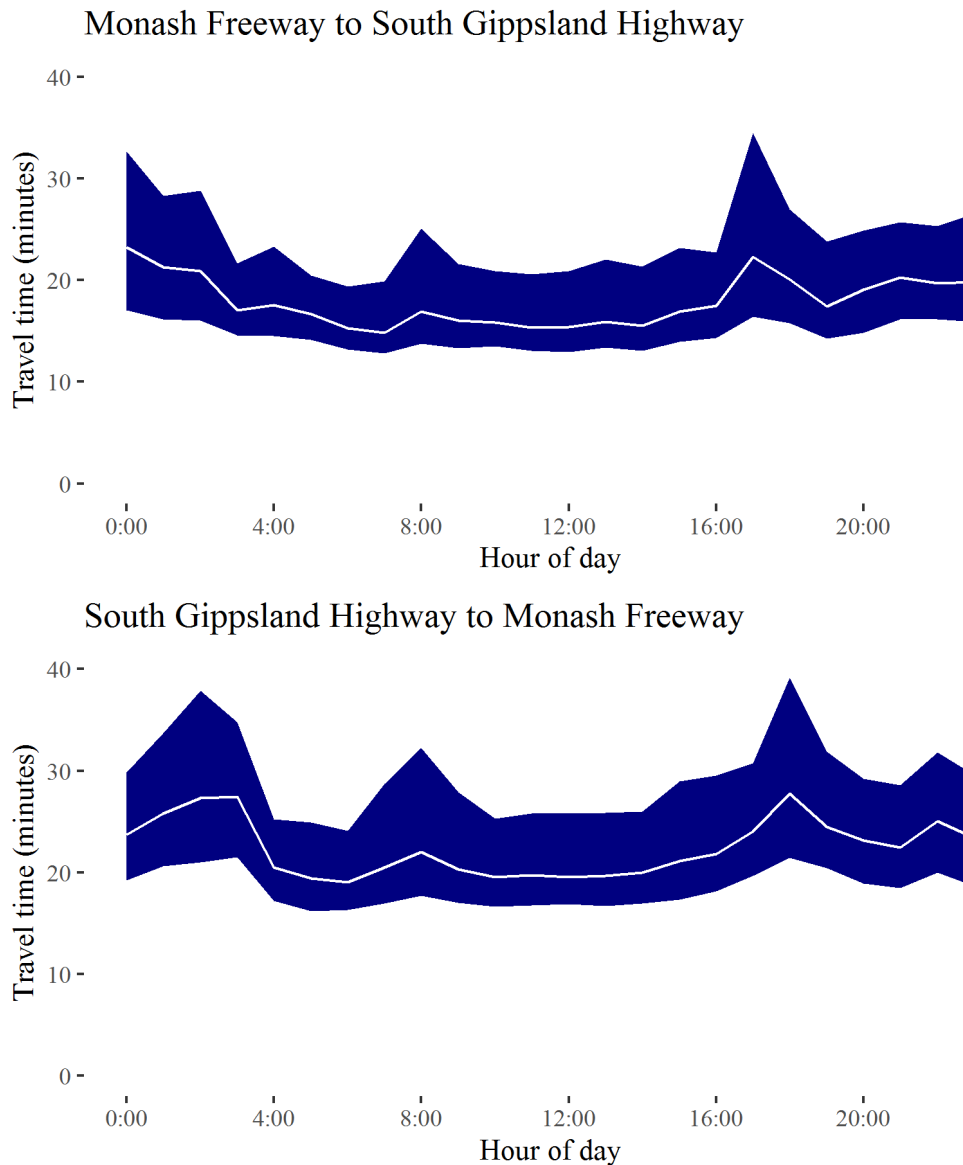
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Monash Freeway to South Gippsland Highway	00:14:50	00:23:13	1.209	00:06:11	00:18:05	1.560	14.8
South Gippsland Highway to Monash Freeway	00:19:01	00:27:47	1.179	00:07:49	00:17:41	1.423	18.2

Source: BITRE estimates.

The best travel times and lowest uncertainty travelling from the Monash Freeway to South Gippsland Highway were at 7am and 6am, respectively, with a median travel time of 15 minutes and an interquartile range of 6 minutes. The longest median travel time was at midnight with a median of 23 minutes and the greatest uncertainty at 5pm with an interquartile range of 18 minutes.

The best median travel time for journeys from South Gippsland Highway to the Monash Freeway was 19 minutes at 6am and the lowest uncertainty was at 6am with an interquartile range of 8 minutes. The longest median travel times and greatest uncertainty were at 6pm with a median of 28 minutes and an interquartile range of 18 minutes.

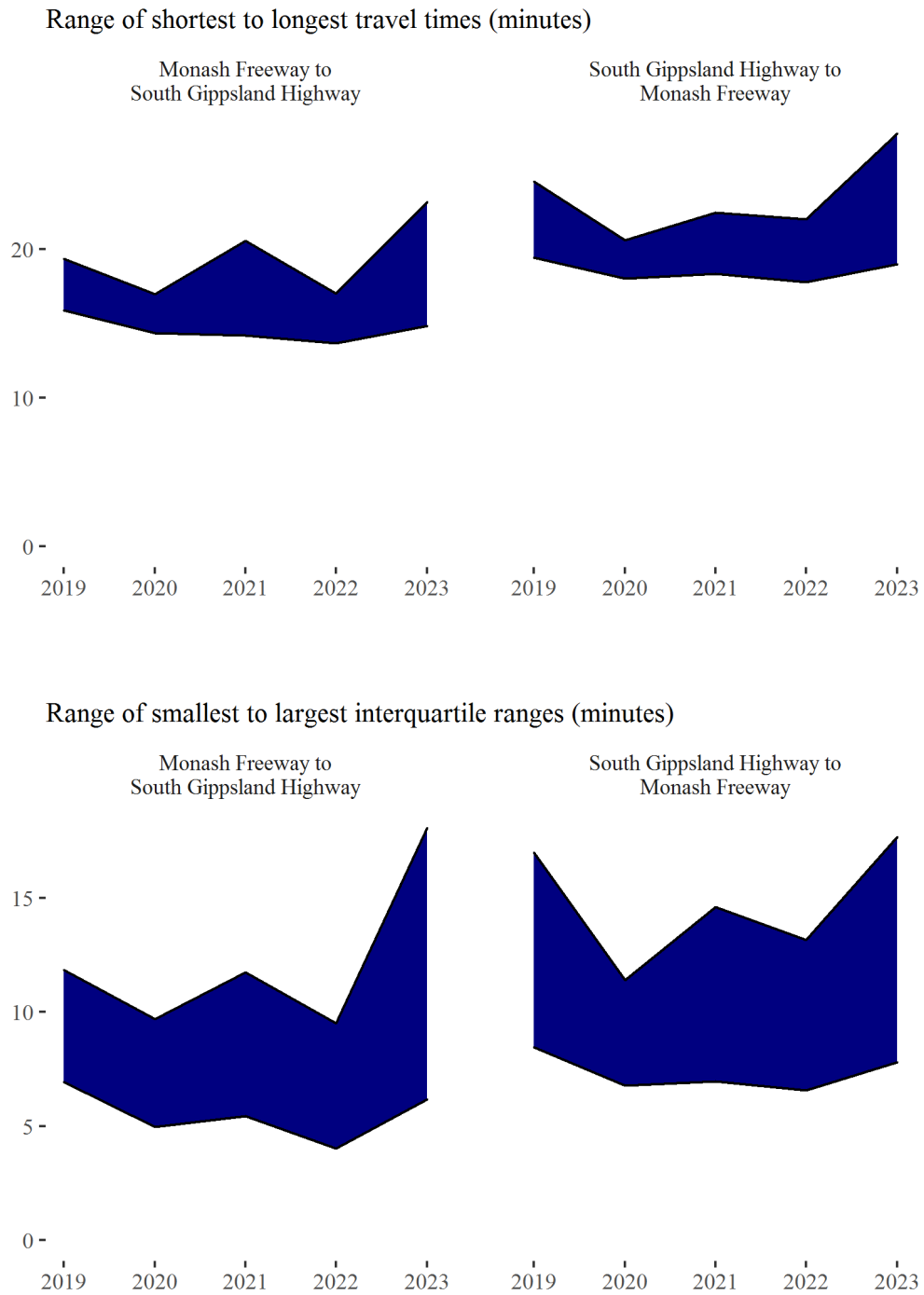
**Figure A.68 13-49 route median and interquartile range travel times**



Source: BITRE estimates.



Figure A.69 13-49 Performance over time

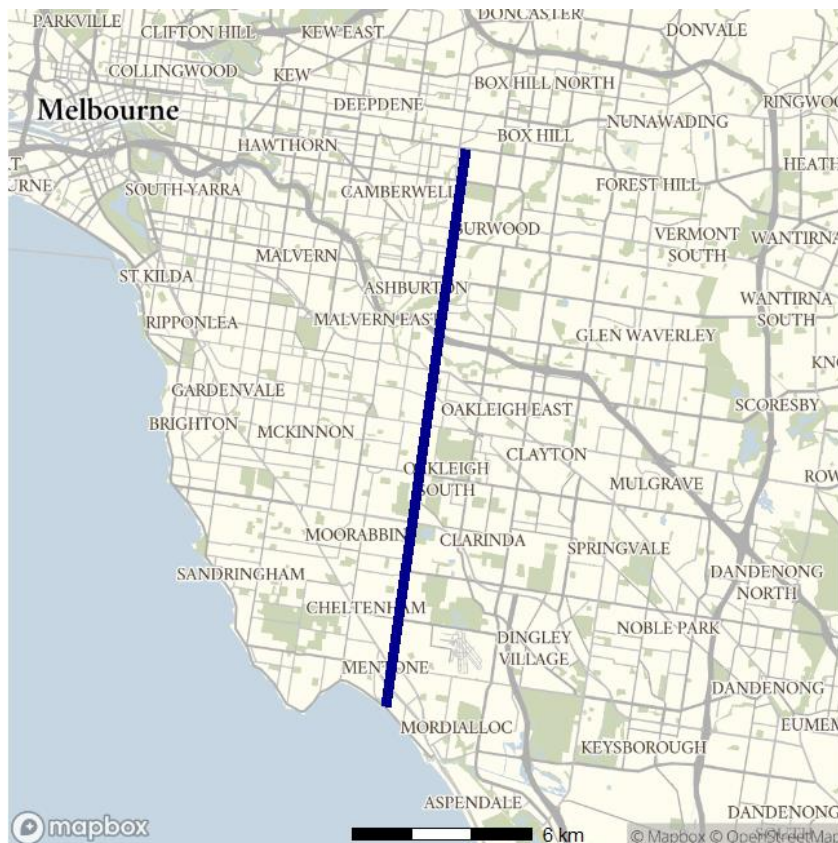


Source: BITRE estimates.

### 15 - Beach Road to Surrey Hills / Surrey Hills to Beach Road

This surface route extends from Canterbury Road in Surrey Hills to Beach Road in Parkdale. The route traverses Moorabbin, Oakleigh, the major retail precinct at Chadstone and Burwood in Melbourne’s south east, crossing the M1 (East) along the way. It is also known as Warrigal Road.

**Figure A.70 15 route map**



Source: BITRE estimates.

**Table A.24 15 route travel times and congestion measures, 2023**

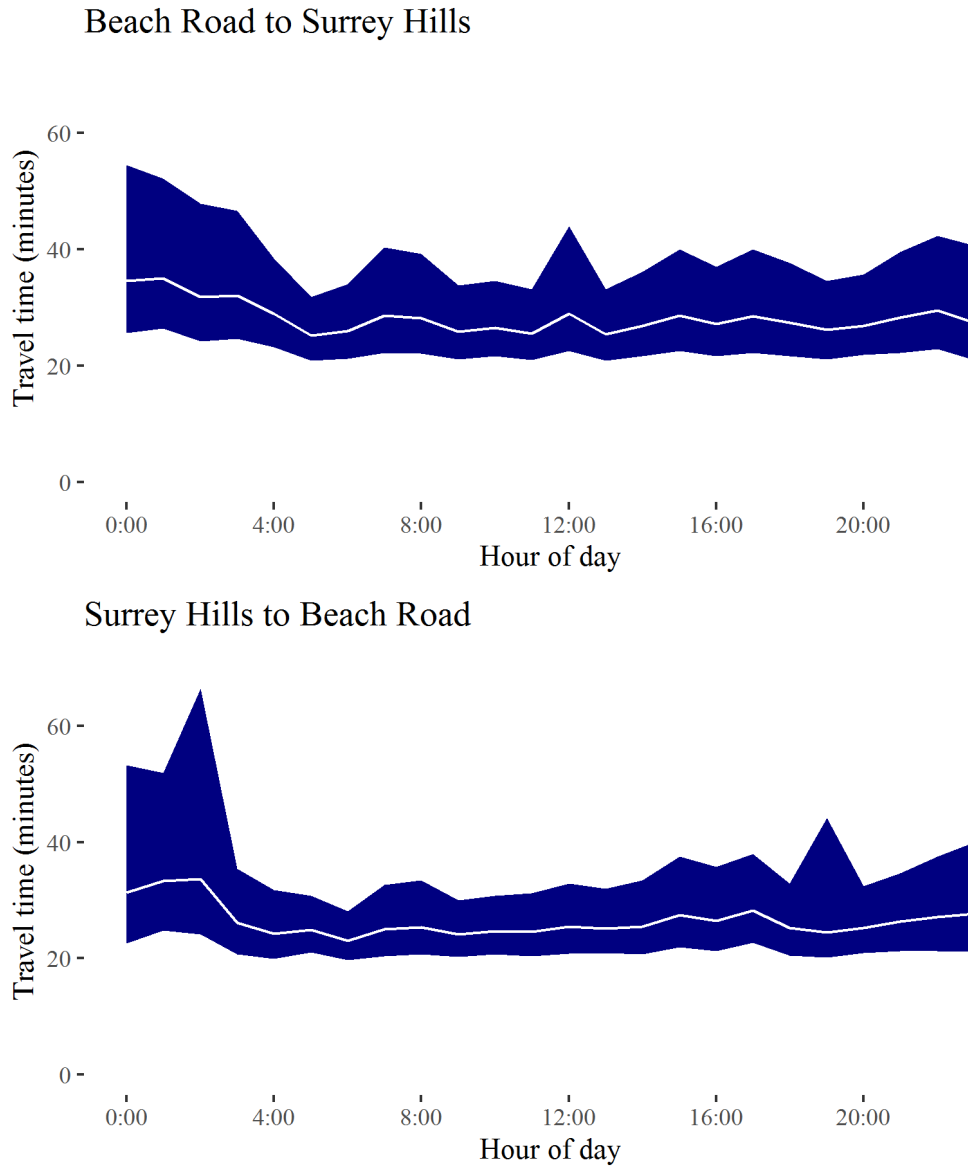
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Beach Road to Surrey Hills	00:25:08	00:35:04	1.125	00:10:56	00:28:51	1.566	18.9
Surrey Hills to Beach Road	00:23:00	00:33:38	1.150	00:08:29	00:42:16	1.857	18.9

Source: BITRE estimates.

The best median travel time for journeys from Beach Road to Surrey Hills was 25 minutes at 5am and the lowest uncertainty was at 5am with an interquartile range of 11 minutes. The longest median travel time was 35 minutes at 1am and the greatest uncertainty was at midnight with an interquartile range of 29 minutes.

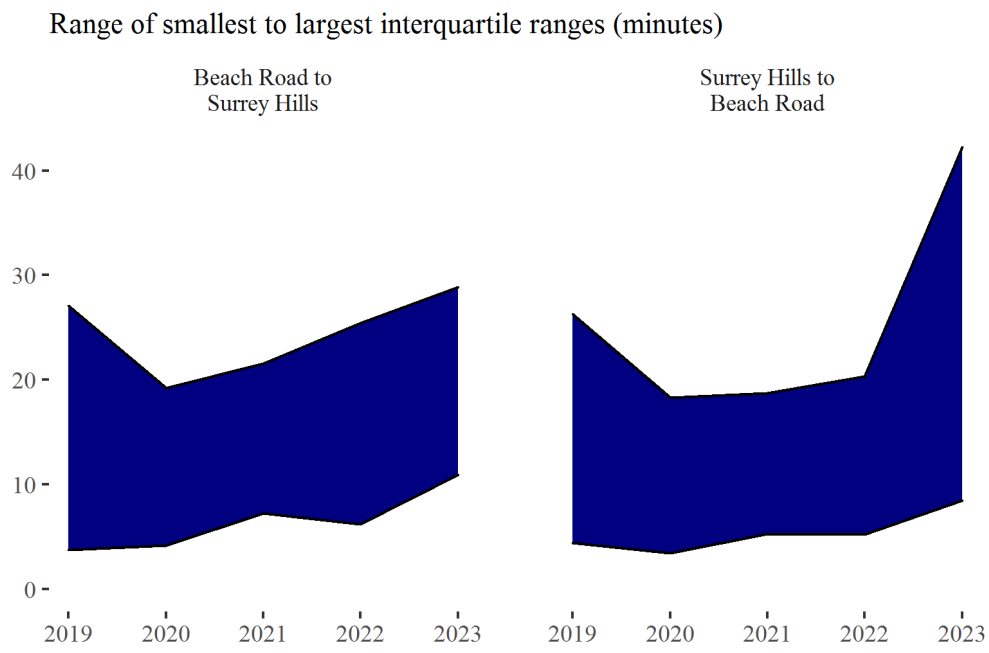
The best median travel time for journeys from Surrey Hills to Beach Road was 23 minutes at 6am and the lowest uncertainty was at 6am with an interquartile range of 8.5 minutes. The longest median travel times and greatest uncertainty were at 2am with a median of 34 minutes and an interquartile range of 42 minutes.

**Figure A.71 15 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.72 15 Performance over time

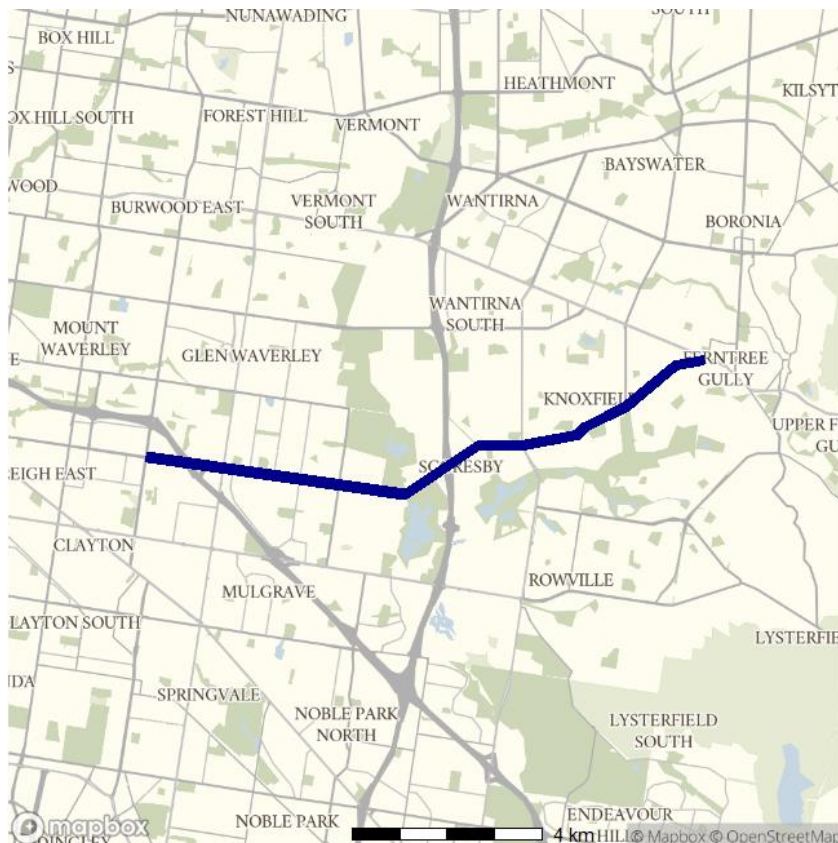


Source: BITRE estimates.

## 22 - Ferntree Gully to M1 / M1 to Ferntree Gully

This surface route in Melbourne’s East starts at the M1 (east) at Notting Hill and extends east through Wheelers Hill and Knoxfield to Ferntree Gully. It services light industrial areas in the vicinity of the M3. It is also known as Ferntree Gully Road.

Figure A.73 22 route map



Source: BITRE estimates.

Table A.25 22 route travel times and congestion measures, 2023

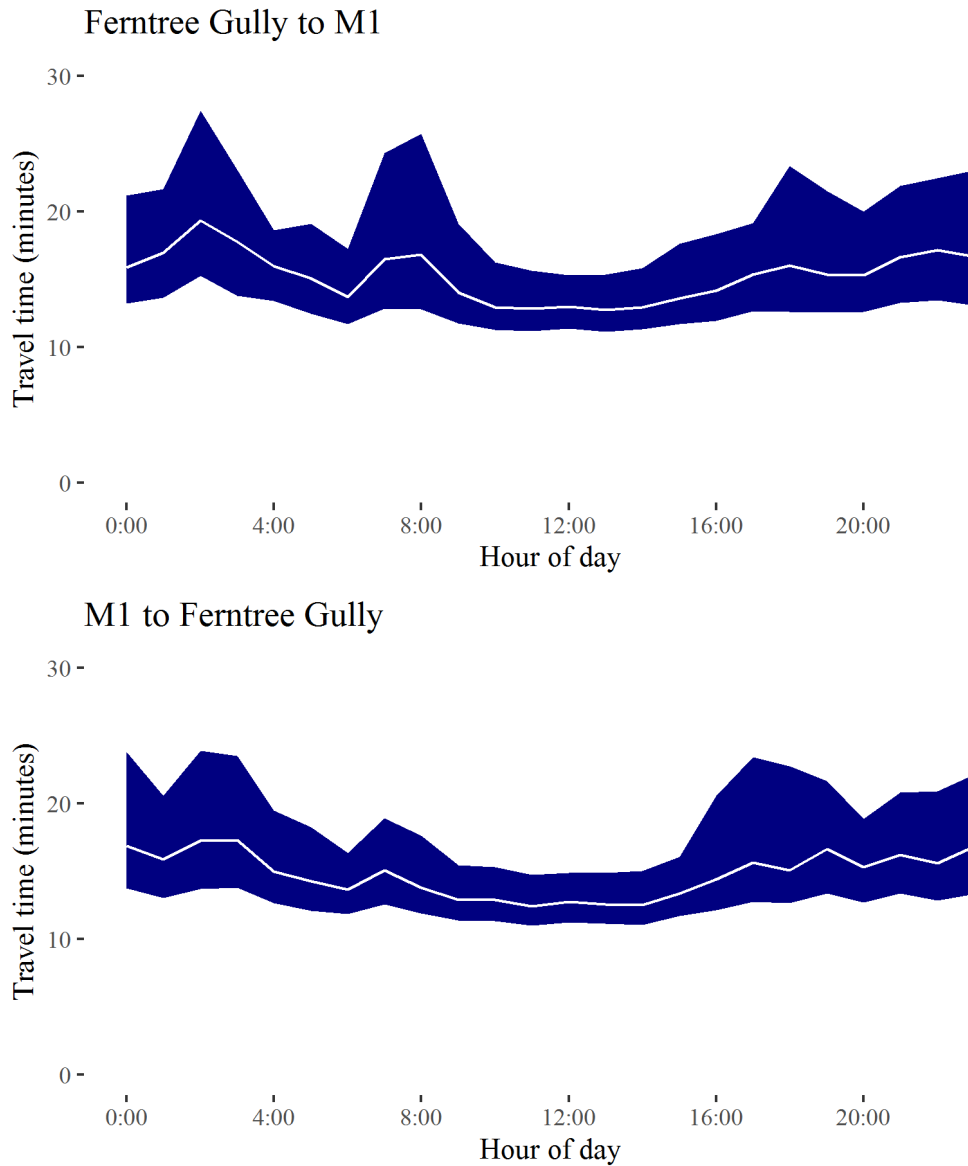
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Ferntree Gully to M1	00:12:42	00:19:19	1.201	00:03:57	00:12:56	1.926	12.6
M1 to Ferntree Gully	00:12:26	00:17:17	1.187	00:03:41	00:10:39	1.838	12.6

Source: BITRE estimates.

The best median travel times and least uncertainty for journeys from Ferntree Gully to M1 were at 1pm with a median travel time of 13 minutes and an interquartile range of 4 minutes. The longest median travel time was 19 minutes at 2am and the greatest uncertainty was at 8am with an interquartile range of 13 minutes.

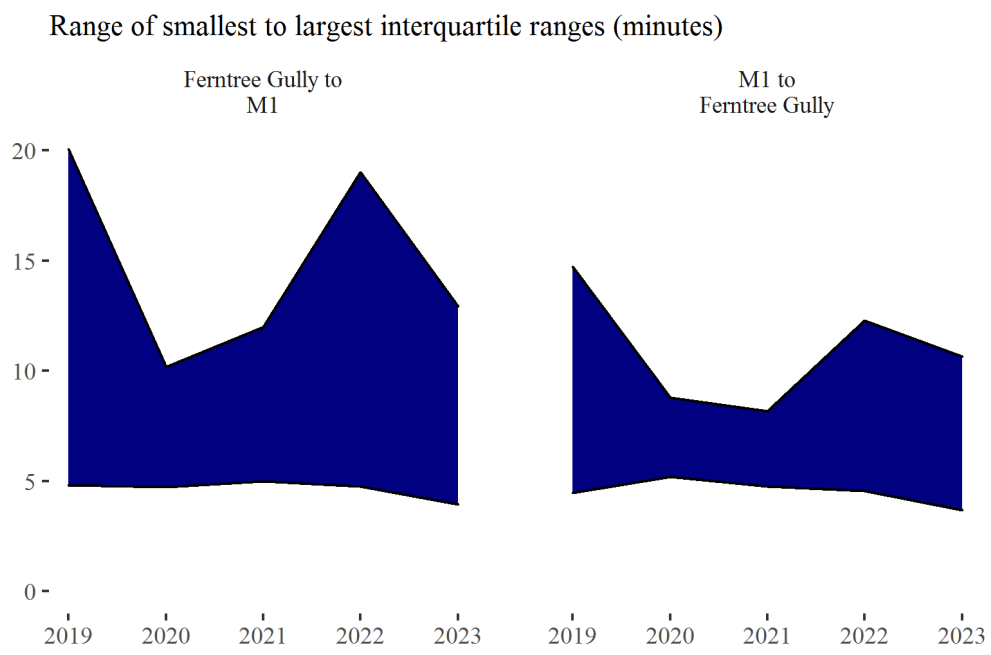
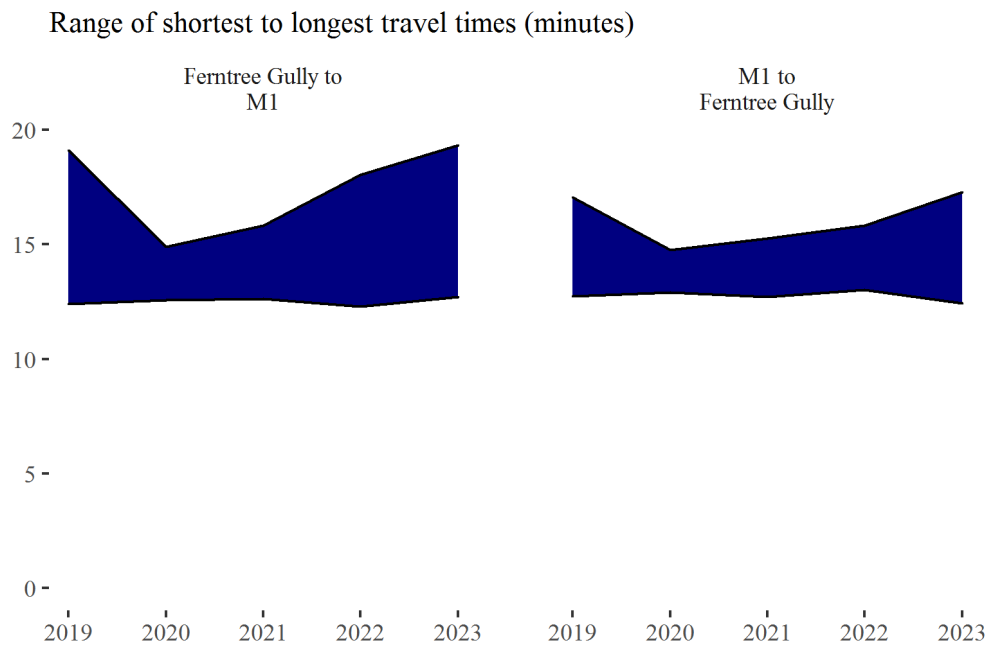
The best travel times and lowest uncertainty travelling from M1 to Ferntree Gully were at 11am and 12am, respectively, with a median travel time of 12 minutes and an interquartile range of 4 minutes. The longest median travel time was 17 minutes at 3am and the greatest uncertainty was at 5pm with an interquartile range of 11 minutes.

**Figure A.74 22 route median and interquartile range travel times**



Source: BITRE estimates.

**Figure A.75 22 Performance over time**

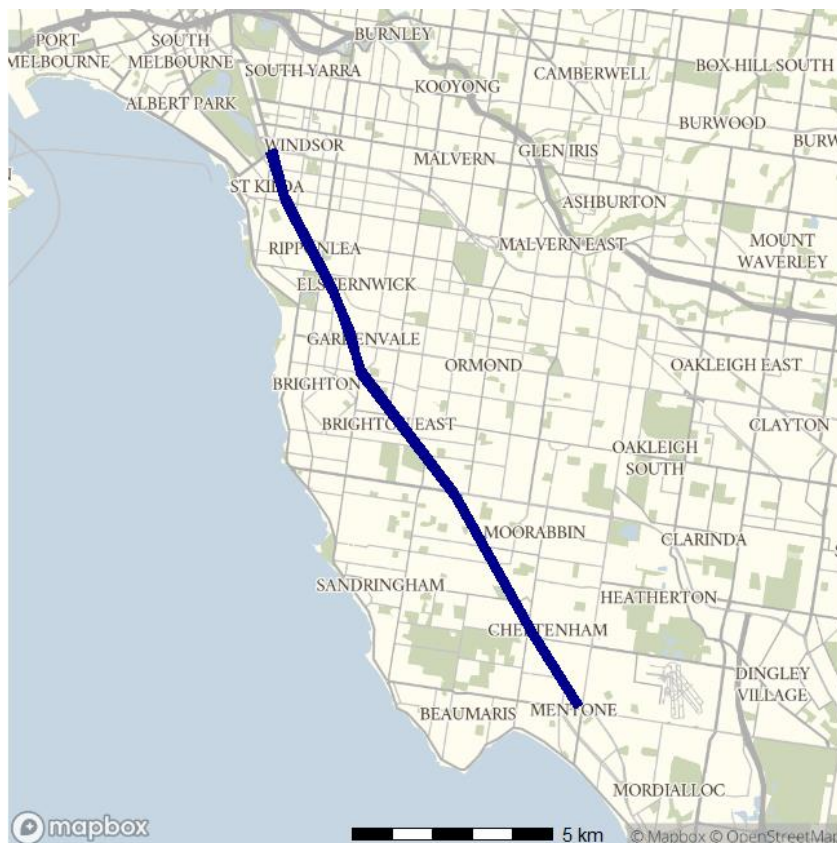


Source: BITRE estimates.

### 3 - Albert Park to Cheltenham / Cheltenham to Albert Park

This surface route travels south east from Albert Park, south-east of the Melbourne CBD, through St Kilda, Brighton and Moorabbin to meet Route 15 (Warrigal Road) at Cheltenham/Mentone. It is also known as the Nepean Highway.

**Figure A.76** 3 route map



Source: BITRE estimates.

**Table A.26** 3 route travel times and congestion measures, 2023

Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Albert Park to Cheltenham	00:15:55	00:24:59	1.254	00:05:32	00:35:20	2.495	16.1
Cheltenham to Albert Park	00:14:13	00:27:35	1.505	00:04:34	00:27:30	2.775	16.0

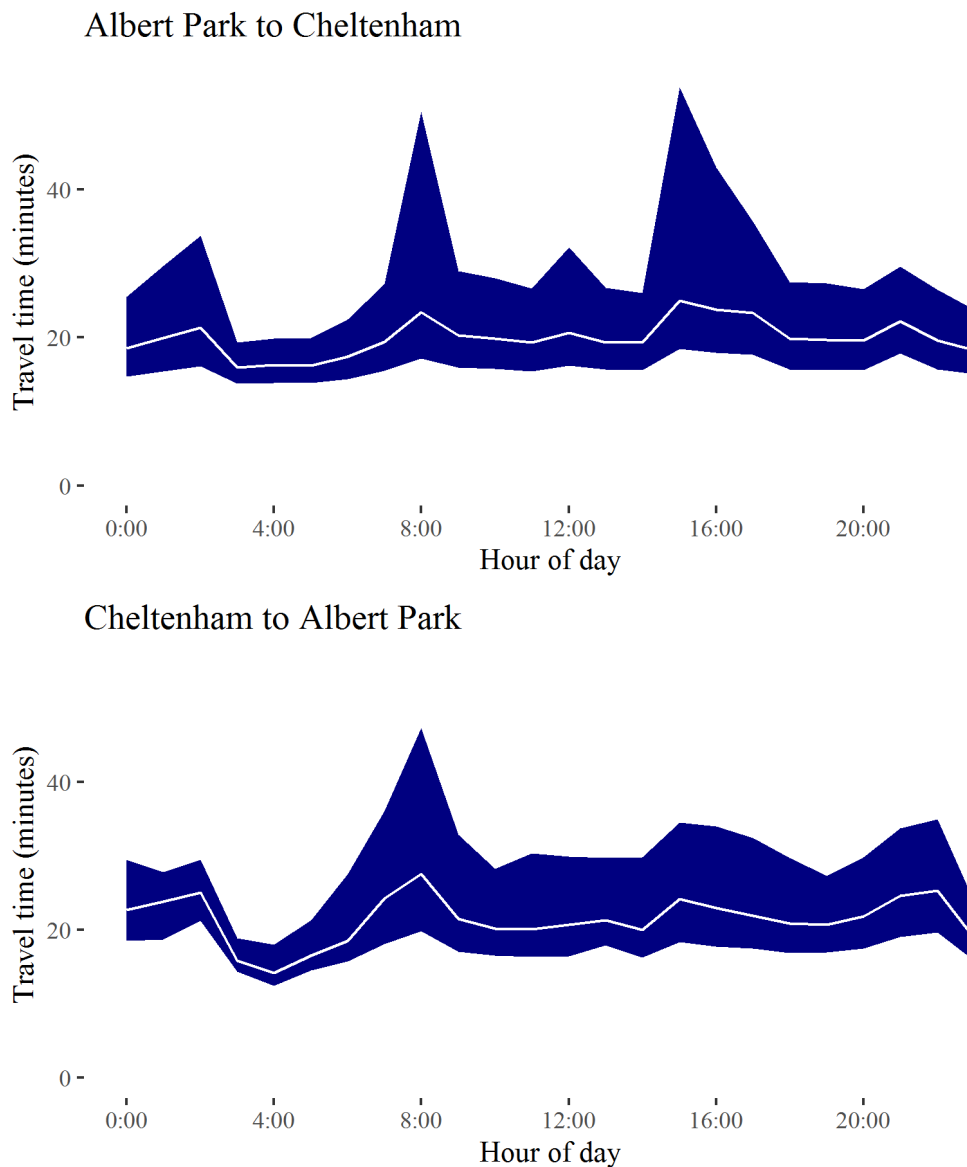
Source: BITRE estimates.



The best median travel time for journeys from Albert Park to Cheltenham was 16 minutes at 3am and the lowest uncertainty was at 3am with an interquartile range of 5.5 minutes. The longest median travel times and greatest uncertainty were at 3pm with a median of 25 minutes and an interquartile range of 35 minutes.

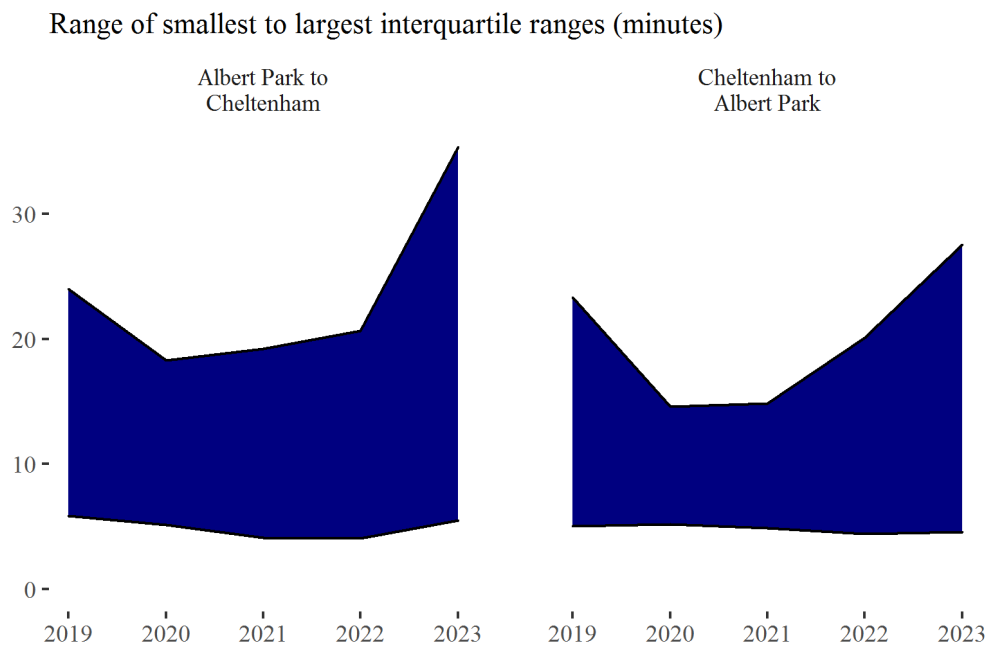
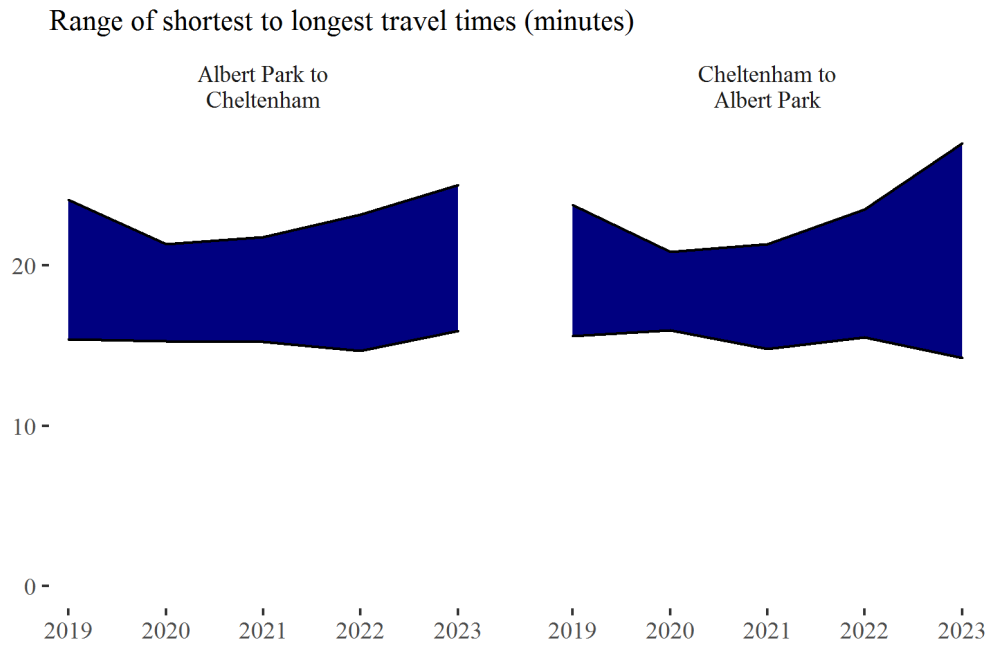
The best travel times and lowest uncertainty travelling from Cheltenham to Albert Park were at 4am and 3am, respectively, with a median travel time of 14 minutes and an interquartile range of 4.5 minutes. The longest median travel times and greatest uncertainty were at 8am with a median of 28 minutes and an interquartile range of 28 minutes.

**Figure A.77 3 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.78 3 Performance over time

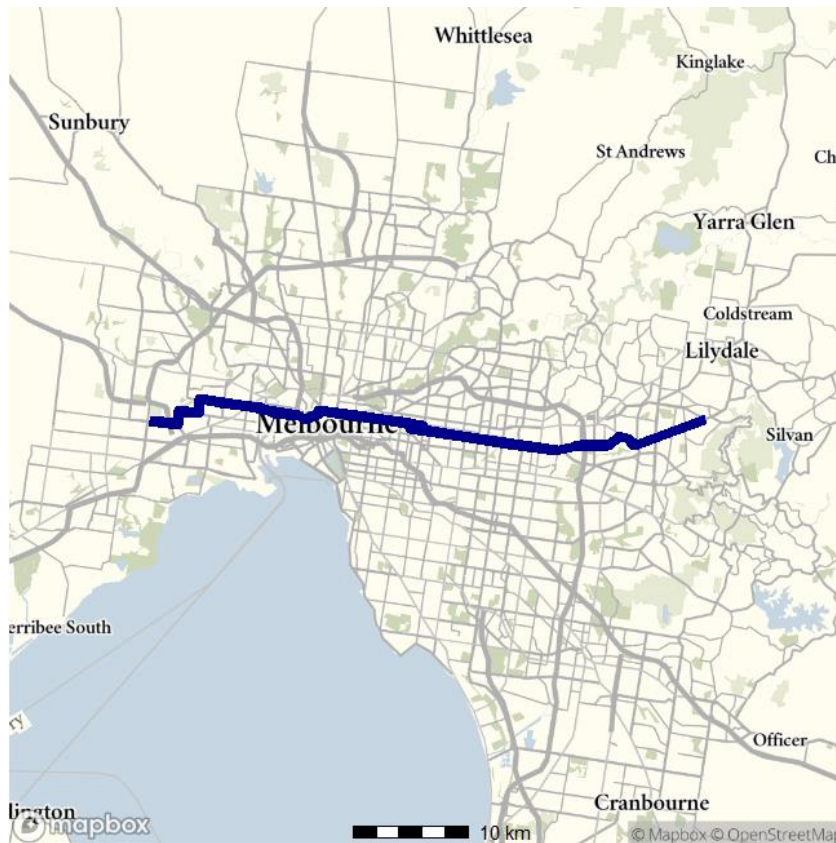


Source: BITRE estimates.

## Route 32 - Derrimut to Montrose / Montrose to Derrimut

This 53-kilometre surface route extends from Derrimut, west of the CBD, to Montrose on the eastern urban fringe. It crosses under the M80, passes Somerville Road, Footscray Road, Port of Melbourne and Victoria Street/Parade at Carlton, Burke Road in Camberwell, Canterbury Road, and intersects with the M3 at Ringwood.

Figure A.79 Route 32 route map



Source: BITRE estimates.

Table A.27 Route 32 route travel times and congestion measures, 2023

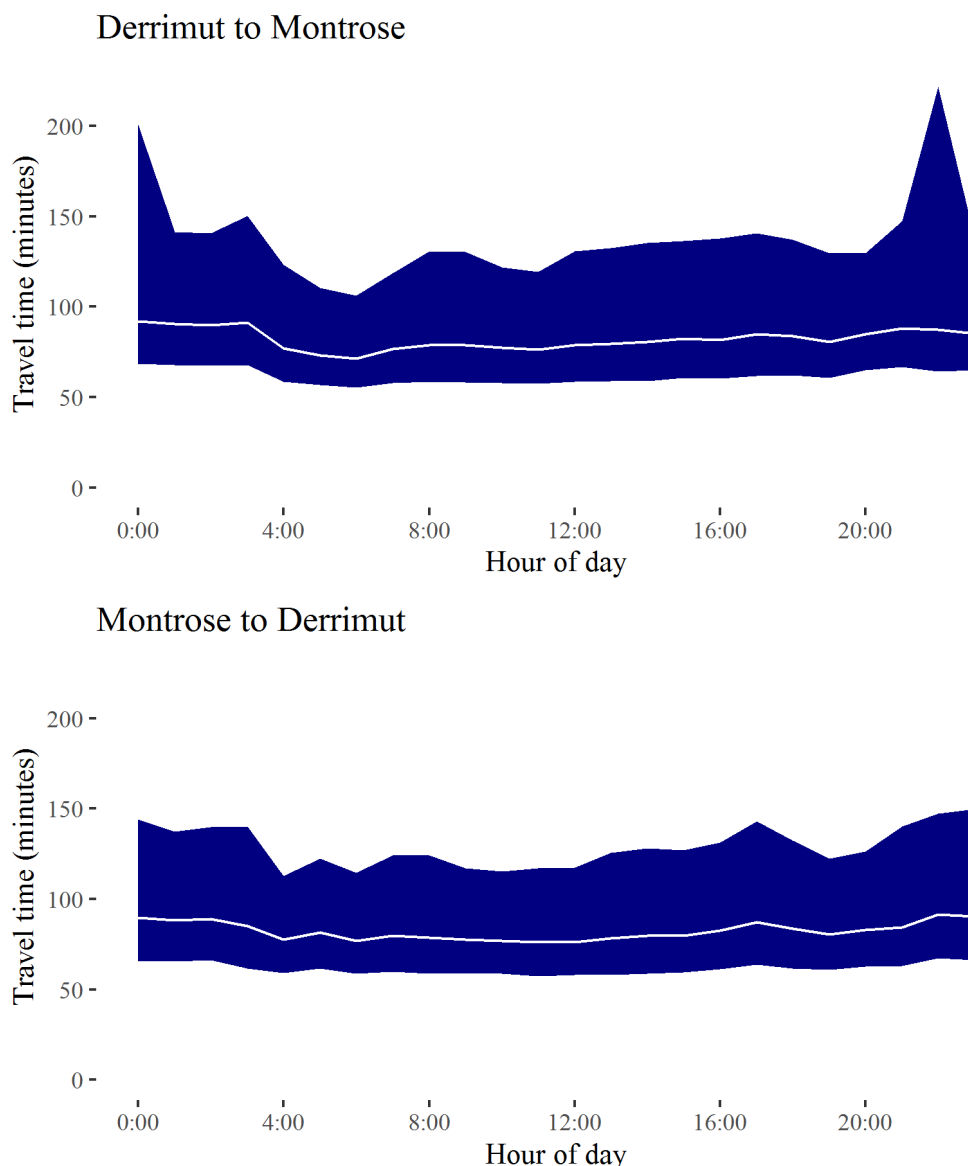
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Derrimut to Montrose	01:11:21	01:31:59	1.151	00:50:53	02:37:13	1.503	52.8
Montrose to Derrimut	01:16:04	01:31:18	1.081	00:53:35	01:23:24	1.265	52.9

Source: BITRE estimates.

The best median travel times and lowest uncertainty for journeys from Derrimut to Montrose were at 6am, with a median travel time of 1 hour 11 minutes and an interquartile range of 51 minutes. The longest median travel time was 1 hour 32 minutes at midnight and the greatest uncertainty was at 10pm with an interquartile range of 2 hour 37 minutes.

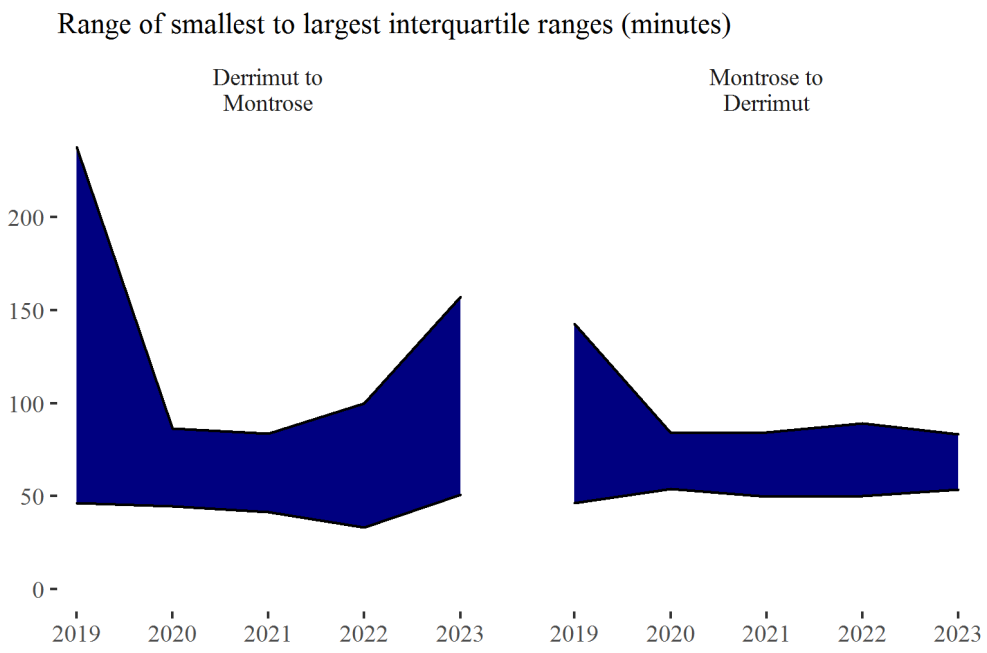
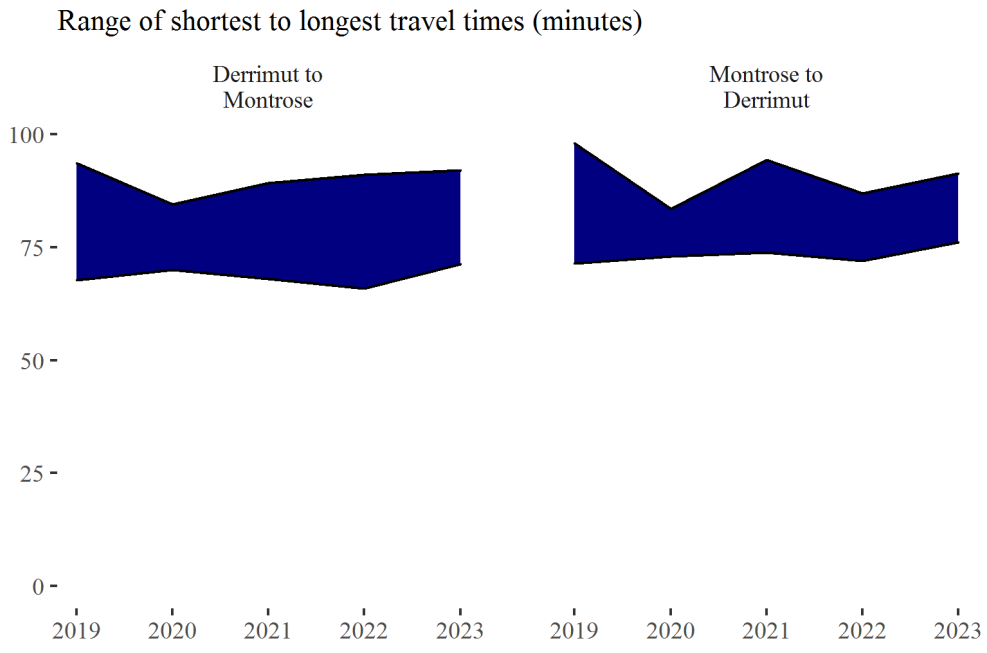
The best travel times and lowest uncertainty travelling from Montrose to Derrimut were at 11am and 4am, respectively, with a median travel time of 1 hour 16 minutes and an interquartile range of 54 minutes. The longest median travel times was 1 hour 31 minutes at 10pm and the greatest uncertainty was at 11pm with an interquartile range of 1 hour 23 minutes.

**Figure A.80 Route 32 route median and interquartile range travel times**



Source: BITRE estimates.

**Figure A.81 Route 32 Performance over time**

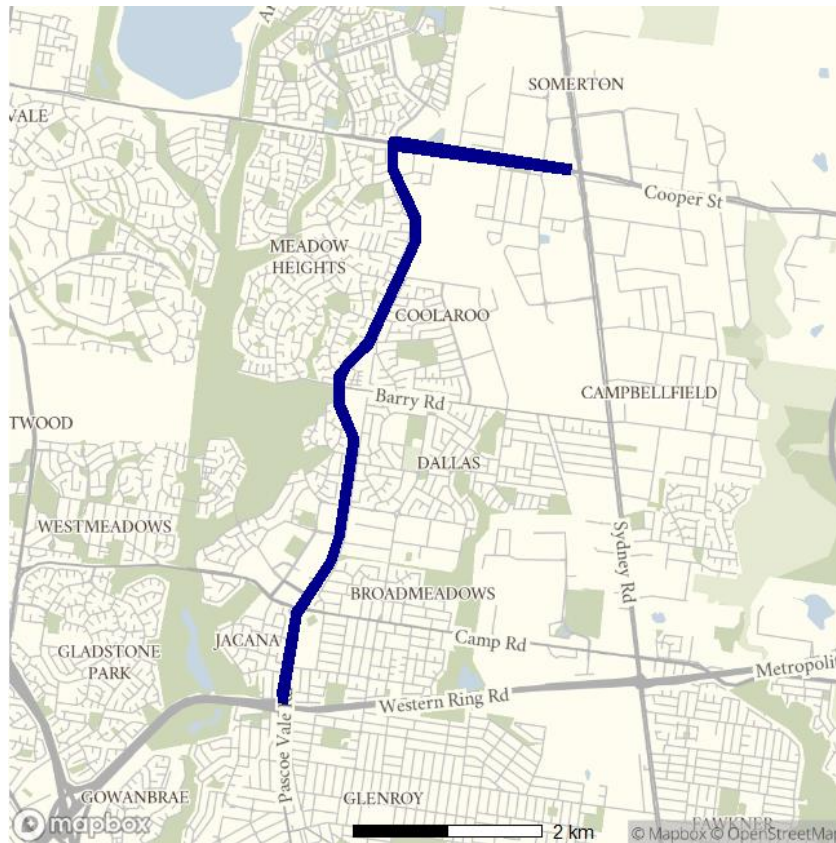


Source: BITRE estimates.

### 35 - Hume Highway to M80 / M80 to Hume Highway

This surface route extends north from the Metropolitan Ring Road (M80) past Broadmeadows to Roxburgh Park and then east through Somerton to the intersection with Sydney Road (old Hume Highway). It serves light industrial areas around Somerton and uses Pascoe Vale and Somerton Roads.

**Figure A.82** 35 route map



Source: BITRE estimates.

**Table A.28** 35 route travel times and congestion measures, 2023

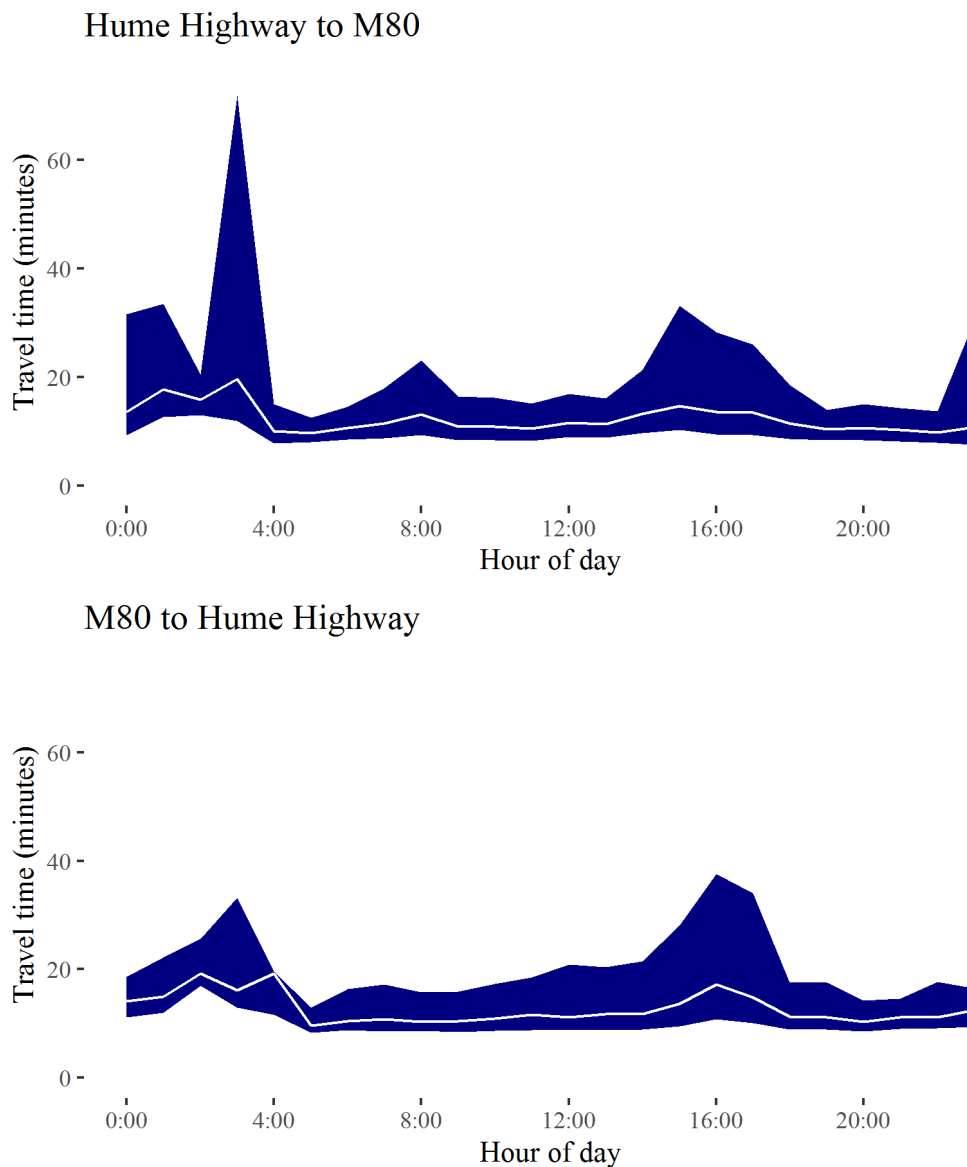
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Hume Highway to M80	00:09:40	00:19:40	1.270	00:04:29	00:59:54	2.933	8.3
M80 to Hume Highway	00:09:35	00:19:15	1.329	00:04:35	00:26:53	2.349	8.3

Source: BITRE estimates.

The best median travel time for journeys from the Hume Highway to the M80 was 10 minutes at 5am and the lowest uncertainty was at 5am with an interquartile range of 4.5 minutes. The longest median travel times and greatest uncertainty were at 3am with a median of 20 minutes and an interquartile range of 1 hour.

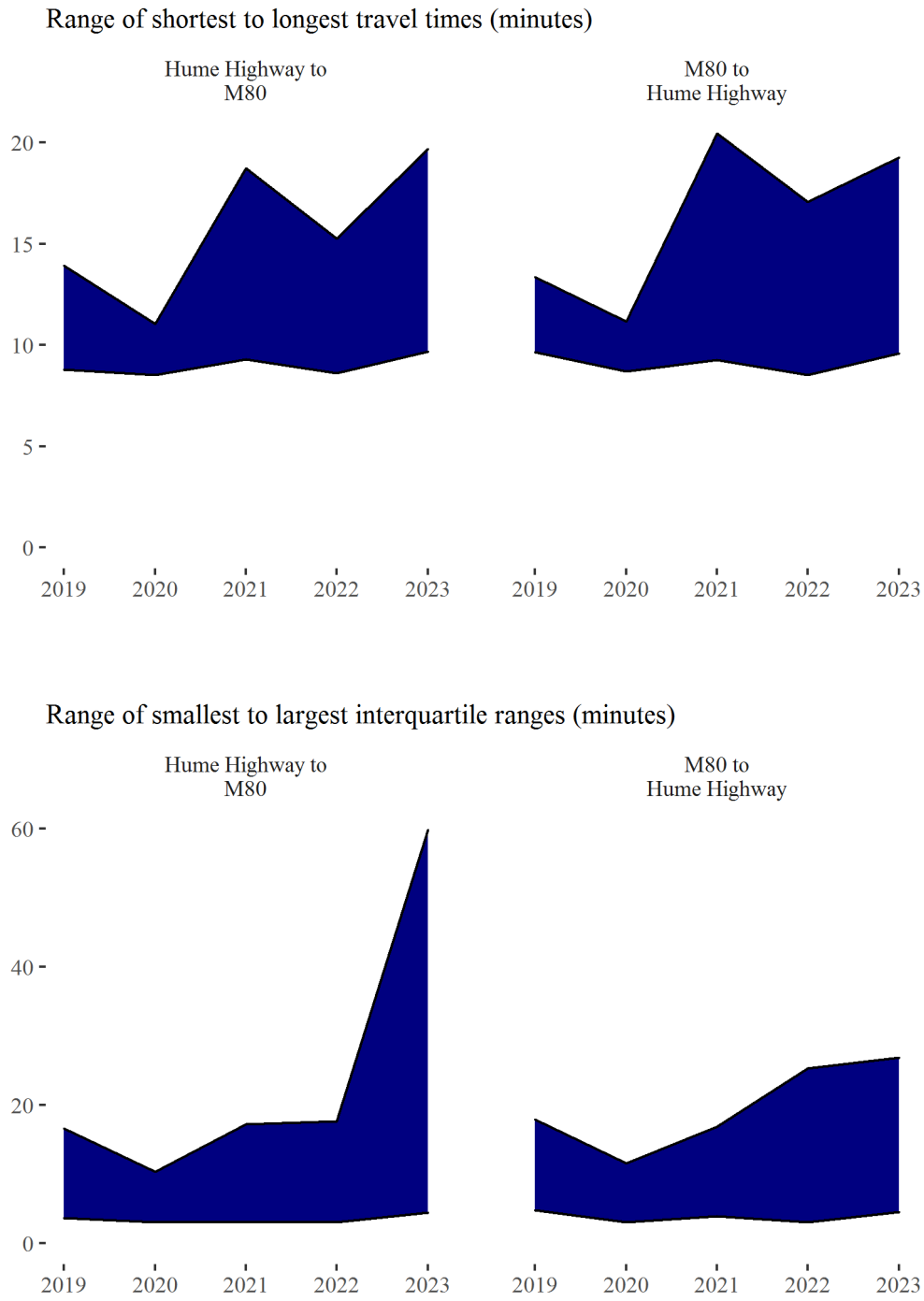
The best median travel time for journeys from the M80 to the Hume Highway was 10 minutes at 5am and the lowest uncertainty was at 5am with an interquartile range of 5 minutes. The longest median travel times were at 4am with a median of 19 minutes and the greatest uncertainty at 4pm with an interquartile range of 27 minutes.

**Figure A.83 35 route median and interquartile range travel times**



Source: BITRE estimates.

**Figure A.84 35 Performance over time**



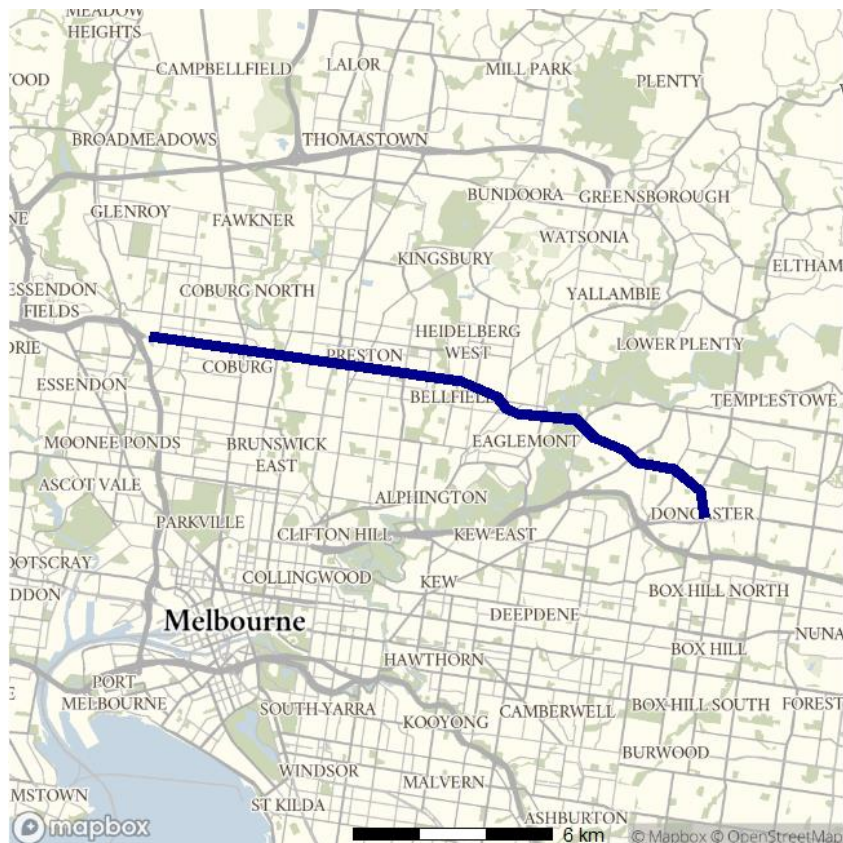
Source: BITRE estimates.



## 40 - Doncaster to M2 / M2 to Doncaster

This surface route extends from Doncaster in the east to the M2 at Strathmore, north of the CBD. The route traverses suburbs including Heidelberg, Preston and Coburg, incorporating Manningham Road, Banksia Street and Bell Street along its length.

**Figure A.85** 40 route map



Source: BITRE estimates.

**Table A.29** 40 route travel times and congestion measures, 2023

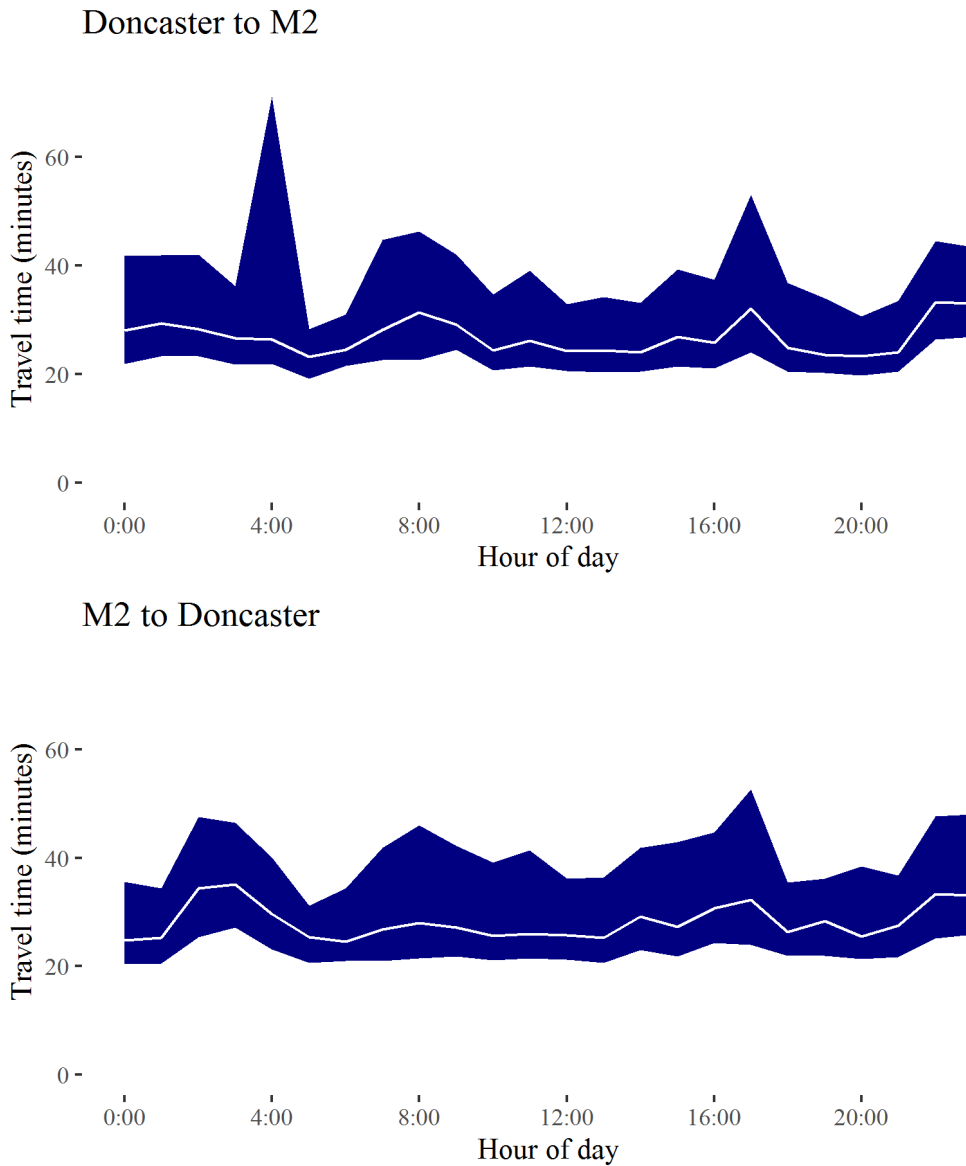
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Doncaster to M2	00:23:12	00:33:18	1.158	00:09:11	00:49:21	1.931	18.6
M2 to Doncaster	00:24:34	00:35:07	1.149	00:10:32	00:28:41	1.738	18.6

Source: BITRE estimates.

The best median travel time for journeys from Doncaster to M2 was 23 minutes at 5am and the lowest uncertainty was at 5am with an interquartile range of 9 minutes. The longest median travel time was 33 minutes at 10pm and the greatest uncertainty was at 4am with an interquartile range of 49 minutes.

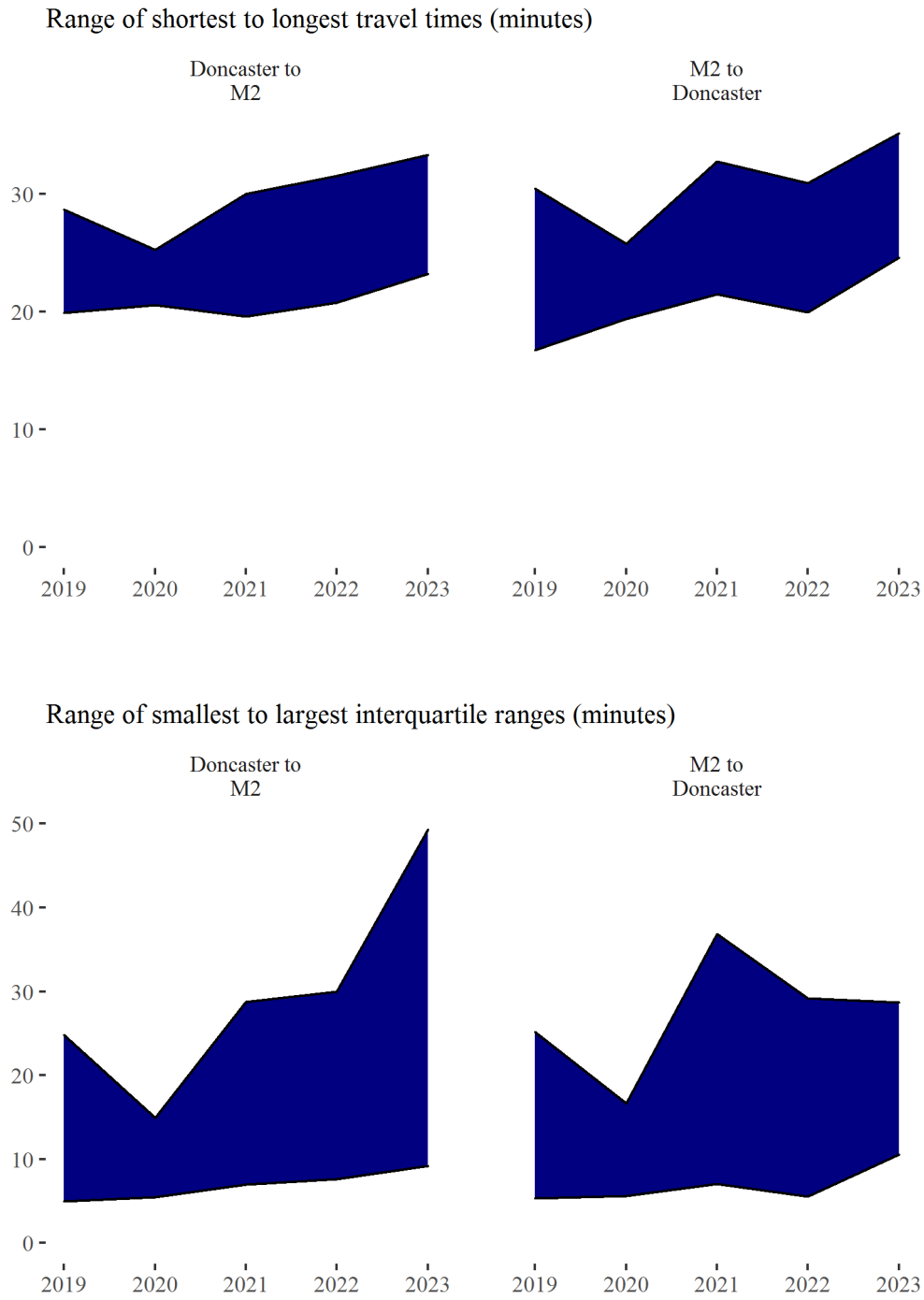
The best travel times and lowest uncertainty travelling from the M2 to Doncaster were at 6am and 5am, respectively, with a median travel time of 25 minutes and an interquartile range of 11 minutes. The longest median travel time was at 3am with a median of 35 minutes and the greatest uncertainty at 5pm with an interquartile range of 29 minutes.

**Figure A.86 40 route median and interquartile range travel times**



Source: BITRE estimates.

**Figure A.87 40 Performance over time**

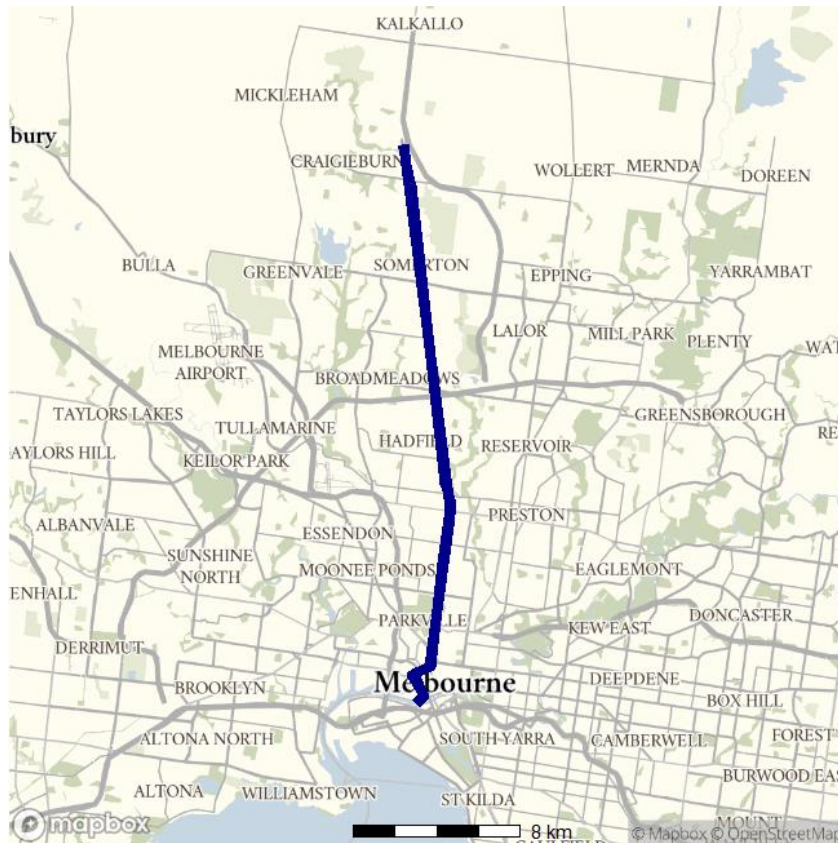


Source: BITRE estimates.

## Route 55 - Hume Freeway to Montague Street / Montague St to Hume Freeway

This surface route connects the Hume Freeway at Craigieburn and Montague Street in south Melbourne via Sydney Road through Somerton, Coburg and North Melbourne, skirting the CBD along Dudley Street and Wurundjeri Way.

Figure A.88 Route 55 route map



Source: BITRE estimates.

Table A.30 Route 55 route travel times and congestion measures, 2023

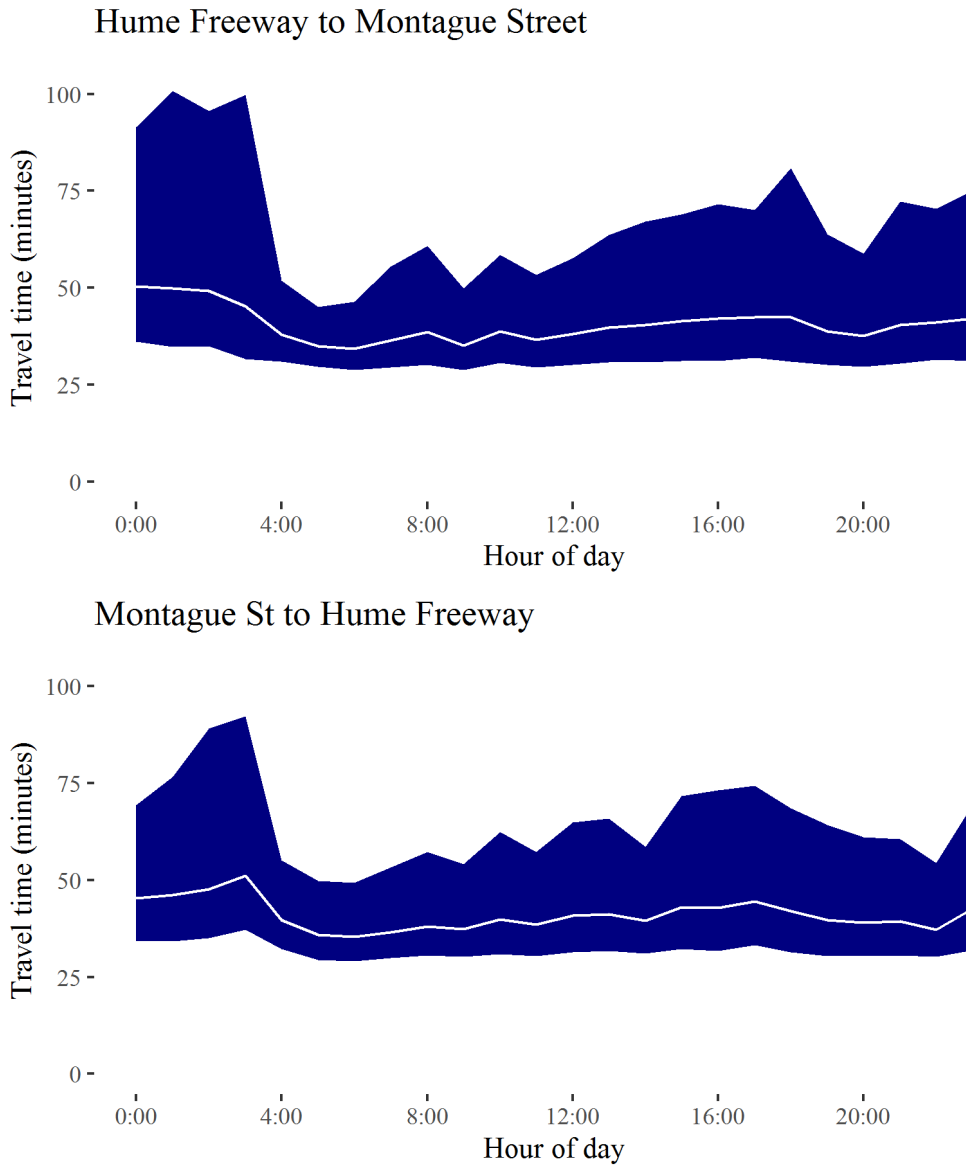
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Hume Freeway to Montague Street	00:34:19	00:50:17	1.182	00:15:27	01:08:16	2.386	28.3
Montague St to Hume Freeway	00:35:18	00:51:07	1.160	00:20:09	00:55:10	1.642	28.0

Source: BITRE estimates.

The best travel times and lowest uncertainty travelling from the Hume Freeway to Montague Street were at 6am and 5am, respectively, with a median travel time of 34 minutes and an interquartile range of 15 minutes. The longest median travel time was at midnight with a median of 50 minutes and the greatest uncertainty at 3am with an interquartile range of 1 hour 8 minutes.

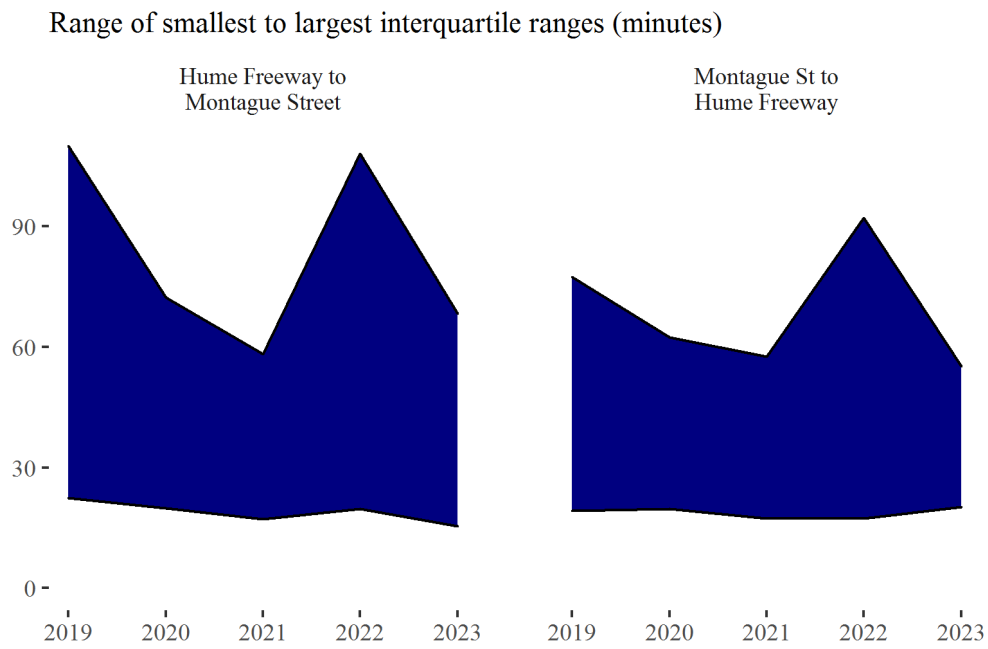
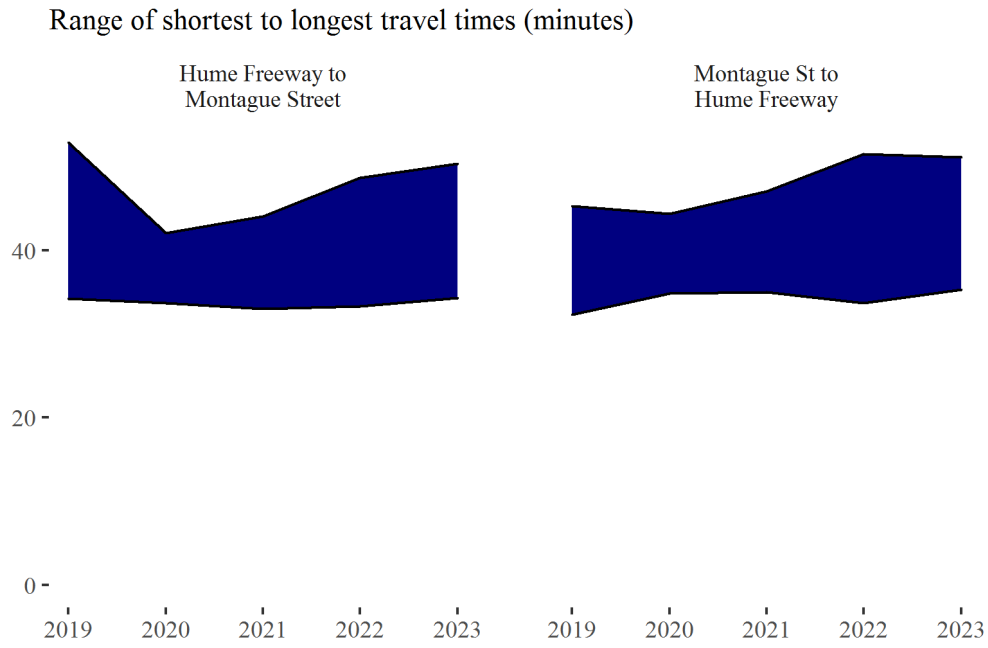
The best median travel time for journeys from Montague St to the Hume Freeway was 35 minutes at 6am and the lowest uncertainty was at 6am with an interquartile range of 20 minutes. The longest median travel times and greatest uncertainty were at 3am with a median of 51 minutes and an interquartile range of 55 minutes.

**Figure A.89** Route 55 route median and interquartile range travel times



Source: BITRE estimates.

**Figure A.90 Route 55 Performance over time**

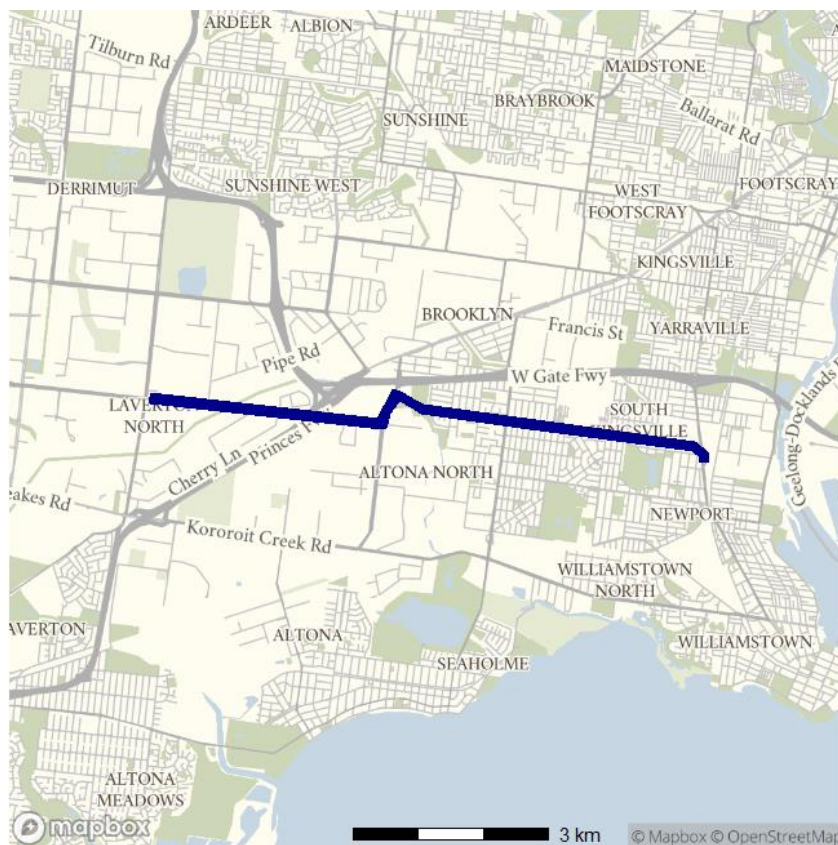


Source: BITRE estimates.

## Route 56 - Laverton to Spotswood / Spotswood to Laverton

This surface route travels a short distance (9 kilometres) between Laverton and Spotswood in Melbourne's west using Dohertys Road, Grieve Parade and Blackshaws Road and passes a number of light industrial areas.

**Figure A.91** Route 56 route map



Source: BITRE estimates.

**Table A.31** Route 56 route travel times and congestion measures, 2023

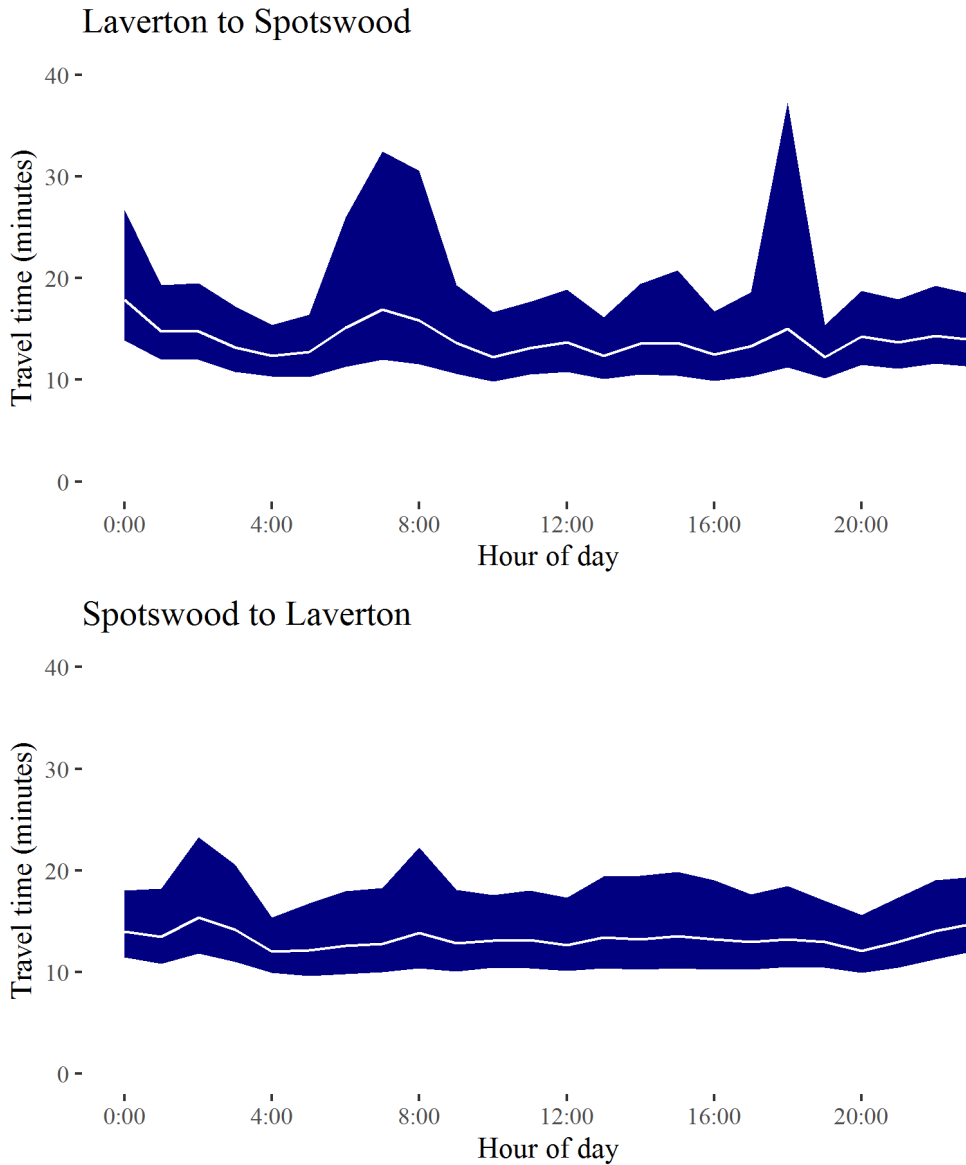
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Laverton to Spotswood	00:12:15	00:17:51	1.139	00:05:04	00:26:03	1.902	9.1
Spotswood to Laverton	00:12:01	00:15:21	1.104	00:05:27	00:11:51	1.470	9.1

Source: BITRE estimates.

The best travel times and lowest uncertainty travelling from Laverton to Spotswood were at 7pm and 4am, respectively, with a median travel time of 12 minutes and an interquartile range of 5 minutes. The longest median travel time was 18 minutes at midnight and the greatest uncertainty was at 6pm with an interquartile range of 26 minutes.

The best median travel times and least uncertainty for journeys from Spotswood to Laverton were at 4am with a median travel time of 12 minutes and an interquartile range of 5.5 minutes. The longest median travel time was at 2am with a median of 15 minutes and the greatest uncertainty at 8am with an interquartile range of 12 minutes.

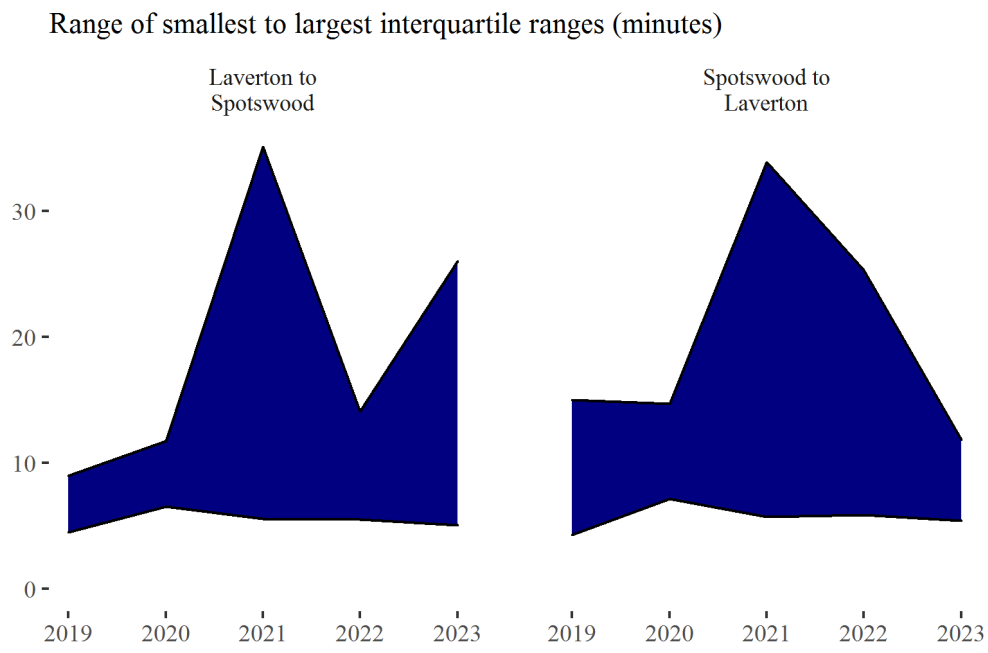
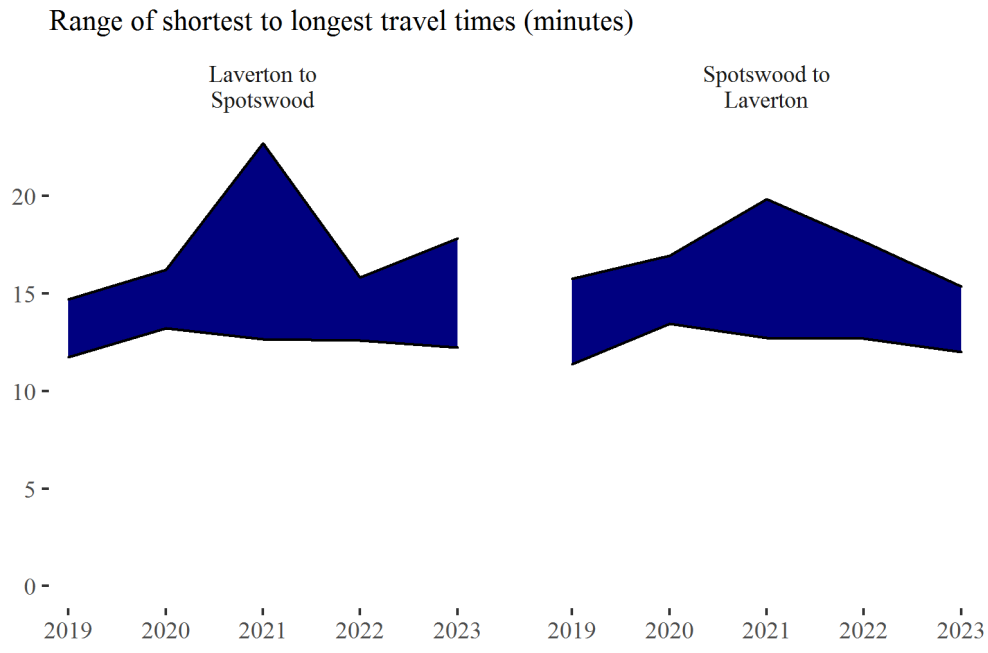
**Figure A.92** Route 56 route median and interquartile range travel times



Source: BITRE estimates.



**Figure A.93 Route 56 Performance over time**

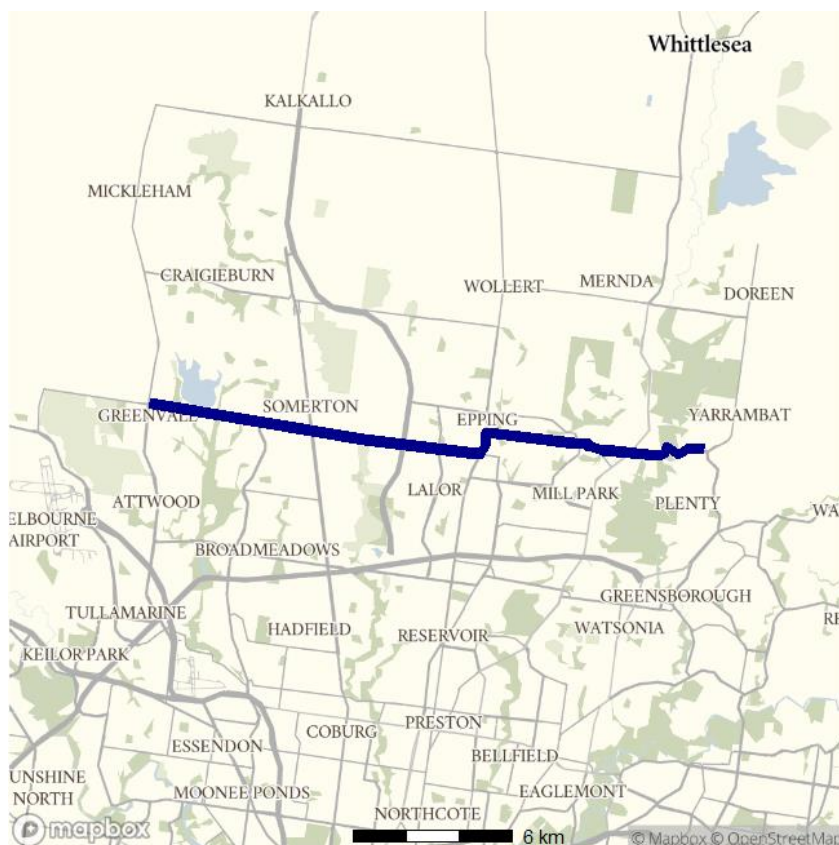


Source: BITRE estimates.

## Route 58 - Greenvale to Yan Yean Road / Yan Yean Road to Greenvale

This surface route extends across Melbourne's northern fringe connecting Mickleham Road in the west and the intersection of Gorge Road and Yan Yean Road near Plenty in northeast Melbourne. It uses Somerton Road, Cooper Street, High Street and McDonalds Road.

Figure A.94 Route 58 route map



Source: BITRE estimates.

Table A.32 Route 58 route travel times and congestion measures, 2023

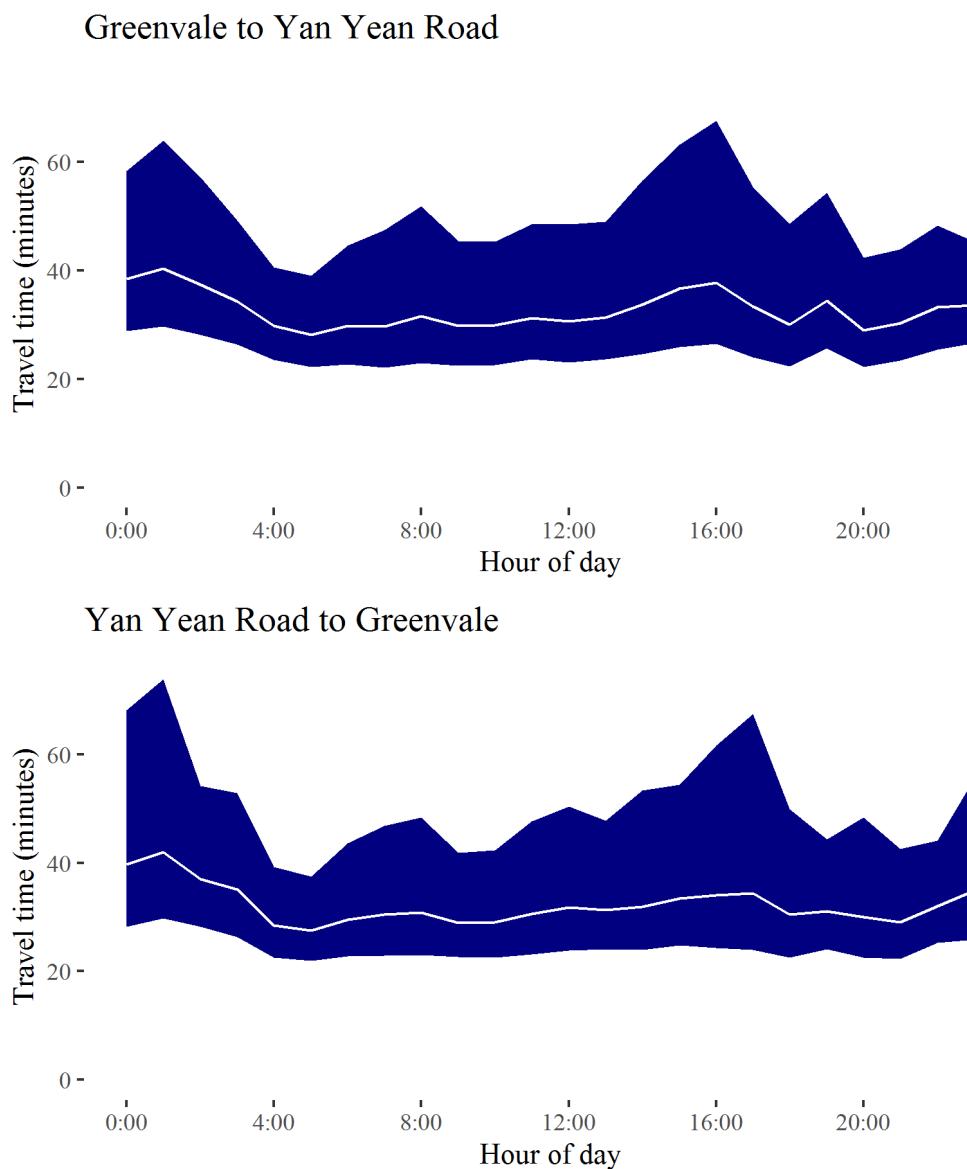
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Greenvale to Yan Yean Road	00:28:06	00:40:24	1.164	00:16:49	00:41:07	1.551	22.3
Yan Yean Road to Greenvale	00:27:30	00:42:02	1.172	00:15:35	00:44:06	1.698	22.2

Source: BITRE estimates.

The best median travel times and lowest uncertainty for journeys from Greenvale to Yan Yean Road were at 5am, with a median travel time of 28 minutes and an interquartile range of 17 minutes. The longest median travel time was at 1am with a median of 40 minutes and the greatest uncertainty at 4pm with an interquartile range of 41 minutes.

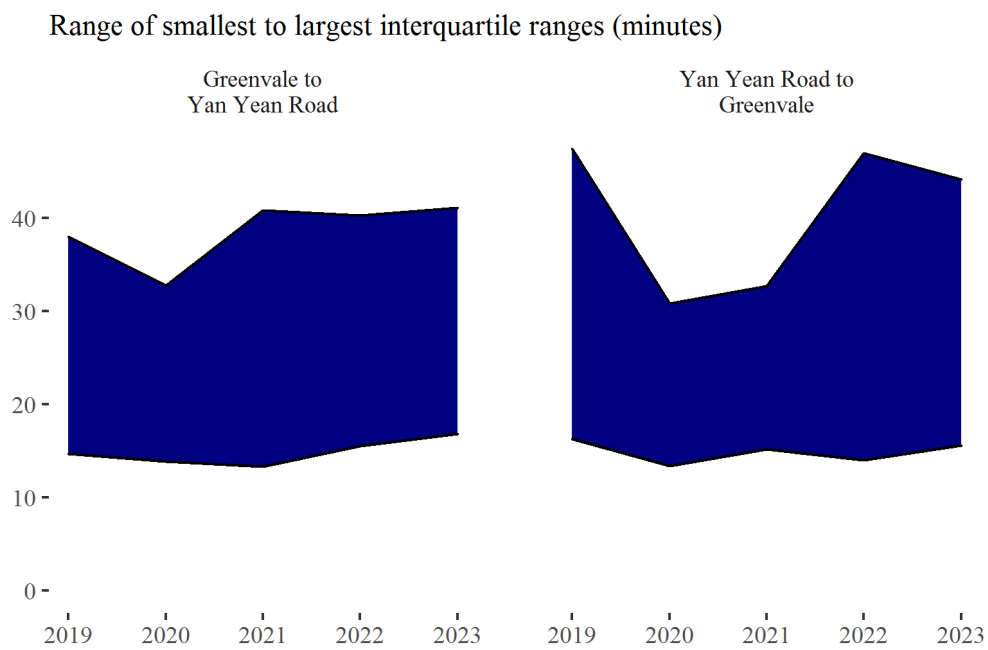
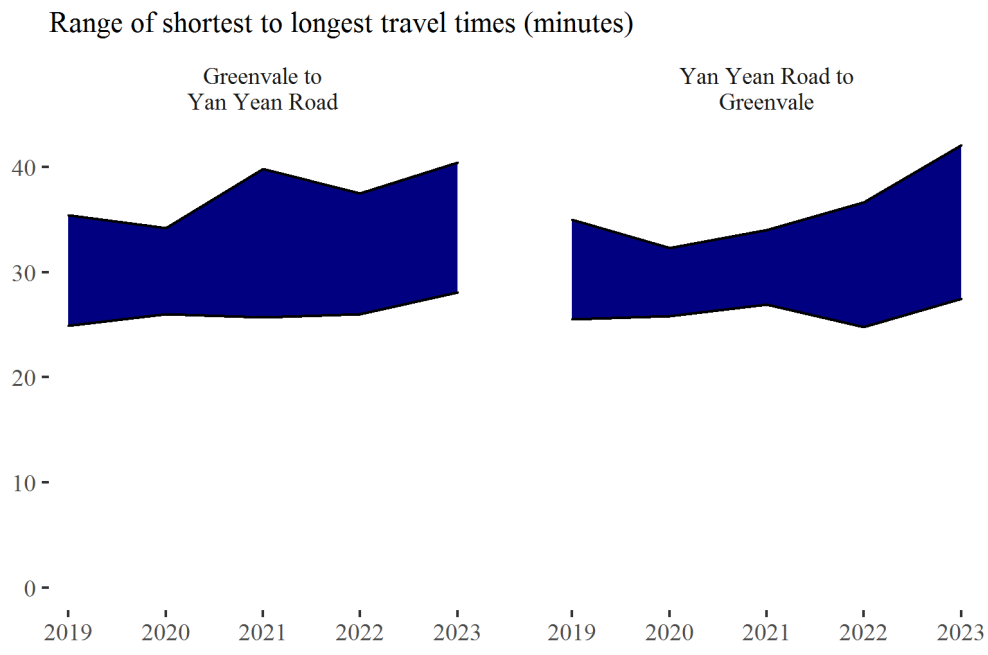
The best median travel times and lowest uncertainty for journeys from Yan Yean Road to Greenvale were at 5am with a median travel time of 28 minutes and an interquartile range of 16 minutes. The longest median travel times and greatest uncertainty were at 1am with a median of 42 minutes and an interquartile range of 44 minutes.

**Figure A.95** Route 58 route median and interquartile range travel times



Source: BITRE estimates.

**Figure A.96 Route 58 Performance over time**

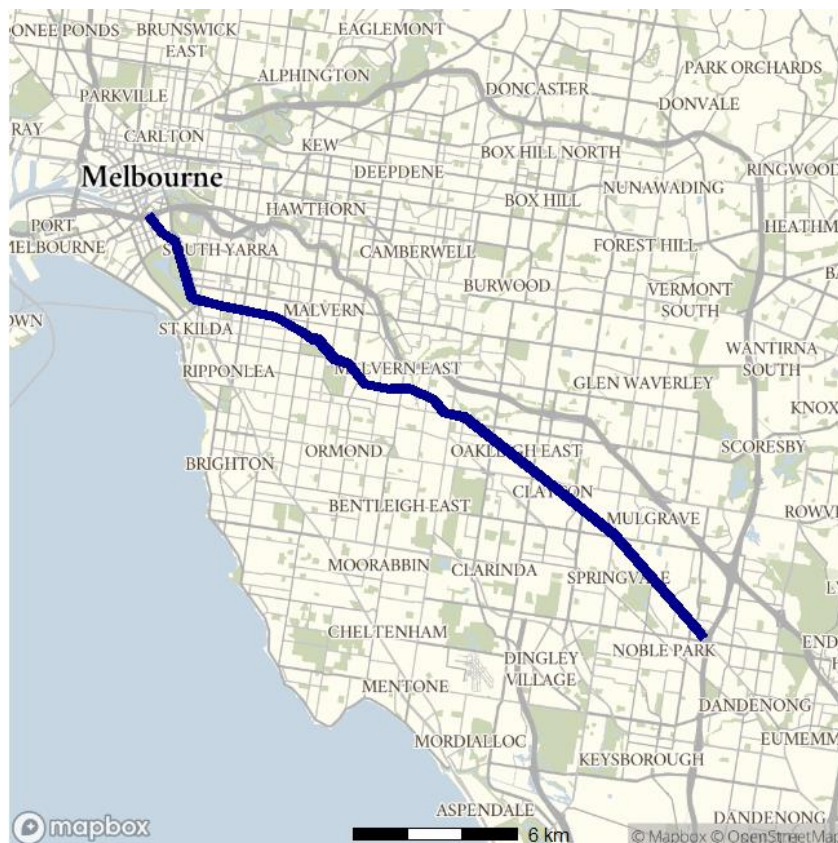


Source: BITRE estimates.

## A60 - M3 to Southbank / Southbank to M3

This surface route travels southeast from the Melbourne CBD roughly parallel to, but south of, the M1 (East). From Southbank it passes through suburbs including Prahran, Oakleigh and Springvale before meeting the M3 at Noble Park. It is also known as the Princes Highway.

**Figure A.97 A60 route map**



Source: BITRE estimates.

**Table A.33 A60 route travel times and congestion measures, 2023**

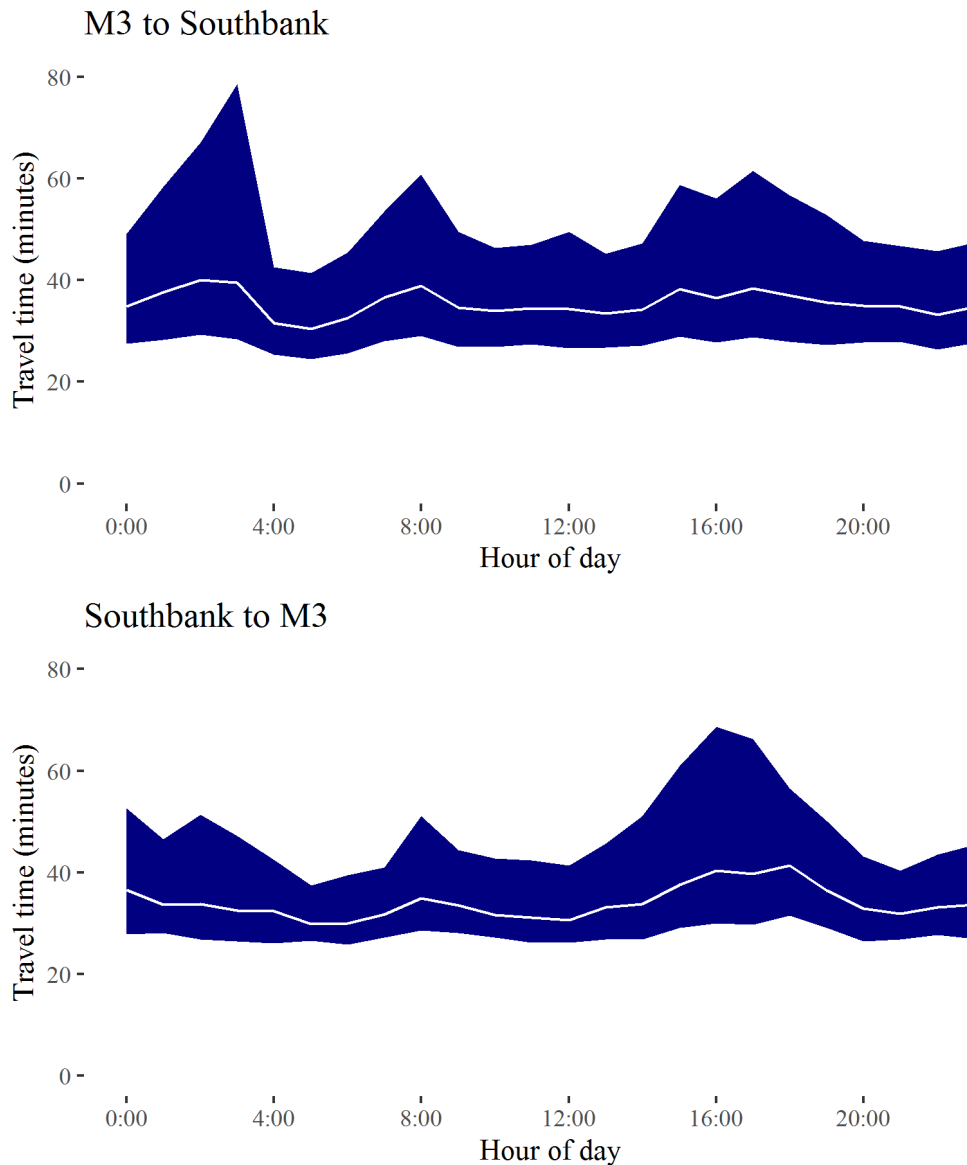
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
M3 to Southbank	00:30:27	00:40:02	1.163	00:16:53	00:50:07	1.473	26.9
Southbank to M3	00:29:53	00:41:20	1.138	00:10:52	00:38:42	1.878	26.8

Source: BITRE estimates.

The best median travel times and lowest uncertainty for journeys from the M3 to Southbank were at 5am, with a median travel time of 30 minutes and an interquartile range of 17 minutes. The longest median travel time was 40 minutes at 2am and the greatest uncertainty was at 3am with an interquartile range of 50 minutes.

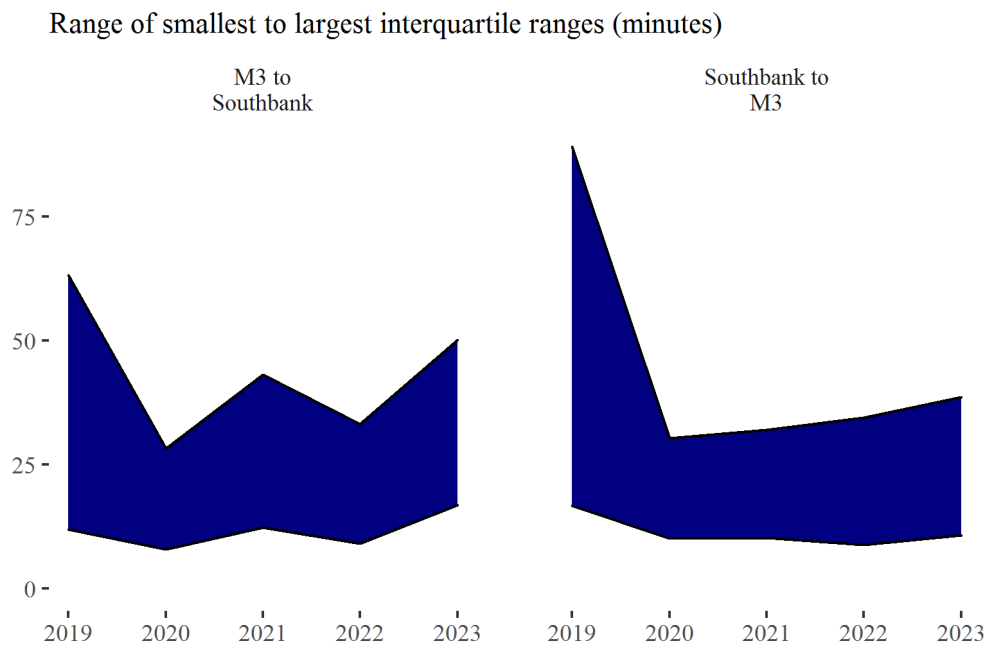
The best median travel times and lowest uncertainty for journeys from Southbank to the M3 were at 5am, with a median travel time of 30 minutes and an interquartile range of 11 minutes. The longest median travel time was 41 minutes at 6pm and the greatest uncertainty was at 4pm with an interquartile range of 39 minutes.

**Figure A.98 A60 route median and interquartile range travel times**



Source: BITRE estimates.

**Figure A.99 A60 Performance over time**

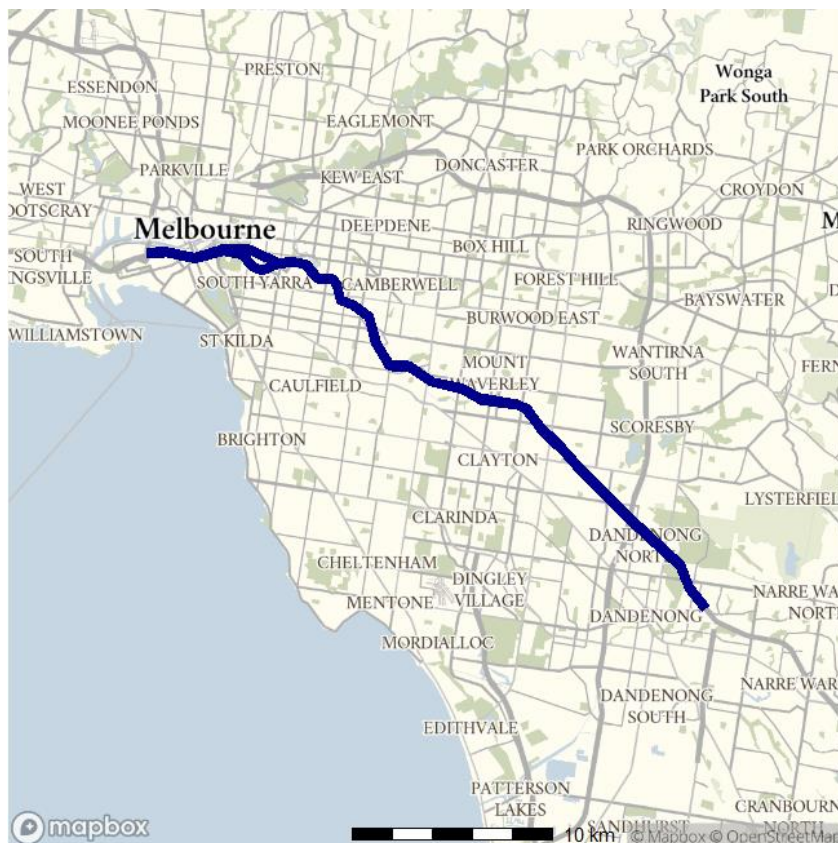


Source: BITRE estimates.

## M1 (East) - City to M420 / M420 to City

This route follows the M1 connecting Port Melbourne and the South Gippsland Freeway (M420) on Melbourne's southeast fringe. It serves light industrial areas around Dandenong and interregional freight from Gippsland. For most of its length it is known as the Monash Freeway.

Figure A.100 M1 (East) route map



Source: BITRE estimates.

Table A.34 M1 (East) route travel times and congestion measures, 2023

Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
City to M420	00:25:14	00:32:13	1.092	00:03:30	00:31:59	3.244	36.0
M420 to City	00:25:28	00:38:18	1.088	00:03:52	00:31:50	3.210	36.5

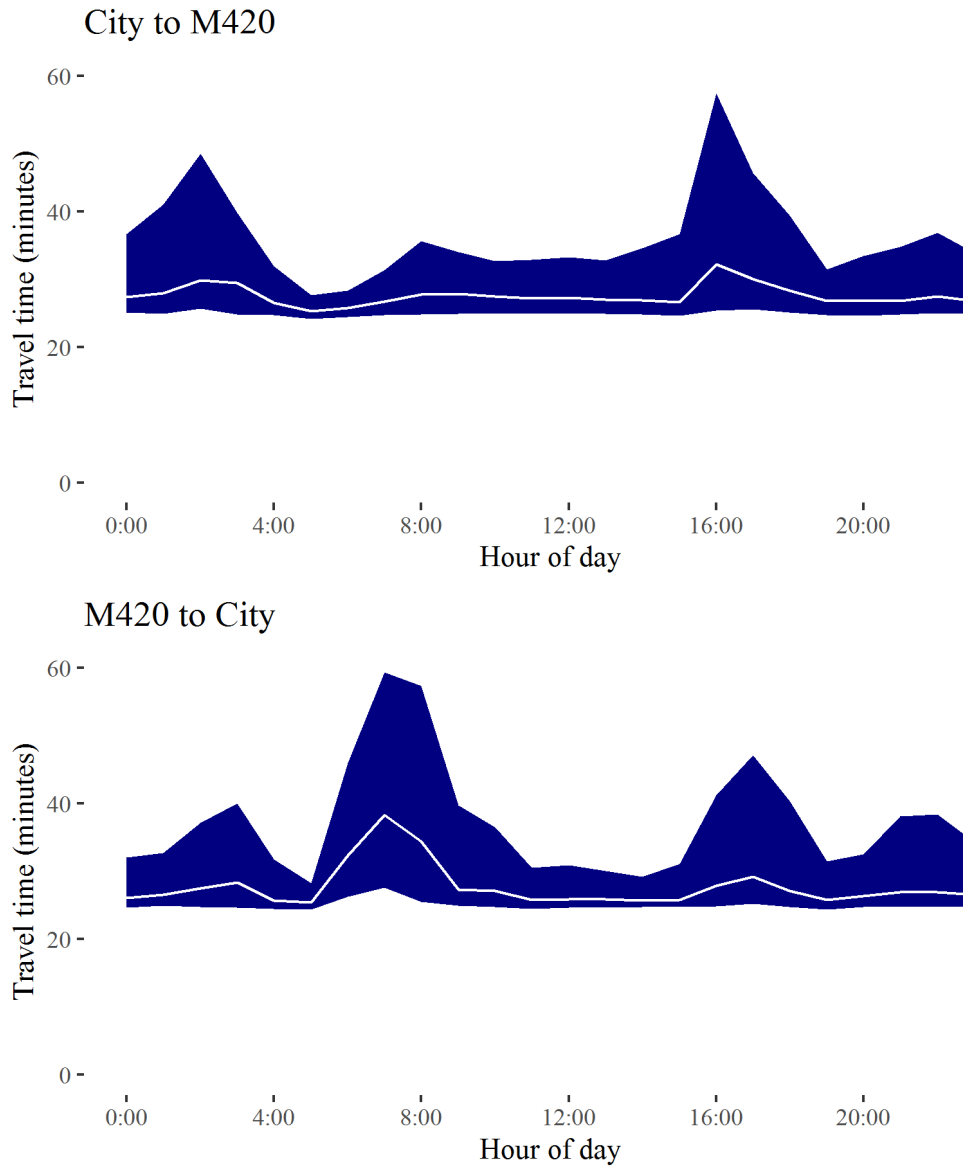
Source: BITRE estimates.



The best median travel times and least uncertainty for journeys from the City to the M420 were at 5am, with a median travel time of 25 minutes and an interquartile range of 3.5 minutes. The longest median travel times and greatest uncertainty were at 4pm with a median of 32 minutes and an interquartile range of 32 minutes.

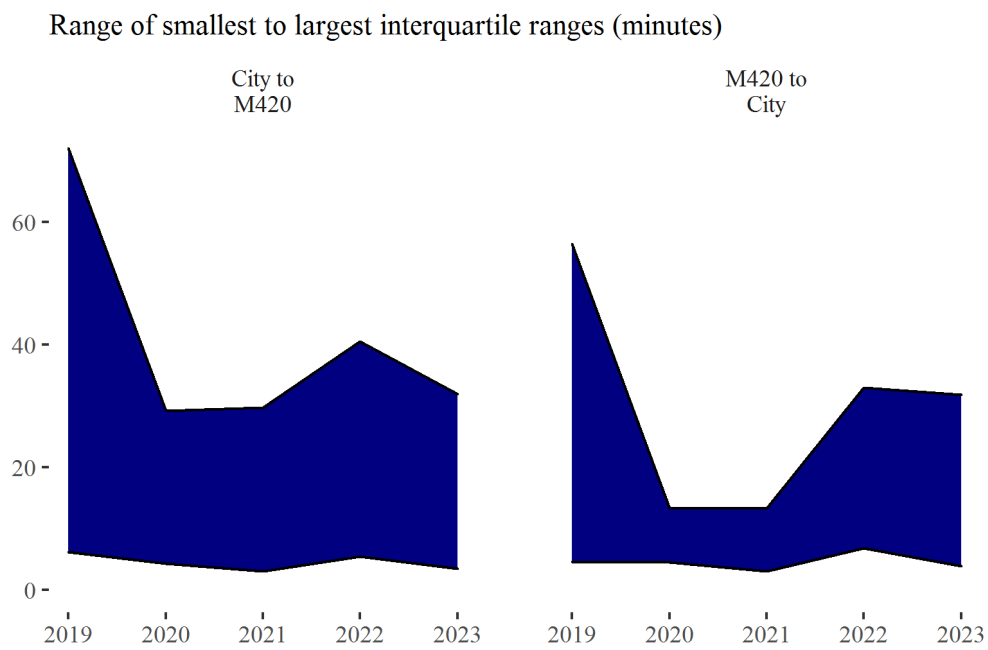
The best median travel time for journeys from the M420 to the City was 25 minutes at 5am and the lowest uncertainty was at 5am with an interquartile range of 4 minutes. The longest median travel time was 38 minutes at 7am and the greatest uncertainty was at 8am with an interquartile range of 32 minutes.

**Figure A.101 M1 (East) route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.102 M1 (East) Performance over time

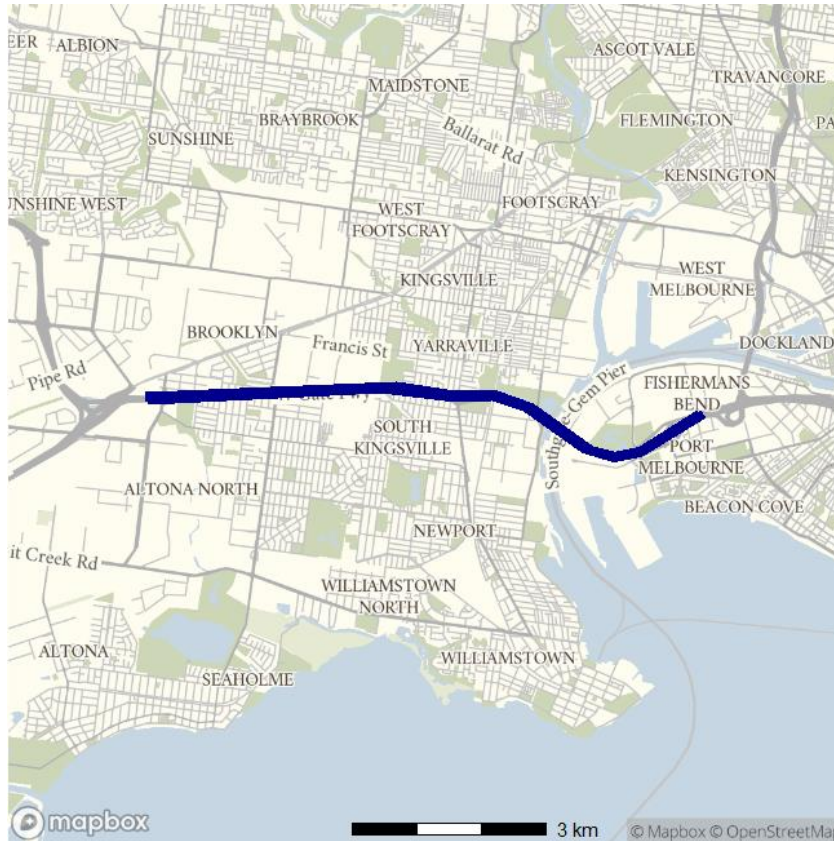


Source: BITRE estimates.

### M1 (West) - City to M80 / M80 to City

This route follows the West Gate Freeway (M1) connecting at its confluence with the Western Ring Road (M80) at Altona and the M2 at Port Melbourne. It serves extensive freight areas around the Port of Melbourne precinct and Melbourne’s inner west.

Figure A.103 M1 (West) route map



Source: BITRE estimates.

Table A.35 M1 (West) route travel times and congestion measures, 2023

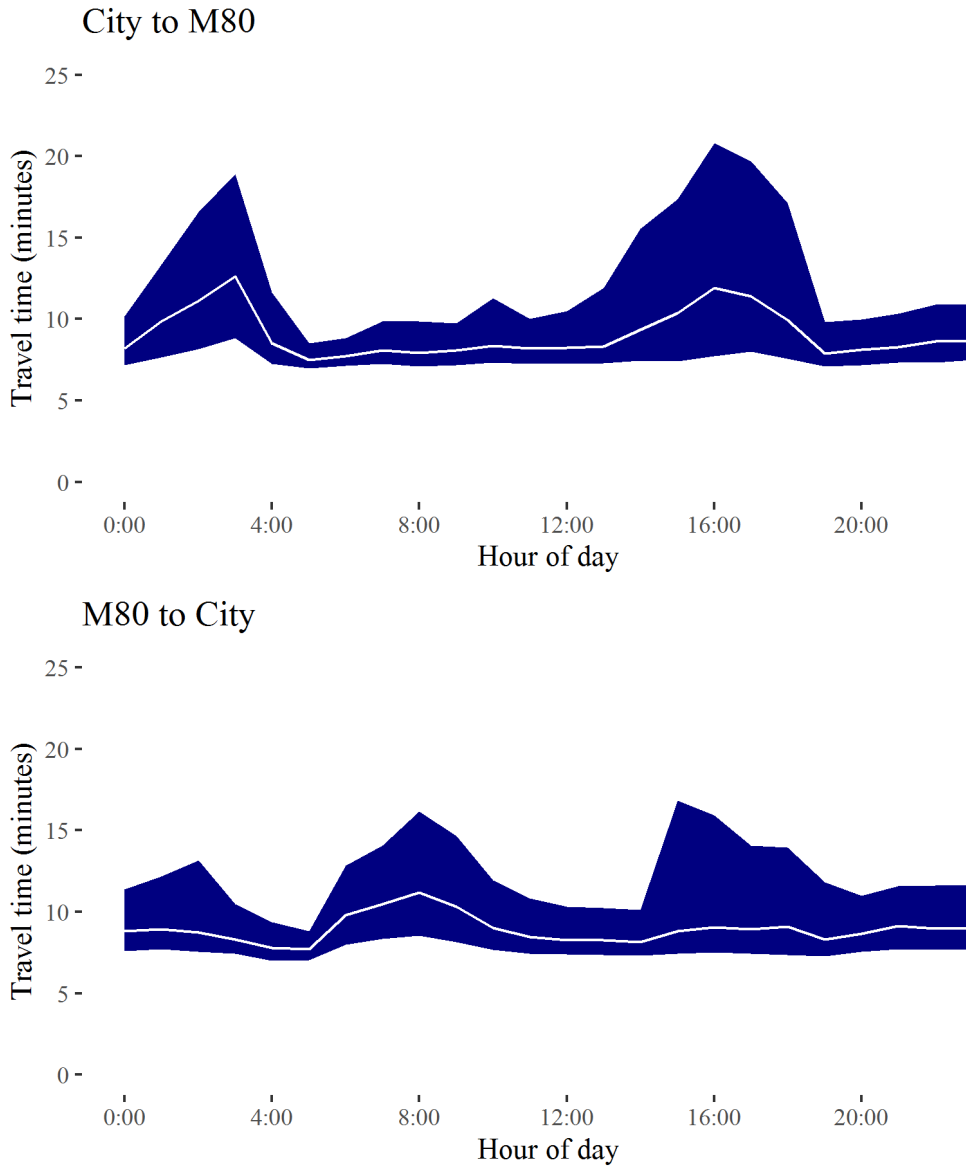
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
City to M80	00:07:29	00:12:36	1.210	00:01:32	00:13:03	3.403	9
M80 to City	00:07:42	00:11:10	1.159	00:01:48	00:09:23	2.616	9

Source: BITRE estimates.

The best median travel times and lowest uncertainty for journeys from City to M80 were at 5am, with a median travel time of 7.5 minutes and an interquartile range of 1.5 minute. The longest median travel time was 13 minutes at 3am and the greatest uncertainty was at 4pm with an interquartile range of 13 minutes.

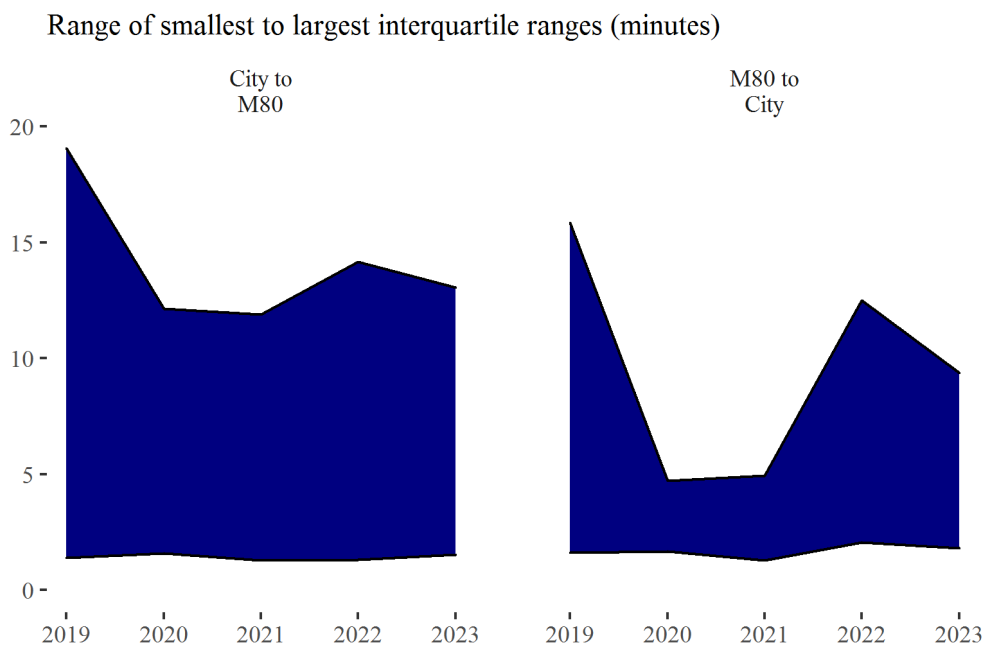
The best median travel times and lowest uncertainty for journeys from M80 to City were at 5am, with a median travel time of 8 minutes and an interquartile range of 2 minutes. The longest median travel time was 11 minutes at 8am and the greatest uncertainty was at 3pm with an interquartile range of 9 minutes.

**Figure A.104 M1 (West) route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.105 M1 (West) Performance over time

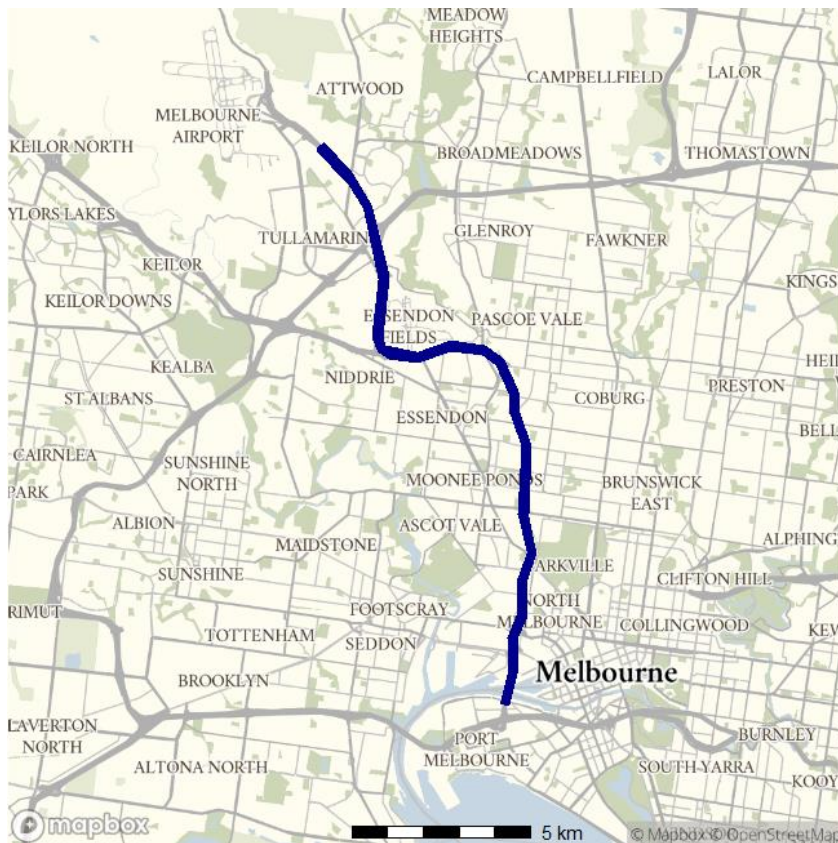


Source: BITRE estimates.

### M2 - CityLink then Tullamarine / Tullamarine then CityLink

This route connects Melbourne Airport and the M1 at Port Melbourne via the CityLink toll road and Tullamarine Freeway.

Figure A.106 M2 route map



Source: BITRE estimates.

Table A.36 M2 route travel times and congestion measures, 2023

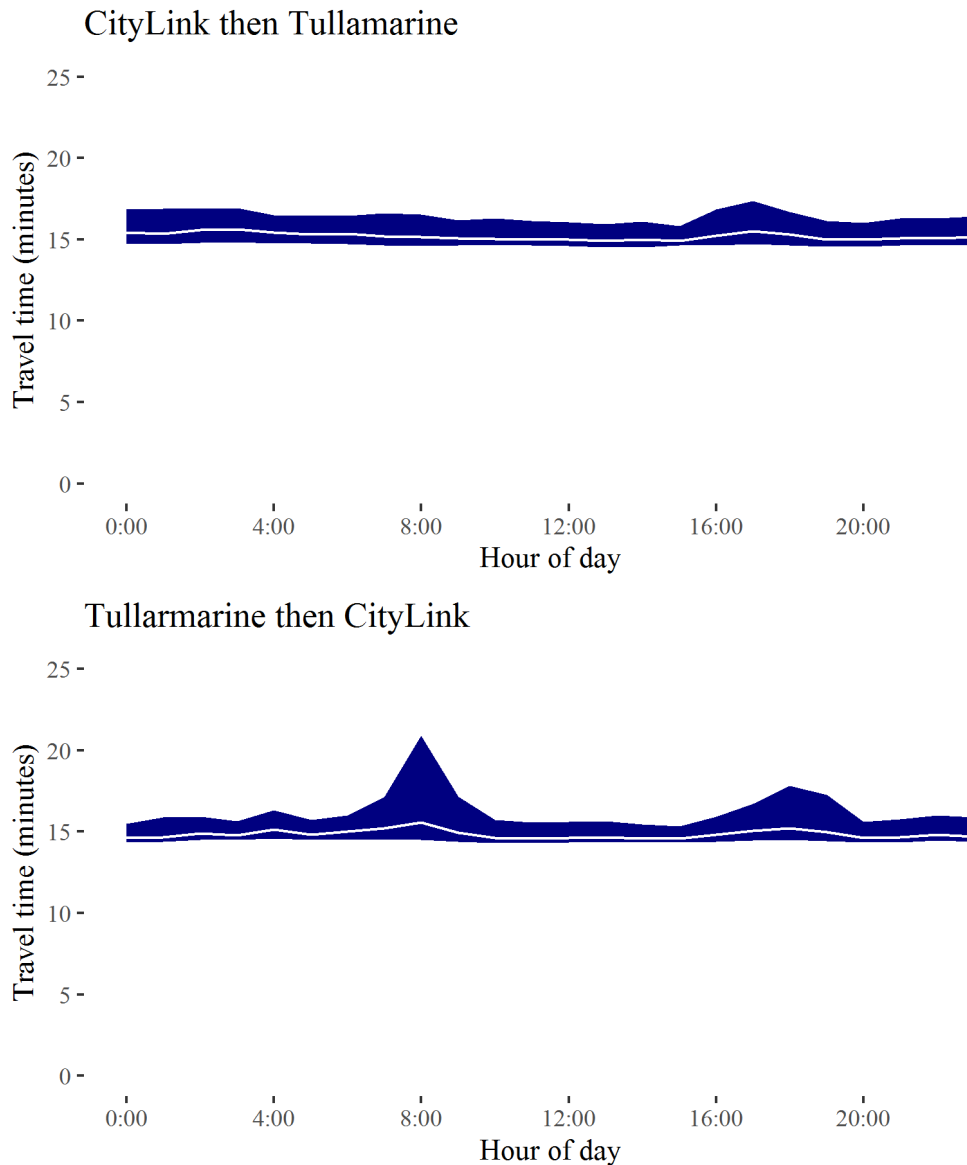
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
CityLink then Tullamarine	00:14:55	00:15:38	1.019	00:01:11	00:02:38	1.498	19.8
Tullamarine then CityLink	00:14:34	00:15:34	1.018	00:01:01	00:06:25	1.828	19.8

Source: BITRE estimates.

The best median travel times and lowest uncertainty for journeys from CityLink then Tullamarine were at 1pm, with a median travel time of 15 minutes and an interquartile range of 71 seconds. The longest median travel time was at 3am with a median of 16 minutes and the greatest uncertainty at 5pm with an interquartile range of 3 minutes.

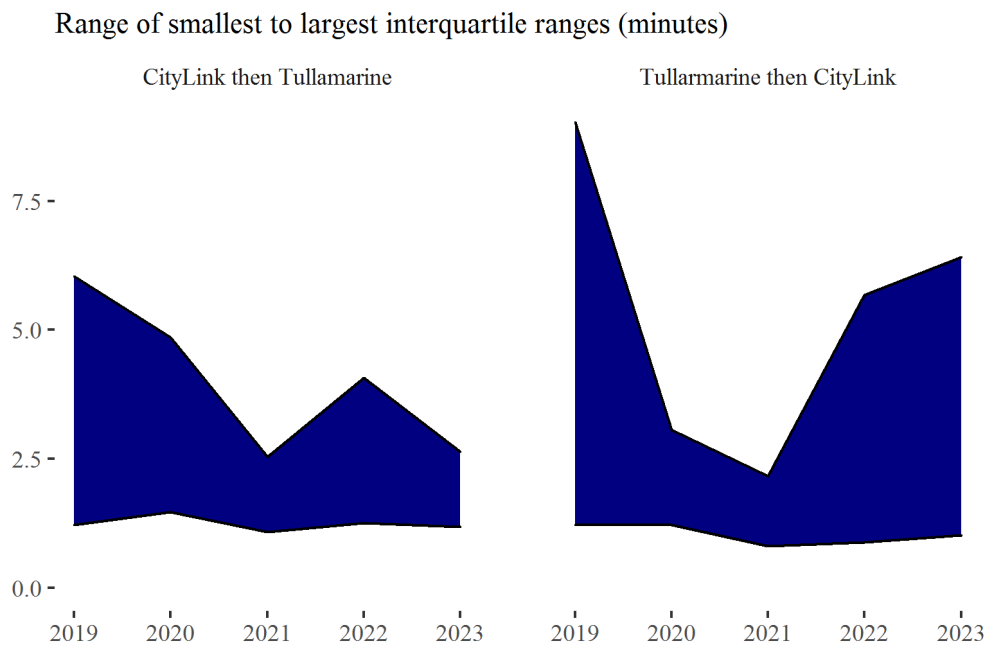
The best median travel time for journeys from Tullamarine then CityLink was 15 minutes at 3pm and the lowest uncertainty was at 3pm with an interquartile range of just over 1 minute. The longest median travel times and greatest uncertainty were at 8am with a median of 16 minutes and an interquartile range of 6 minutes.

**Figure A.107 M2 route median and interquartile range travel times**



Source: BITRE estimates.

**Figure A.108 M2 Performance over time**



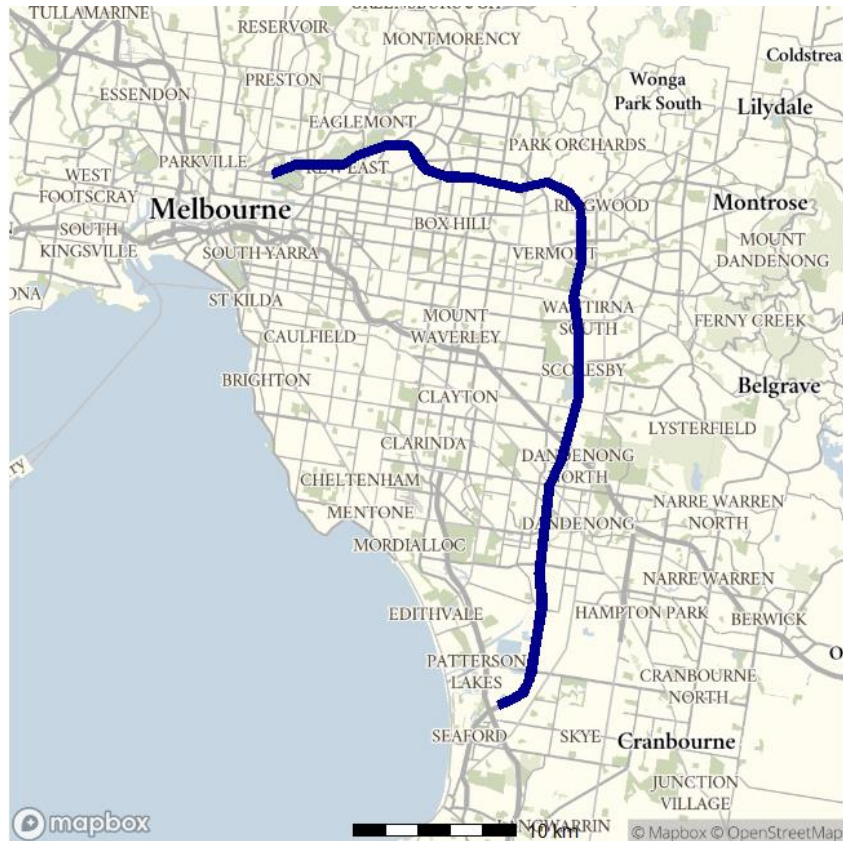
Source: BITRE estimates.



### M3 - Frankston to Hoddle Street / Hoddle St to Frankston

This route runs between Abbotsford, northeast of the CBD, and Frankston in Melbourne's far south east. It uses the Eastern Freeway, Eastlink and the Frankston Freeway.

**Figure A.109 M3 route map**



Source: BITRE estimates.

**Table A.37 M3 route travel times and congestion measures, 2023**

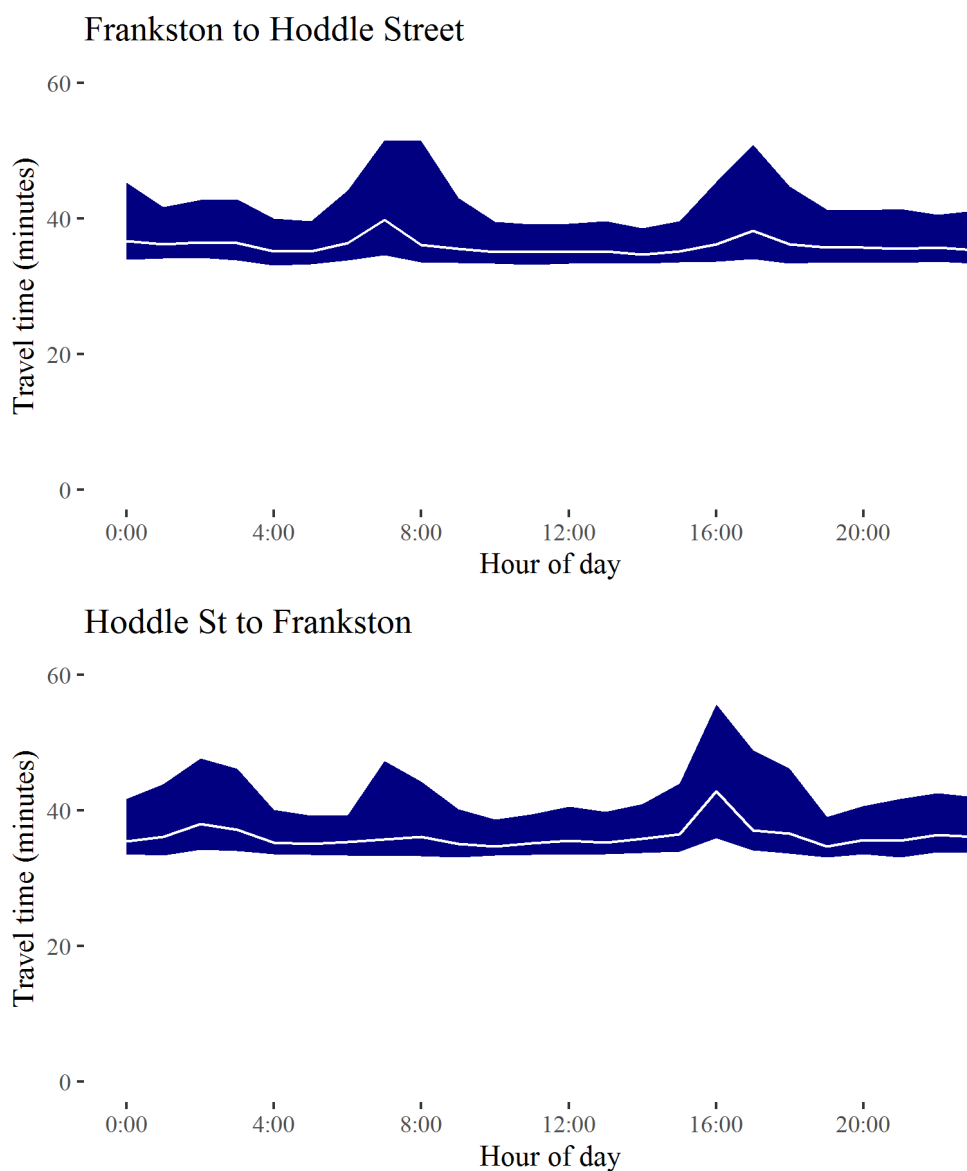
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Frankston to Hoddle Street	00:34:40	00:39:49	1.036	00:05:14	00:17:56	1.740	53.0
Hoddle St to Frankston	00:34:44	00:42:53	1.041	00:05:17	00:19:42	1.754	53.3

Source: BITRE estimates.

The best median travel time for journeys from Frankston to Hoddle Street was 35 minutes at 2pm and the lowest uncertainty was at 2pm with an interquartile range of 5 minutes. The longest median travel time was 40 minutes at 7am and the greatest uncertainty was at 8am with an interquartile range of 18 minutes.

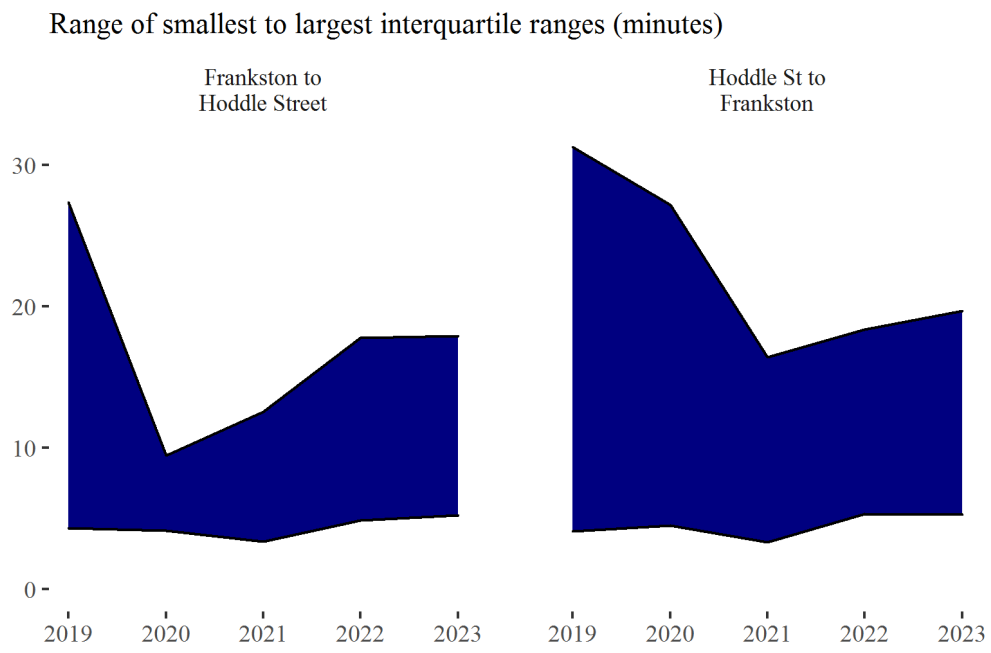
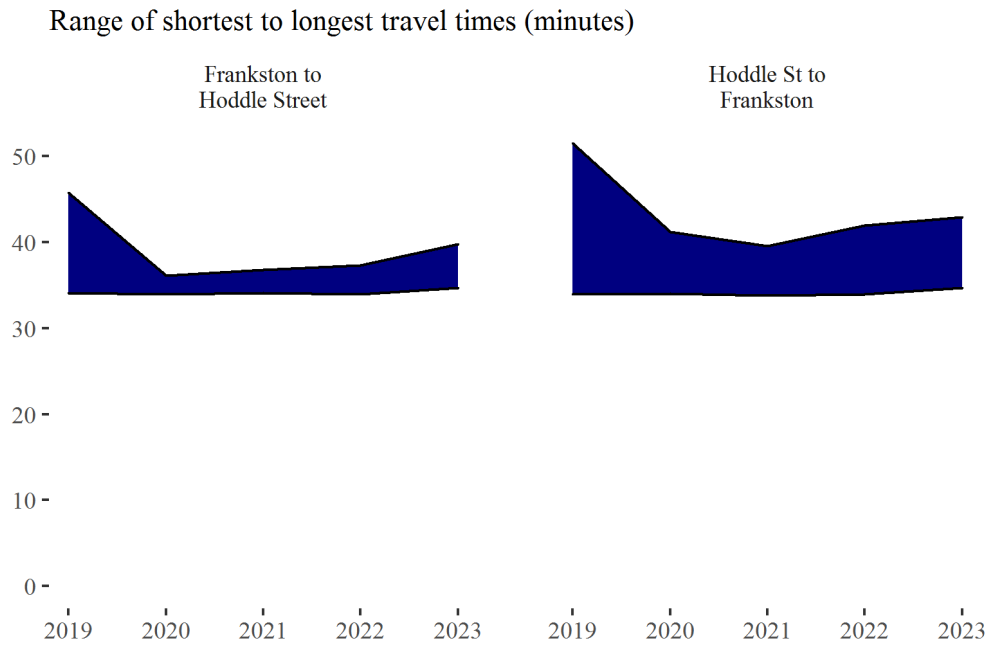
The best median travel times and lowest uncertainty for journeys from Hoddle St to Frankston were at 7pm, with a median travel time of 35 minutes and an interquartile range of 5 minutes. The longest median travel times and greatest uncertainty were at 4pm, with a median of 43 minutes and an interquartile range of 20 minutes.

**Figure A.110 M3 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.111 M3 Performance over time

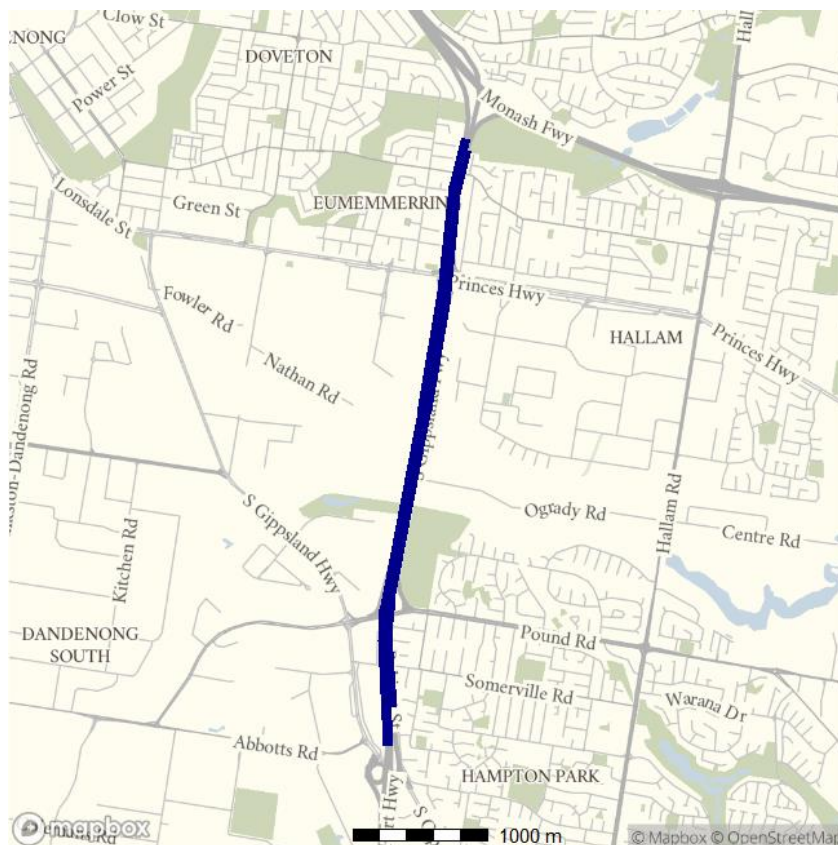


Source: BITRE estimates.

## M420 - Monash Freeway to South Gippsland Highway / South Gippsland Highway to Monash Freeway

This short (4.5 kilometre) route connects the M1 (East) to the South Gippsland Highway at Lyndhurst, servicing industrial areas in Melbourne's south east, via the South Gippsland Freeway.

**Figure A.112 M420 route map**



Source: BITRE estimates.

**Table A.38 M420 route travel times and congestion measures, 2023**

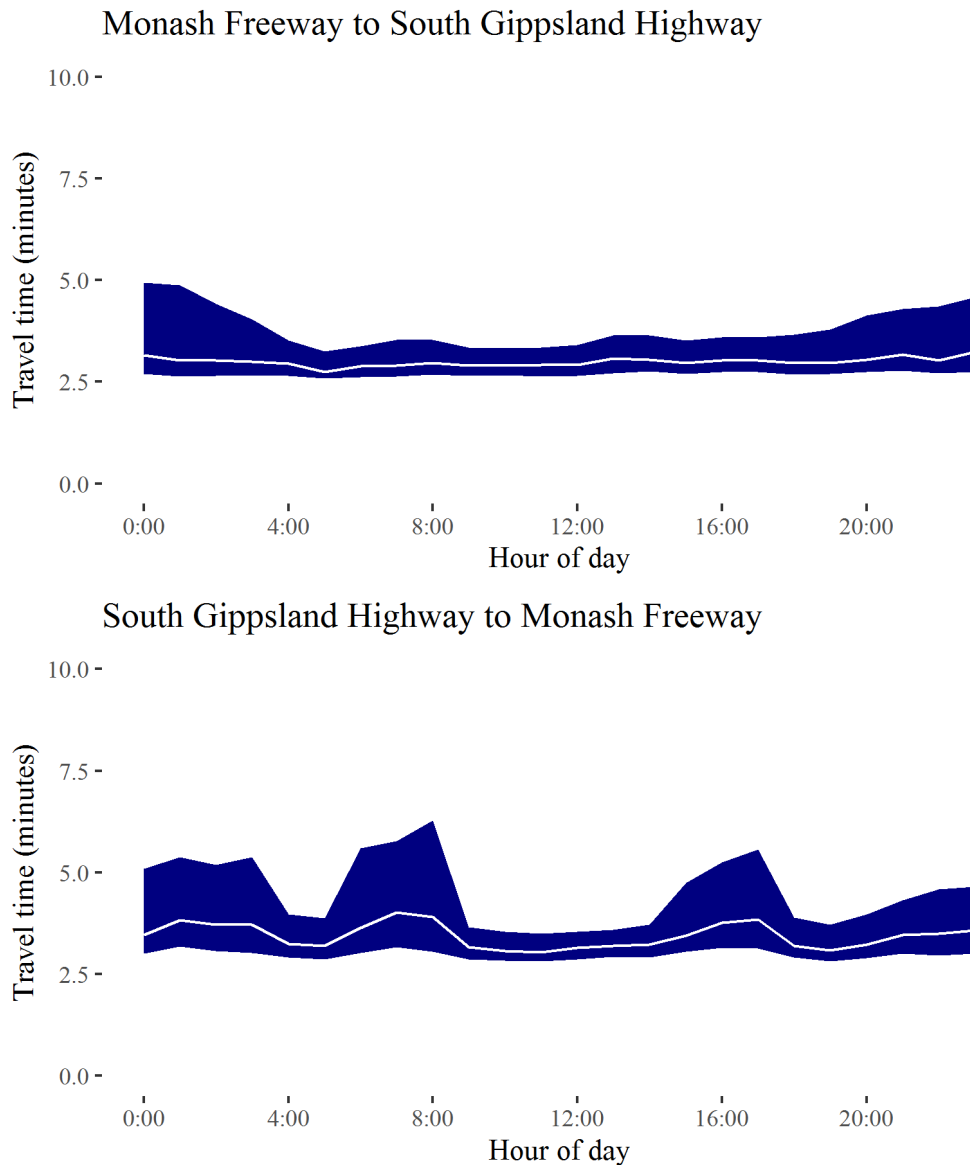
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Monash Freeway to South Gippsland Highway	00:02:44	00:03:14	1.092	00:00:39	00:02:15	1.728	4.2
South Gippsland Highway to Monash Freeway	00:03:02	00:04:01	1.137	00:00:40	00:03:14	2.321	4.6

Source: BITRE estimates.

The best travel times and lowest uncertainty travelling from the Monash Freeway to the South Gippsland Highway were at 5am and 10am, respectively, with a median travel time of 3 minutes and an interquartile range of 39 seconds. The longest median travel time was 3 minutes at 11pm and the greatest uncertainty was at 1am with an interquartile range of 2 minutes.

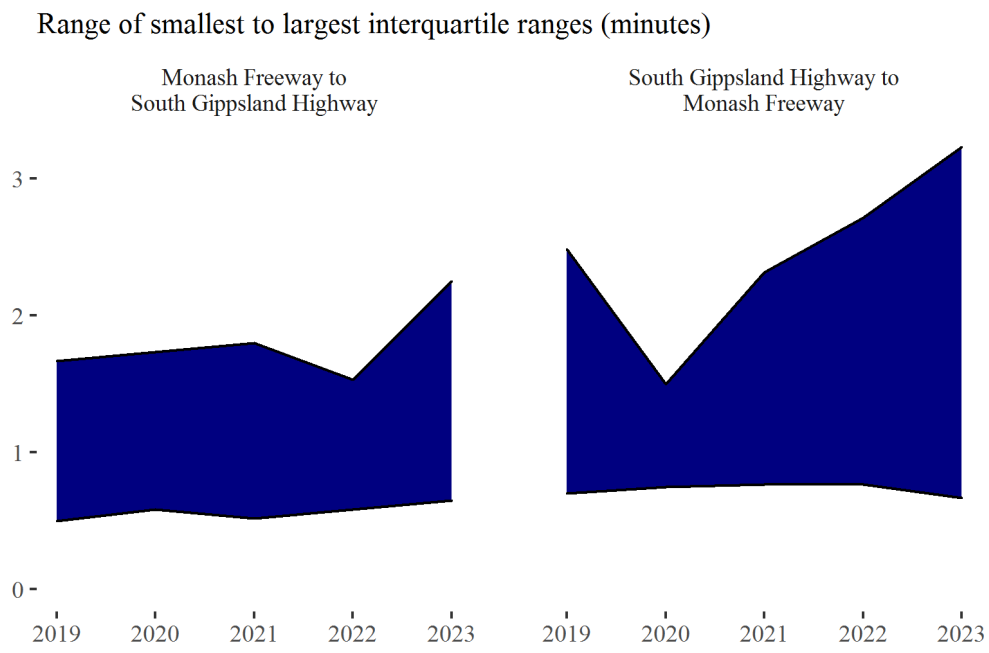
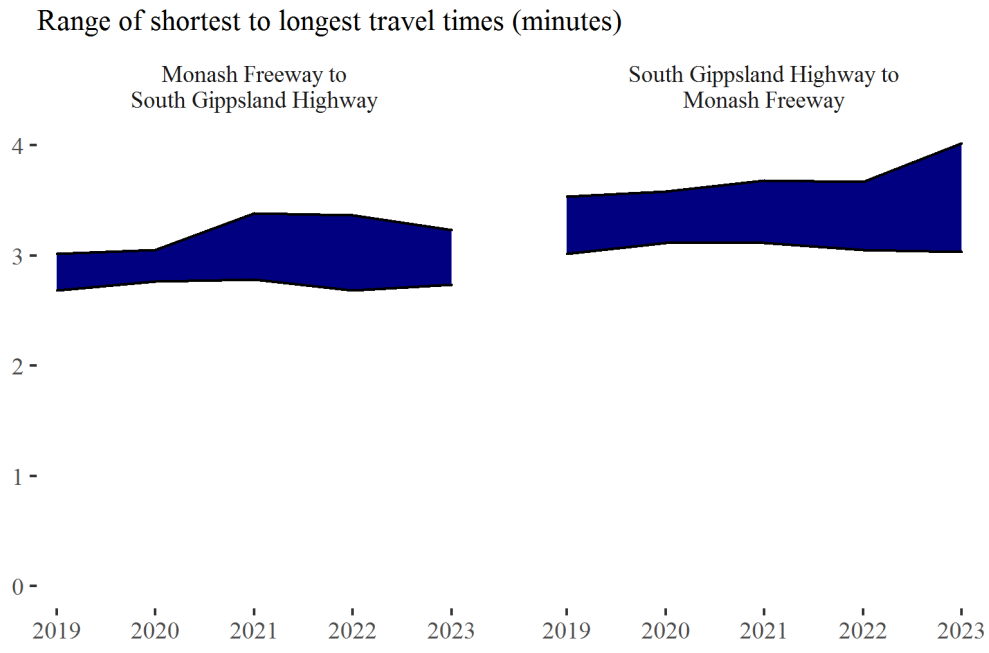
The best median travel times and lowest uncertainty for journeys from the South Gippsland Highway to the Monash Freeway was at 11am with a median travel time of 3 minutes and an interquartile range of 40 seconds. The longest median travel time was 4 minutes at 7am and the greatest uncertainty was at 8am with an interquartile range of 3 minutes.

**Figure A.113 M420 route median and interquartile range travel times**



Source: BITRE estimates.

**Figure A.114 M420 Performance over time**

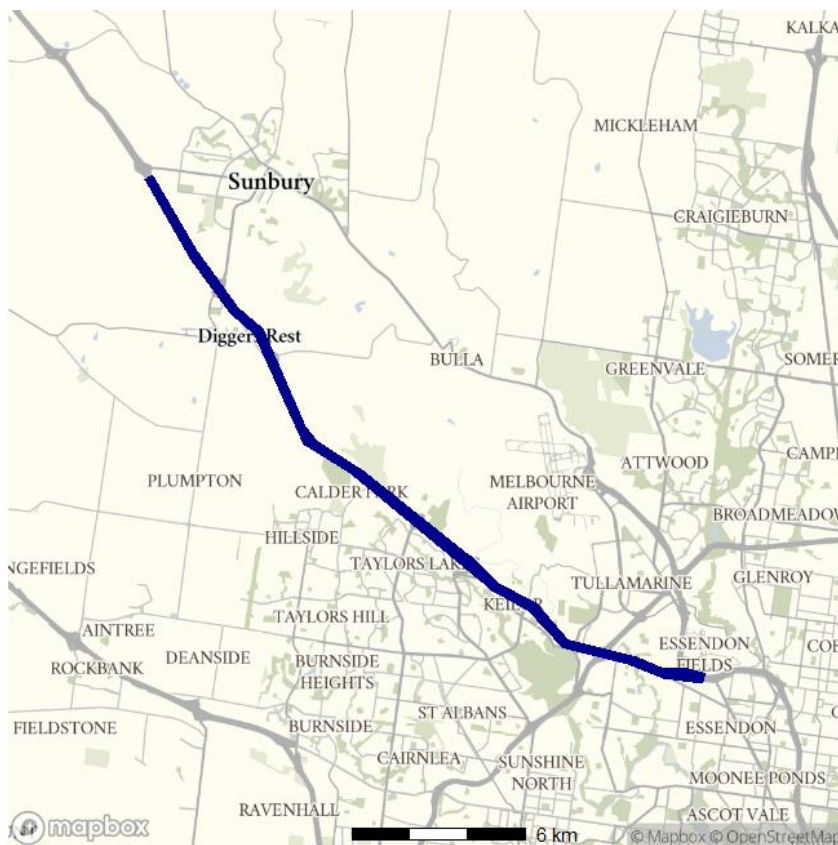


Source: BITRE estimates.

## M79 - Essendon to Gap Road / Gap Road to Essendon

This lengthy motorway route follows the A79/M79 from Gap Road, west of Sunbury, to Essendon where it joins the CityLink toll road. For most of its length it is known as the Calder Freeway.

Figure A.115 M79 route map



Source: BITRE estimates.

Table A.39 M79 route travel times and congestion measures, 2023

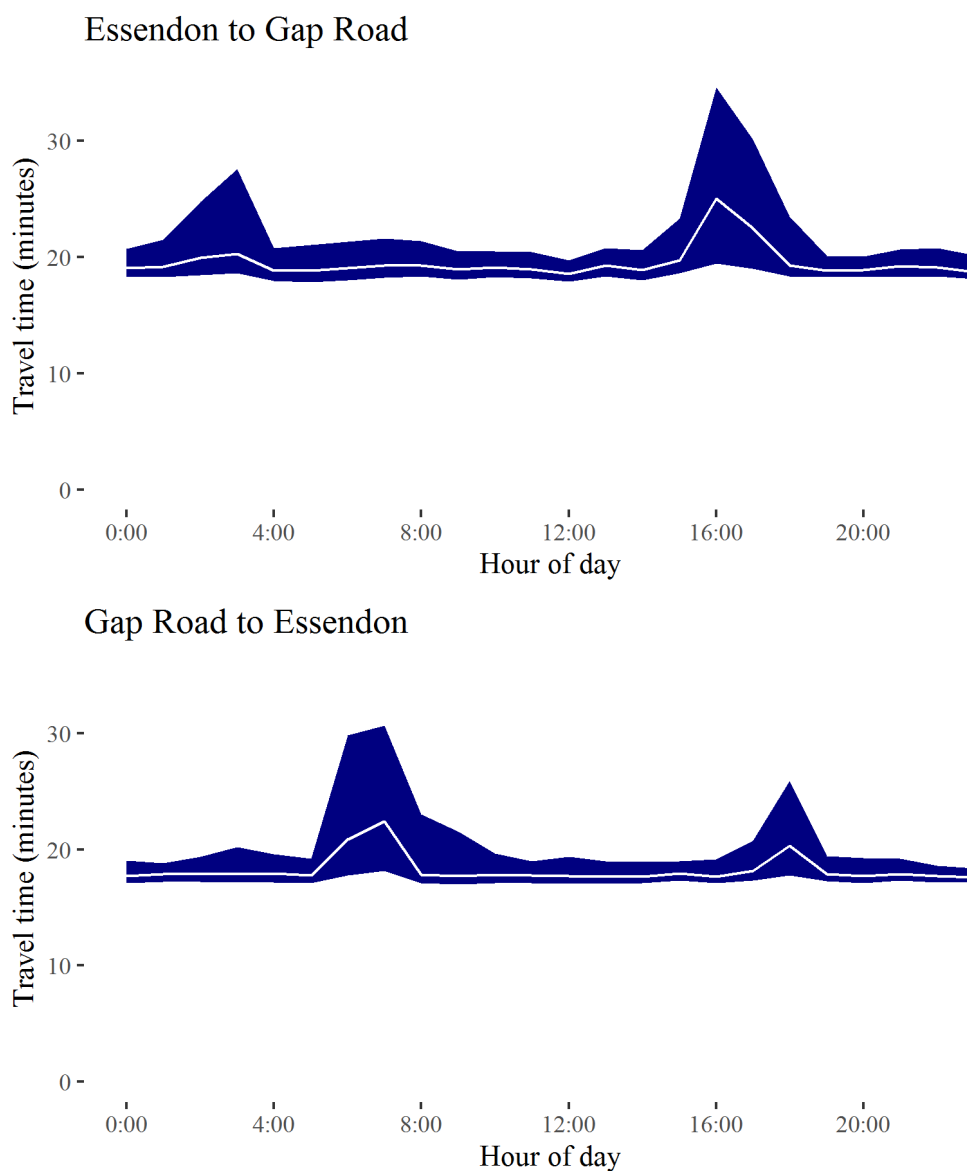
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Essendon to Gap Road	00:18:32	00:25:00	1.054	00:01:48	00:15:10	2.237	27.3
Gap Road to Essendon	00:17:36	00:22:24	1.035	00:01:16	00:12:28	2.743	27.2

Source: BITRE estimates.

The best median travel times and least uncertainty for journeys from Essendon to Gap Road were at 12am, with a median travel time of 19 minutes and an interquartile range of 2 minutes. The longest median travel times and greatest uncertainty were at 4pm, with a median of 25 minutes and an interquartile range of 15 minutes.

The best median travel time for journeys from Gap Road to Essendon was 18 minutes at 11pm and the lowest uncertainty was at 11pm with an interquartile range of 76 seconds. The longest median travel times and greatest uncertainty were at 7am, with a median of 22 minutes and an interquartile range of 12 minutes.

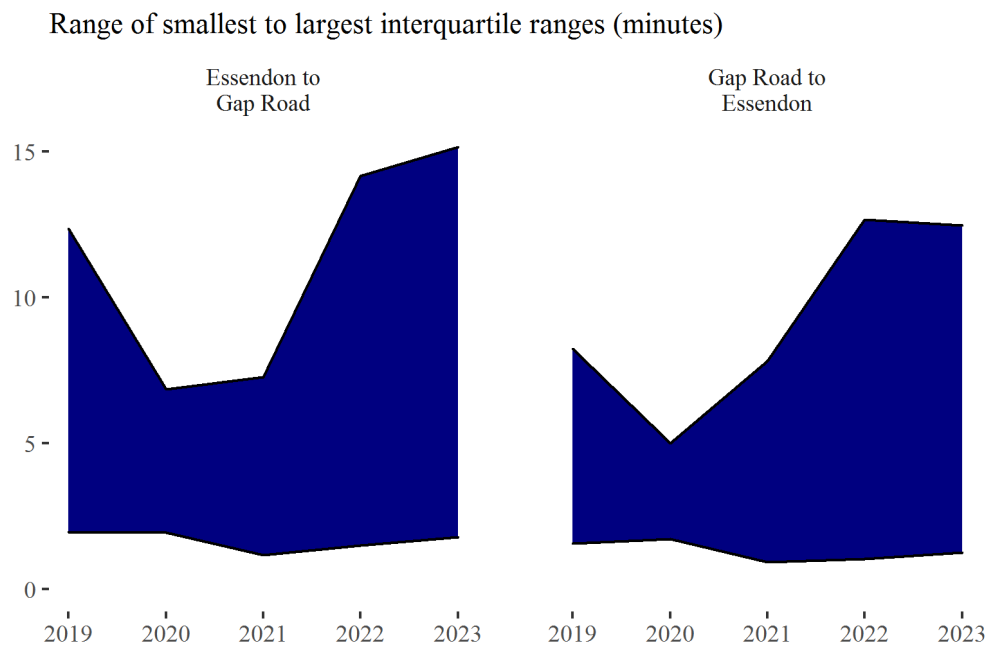
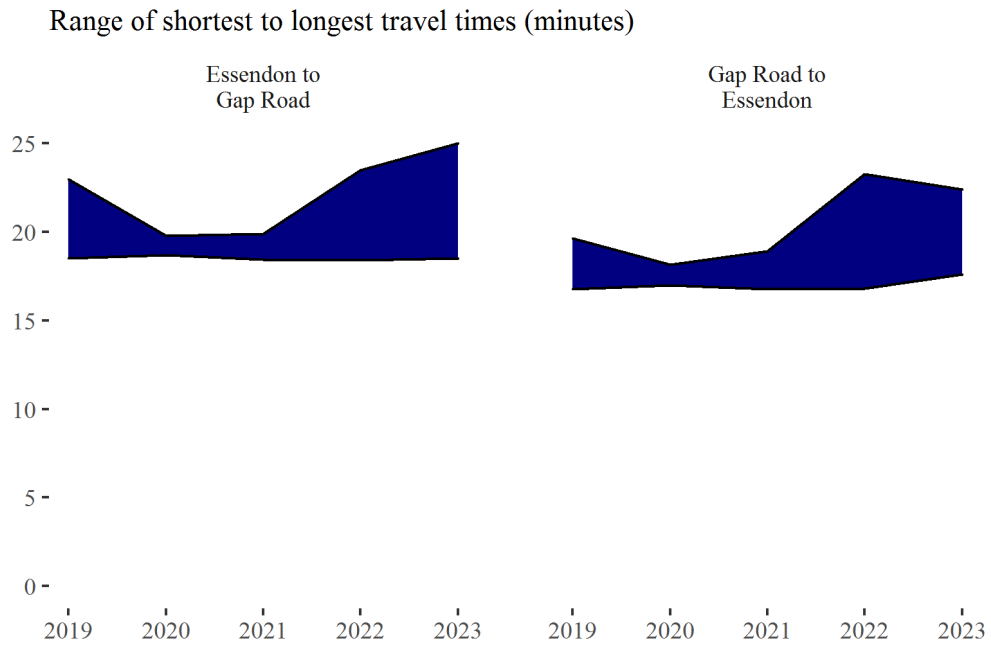
**Figure A.116 M79 route median and interquartile range travel times**



Source: BITRE estimates.



Figure A.117 M79 Performance over time

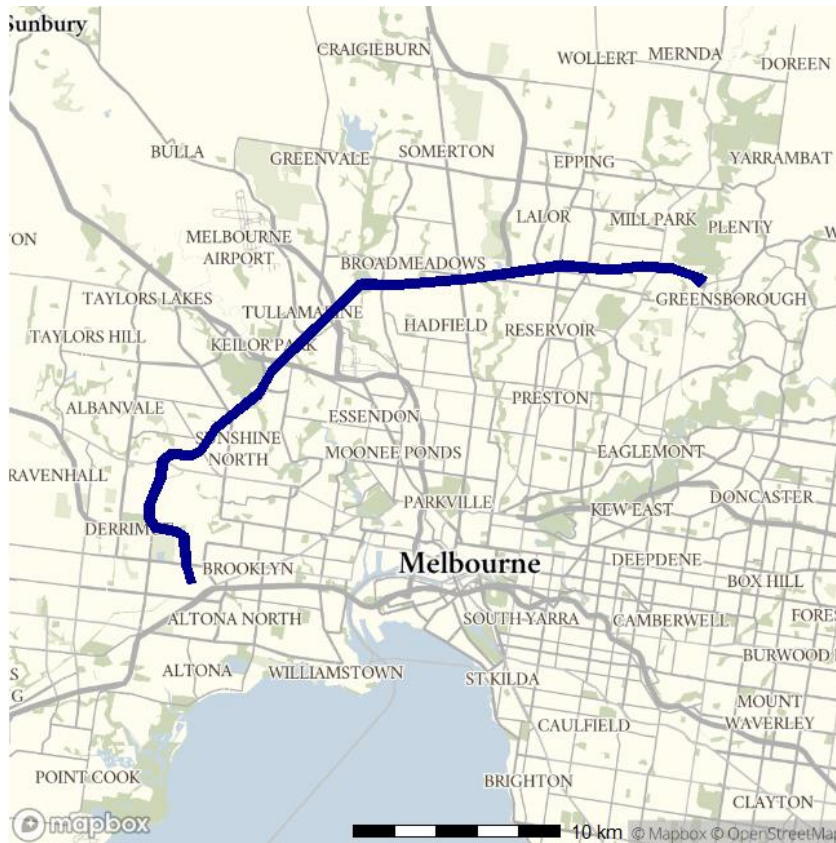


Source: BITRE estimates.

## M80 - Altona to Greensborough / Greensborough to Altona

This 38-kilometre route follows the M80 (Western Ring Road) in the west and north of Melbourne. It passes through the western outskirts of the Melbourne metropolitan area as the Western Ring Road, meets the M1 and proceeds to the Greensborough Bypass in north-east Melbourne as the Metropolitan Ring Road.

Figure A.118 M80 route map



Source: BITRE estimates.

Table A.40 M80 route travel times and congestion measures, 2023

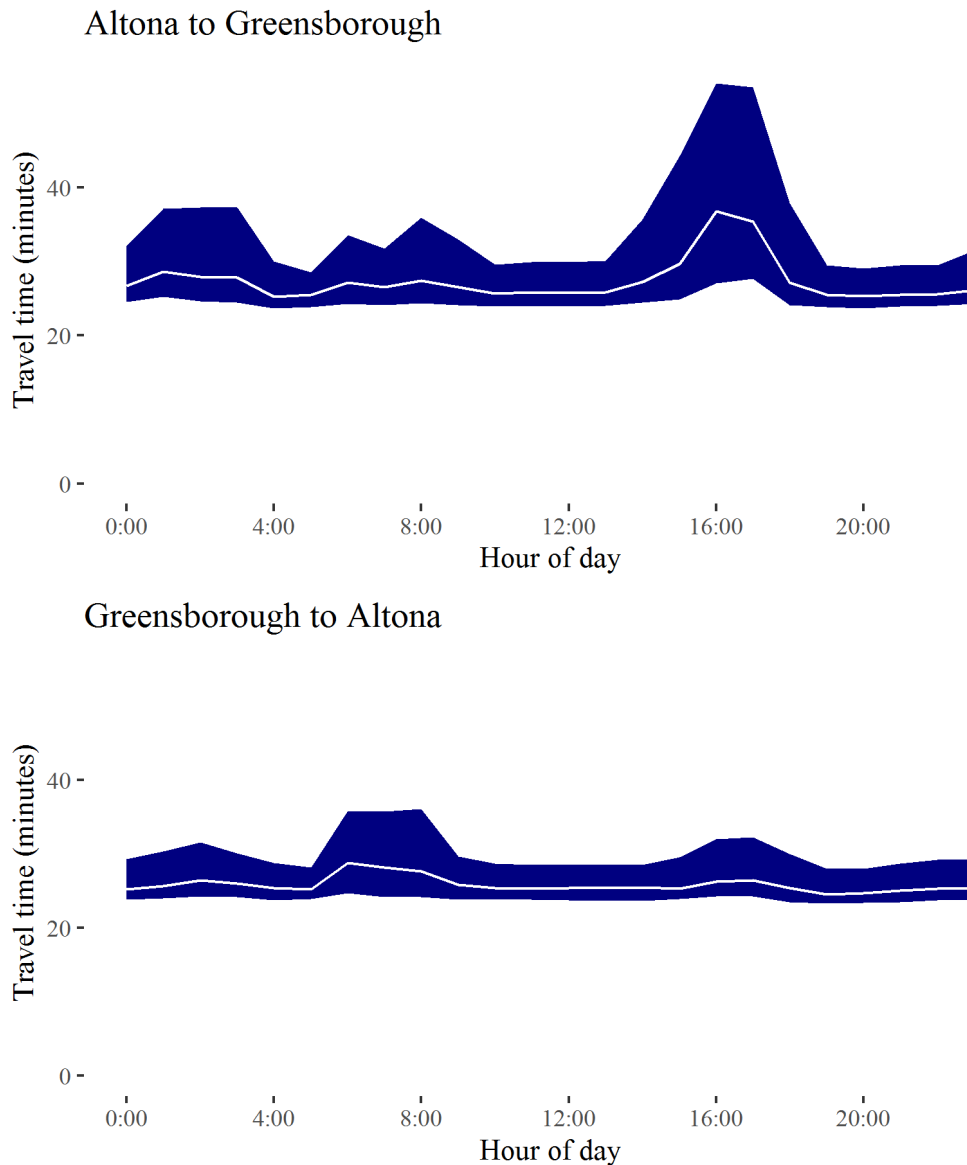
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Altona to Greensborough	00:25:16	00:36:50	1.084	00:04:43	00:27:05	2.155	37.5
Greensborough to Altona	00:24:33	00:28:46	1.052	00:04:15	00:11:55	1.492	37.4

Source: BITRE estimates.

The best travel times and lowest uncertainty travelling from Altona to Greensborough were at 4am and 5am, respectively, with a median travel time of 25 minutes and an interquartile range of 5 minutes. The longest median travel times and greatest uncertainty were at 4pm, with a median of 37 minutes and an interquartile range of 27 minutes.

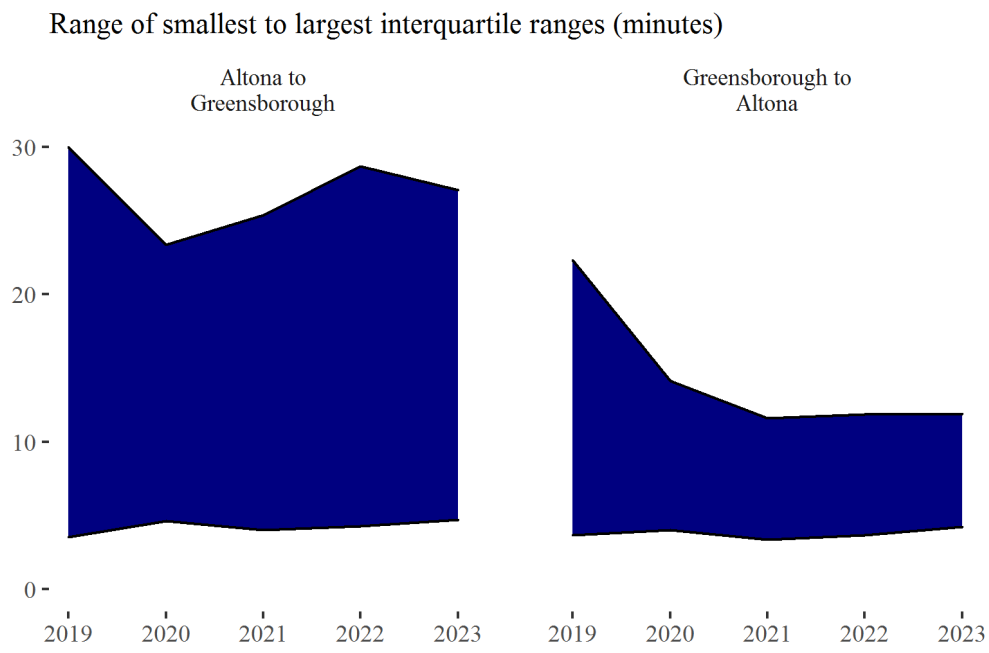
The best median travel times and lowest uncertainty for journeys from Greensborough to Altona were at 7pm, with a median travel time of 25 minutes and an interquartile range of 4 minutes. The longest median travel time was 29 minutes at 6am and the greatest uncertainty was at 8am with an interquartile range of 12 minutes.

**Figure A.119 M80 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.120 M80 Performance over time

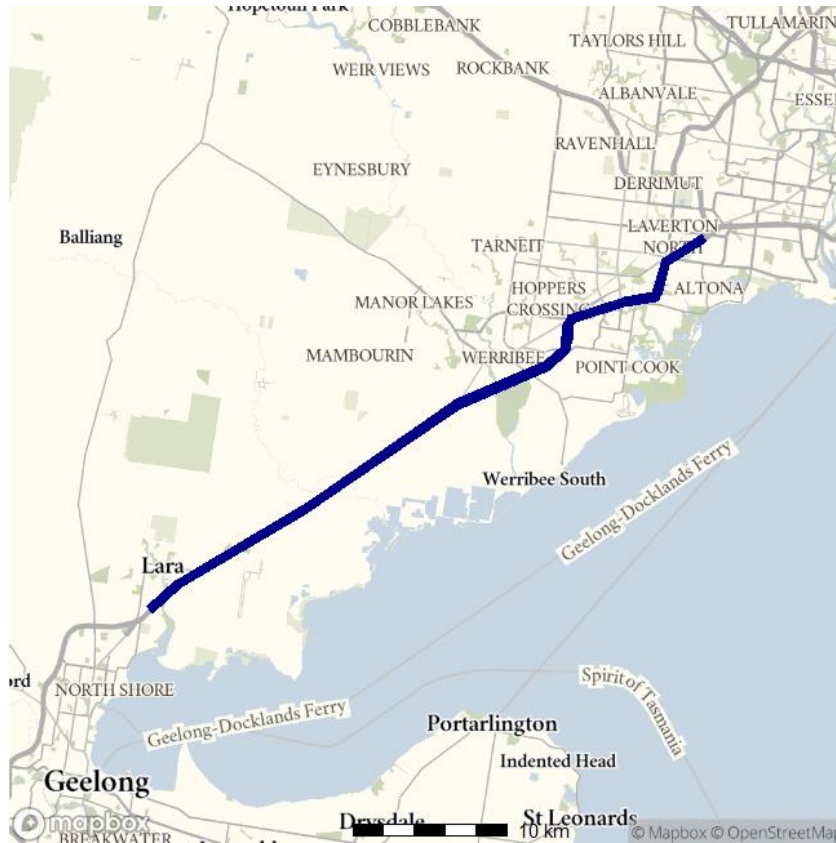


Source: BITRE estimates.

## Princes Freeway - Geelong Ring Road to M80 / M80 to Geelong Ring Road

This route connects Geelong to the Melbourne orbital road network. It also serves Melbourne's expanding Western Suburbs.

**Figure A.121 Princes Freeway route map**



Source: BITRE estimates.

**Table A.41 Princes Freeway route travel times and congestion measures, 2023**

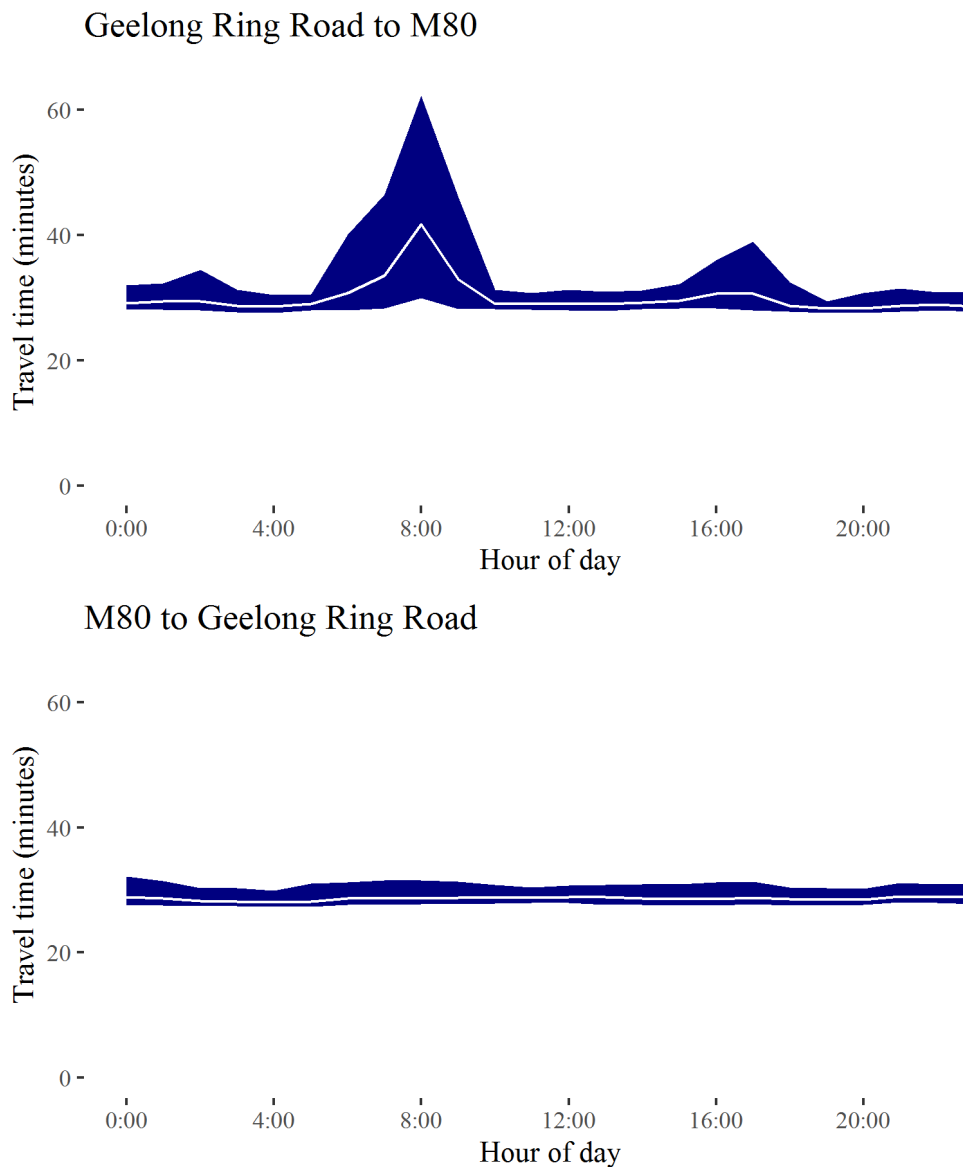
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Geelong Ring Road to M80	00:28:16	00:41:44	1.063	00:01:51	00:32:22	3.637	45.4
M80 to Geelong Ring Road	00:28:03	00:29:00	1.021	00:02:28	00:04:30	1.319	45.1

Source: BITRE estimates.

The best median travel times and lowest uncertainty for journeys from Geelong Ring Road to M80 were at 7pm, with a median travel time of 28 minutes and an interquartile range of 2 minutes. The longest median travel times and greatest uncertainty were at 8am, with a median of 42 minutes and an interquartile range of 32 minutes.

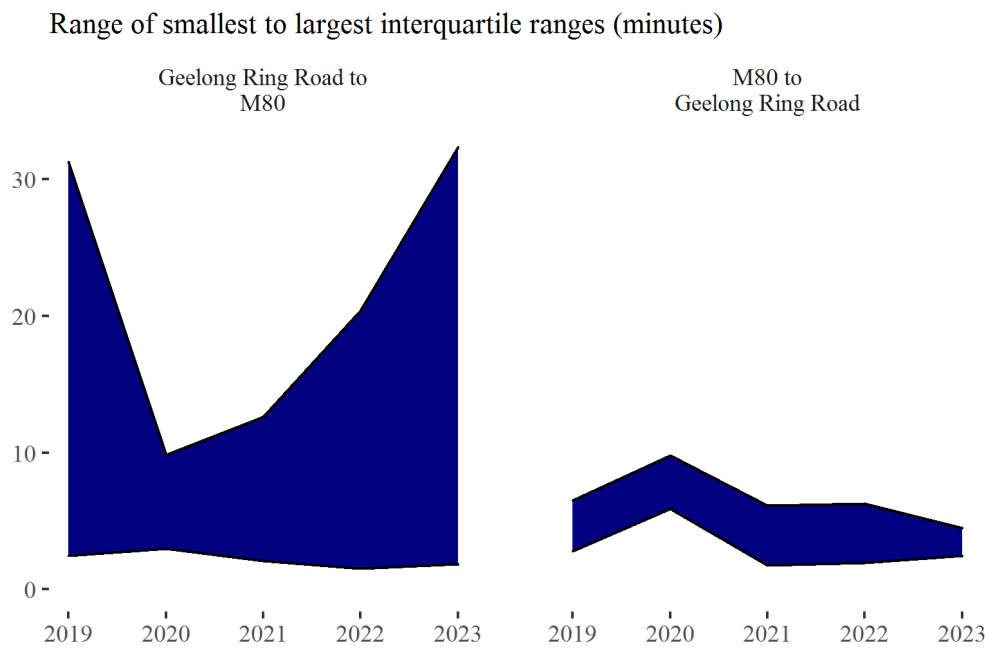
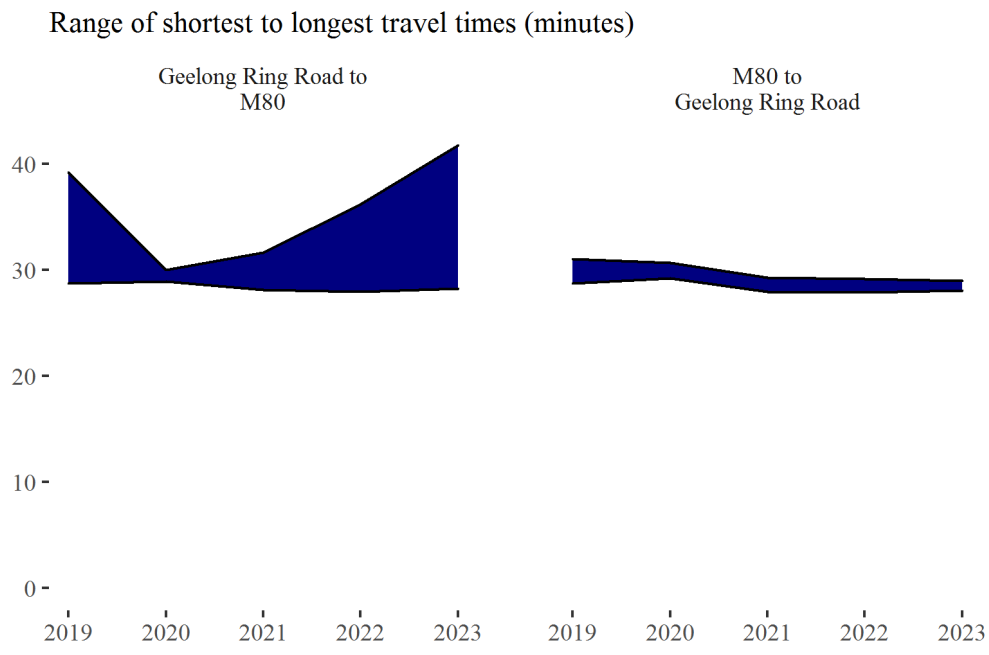
The best median travel times and lowest uncertainty for journeys from M80 to Geelong Ring Road were at 4am, with a median travel time of 28 minutes and an interquartile range of 2.5 minutes. The longest median travel time was at 9pm with a median of 29 minutes and the greatest uncertainty at midnight with an interquartile range of 4.5 minutes.

**Figure A.122 Princes Freeway route median and interquartile range travel times**



Source: BITRE estimates.

**Figure A.123 Princes Freeway Performance over time**

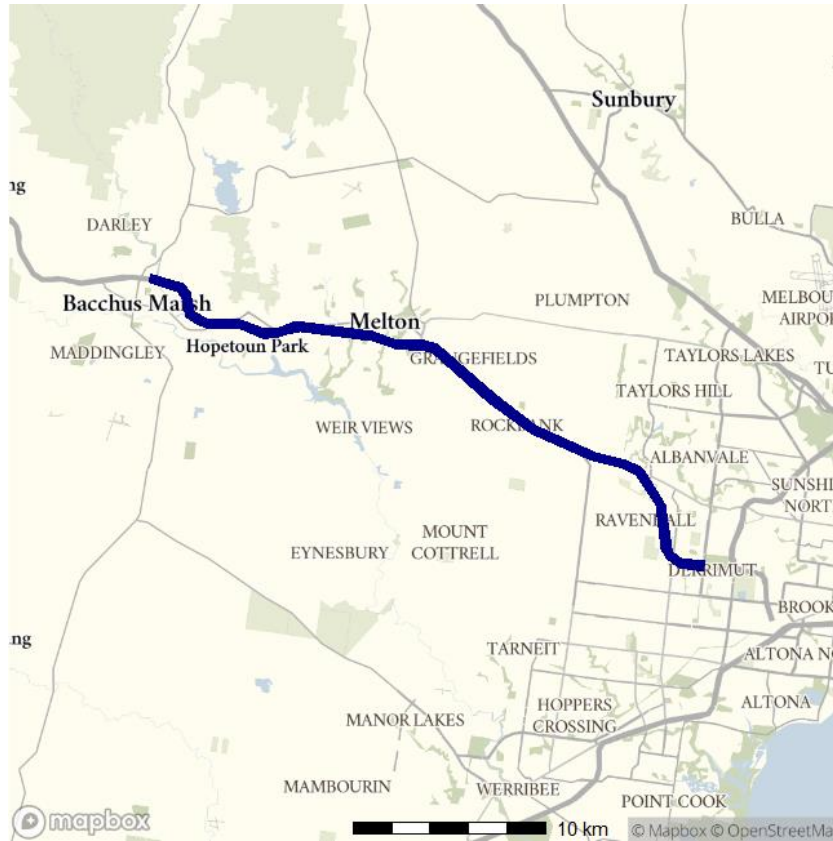


Source: BITRE estimates.

## Western Freeway - Bacchus Marsh to Derrimut / Derrimut to Bacchus Marsh

This route follows the Western Freeway (M8) linking Bacchus Marsh west of Melbourne and Derrimut where it meets the M80 (Western Ring Road).

**Figure A.124 Western Freeway route map**



Source: BITRE estimates.

**Table A.42 Western Freeway route travel times and congestion measures, 2023**

Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Bacchus Marsh to Derrimut	00:21:40	00:25:35	1.056	00:02:10	00:16:40	2.696	35.7
Derrimut to Bacchus Marsh	00:21:56	00:29:55	1.083	00:01:51	00:15:54	3.030	35.6

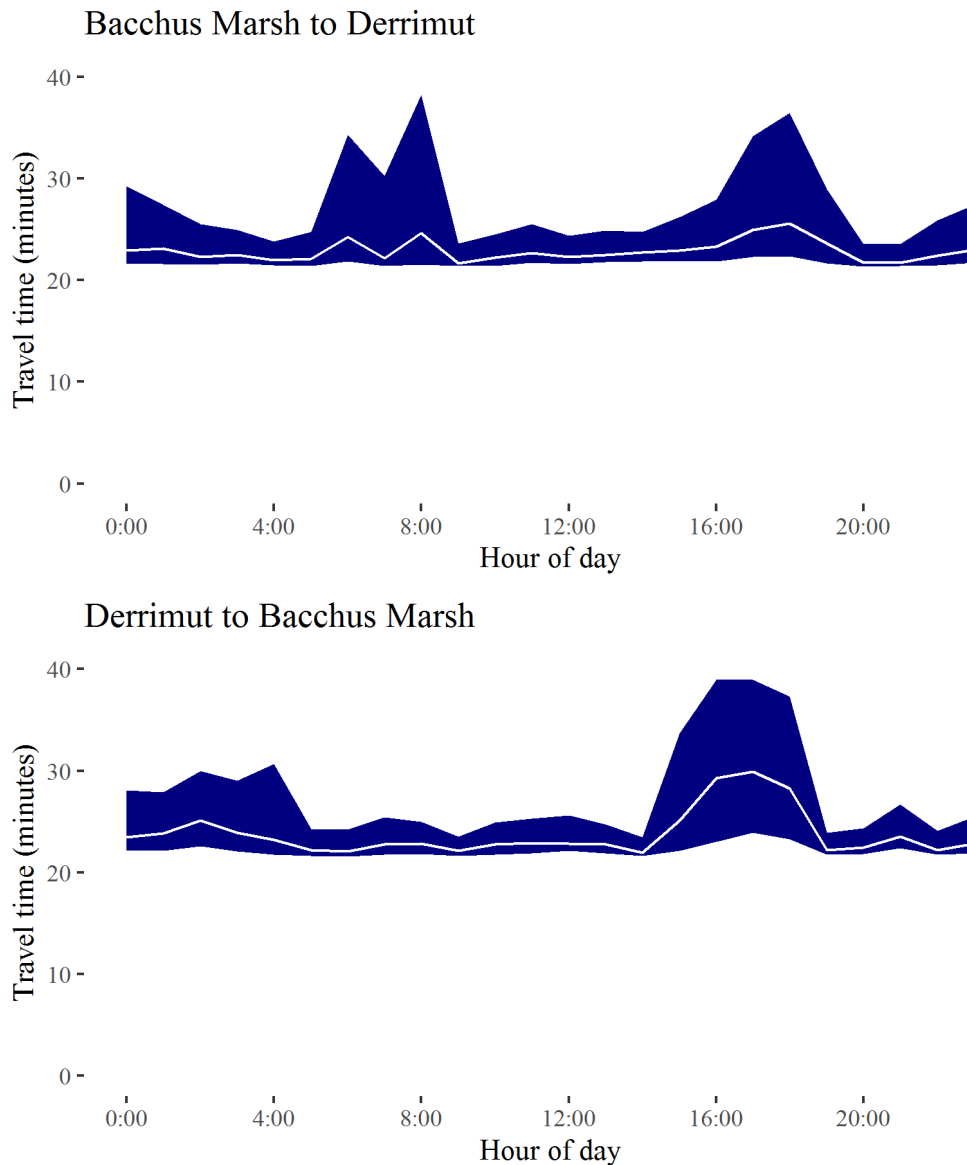
Source: BITRE estimates.



The best median travel times and least uncertainty for journeys from Bacchus Marsh to Derrimut were at 9am, with a median travel time of 22 minutes and an interquartile range of 2 minutes. The longest median travel time was 26 minutes at 6pm and the greatest uncertainty was at 8am with an interquartile range of 17 minutes.

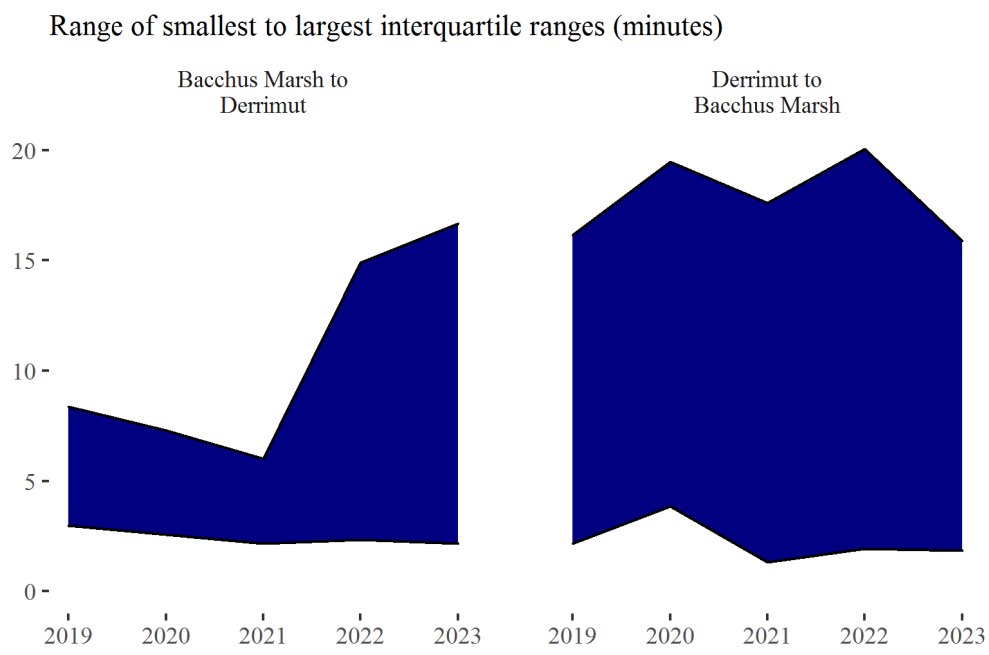
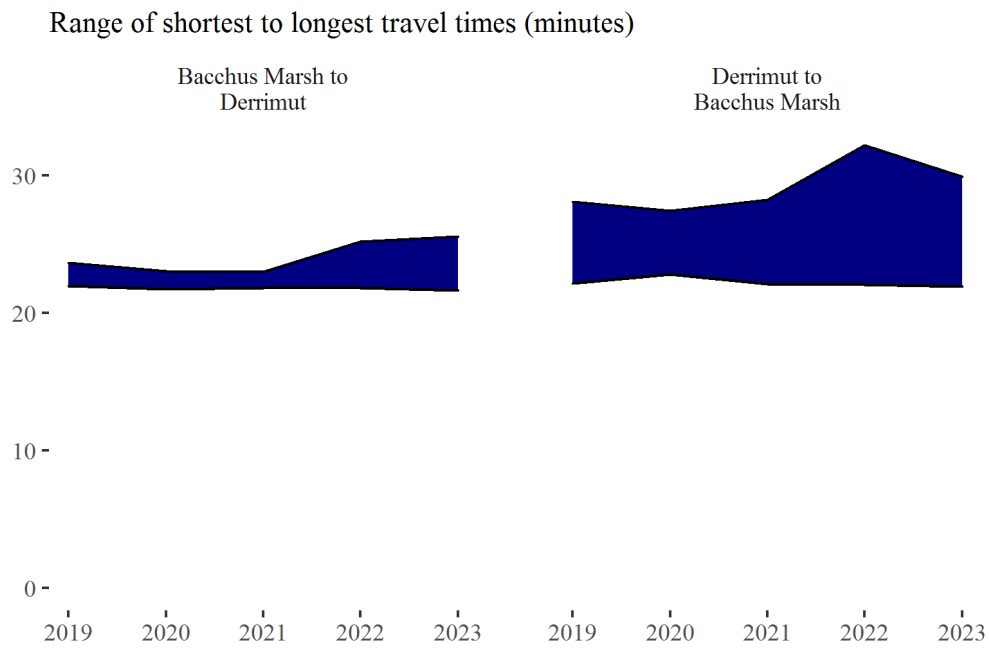
The best median travel times and lowest uncertainty for journeys from Derrimut to Bacchus Marsh were at 2pm with a median travel time of 22 minutes and an interquartile range of 2 minutes. The longest median travel time was 30 minutes at 5pm and the greatest uncertainty was at 4pm with an interquartile range of 16 minutes.

**Figure A.125 Western Freeway route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.126 Western Freeway Performance over time



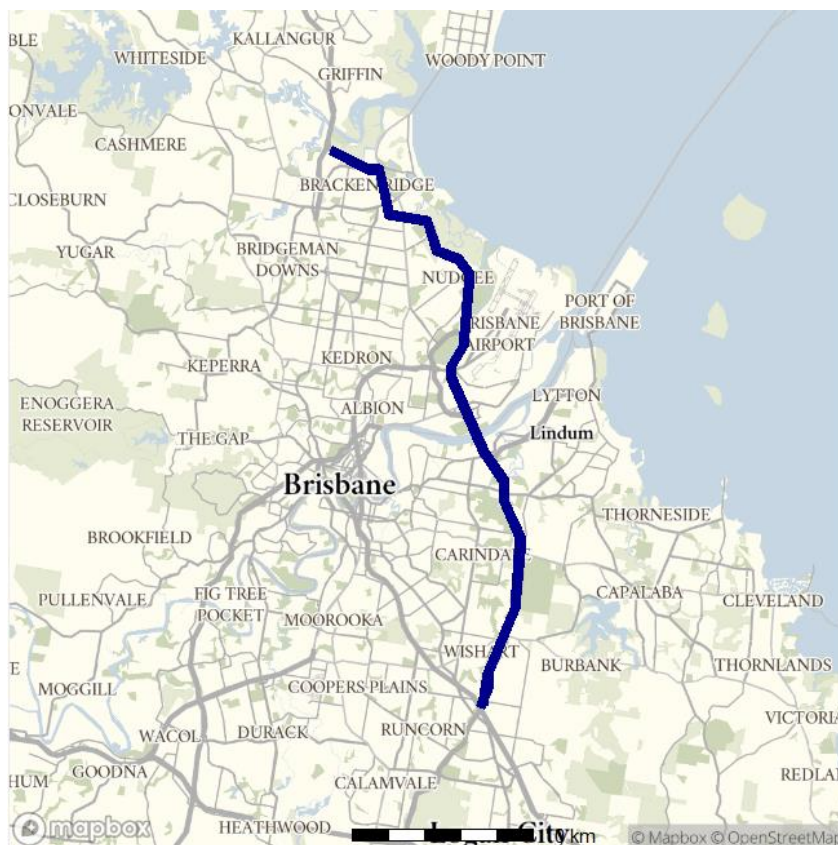
Source: BITRE estimates.

## Brisbane routes

### M1 - Bruce Highway to Pacific Motorway / Pacific Motorway to Bruce Highway

This route extends from the Gympie Arterial Road (M3) at Bald Hills in the north of Brisbane to Eight Mile Plains in the south of Brisbane, crossing the Brisbane River near Eagle Farm. It encompasses most of the Gateway Motorway. It is a major intercity and interregional route through its connections with the Pacific Motorway and Bruce Highway. This route also connects to the M2, M3, M4, M6 and M7 (via Southern Cross Way) motorways also covered in this report.

**Figure A.127 M1 route map**



Source: BITRE estimates.

**Table A.43 M1 route travel times and congestion measures, 2023**

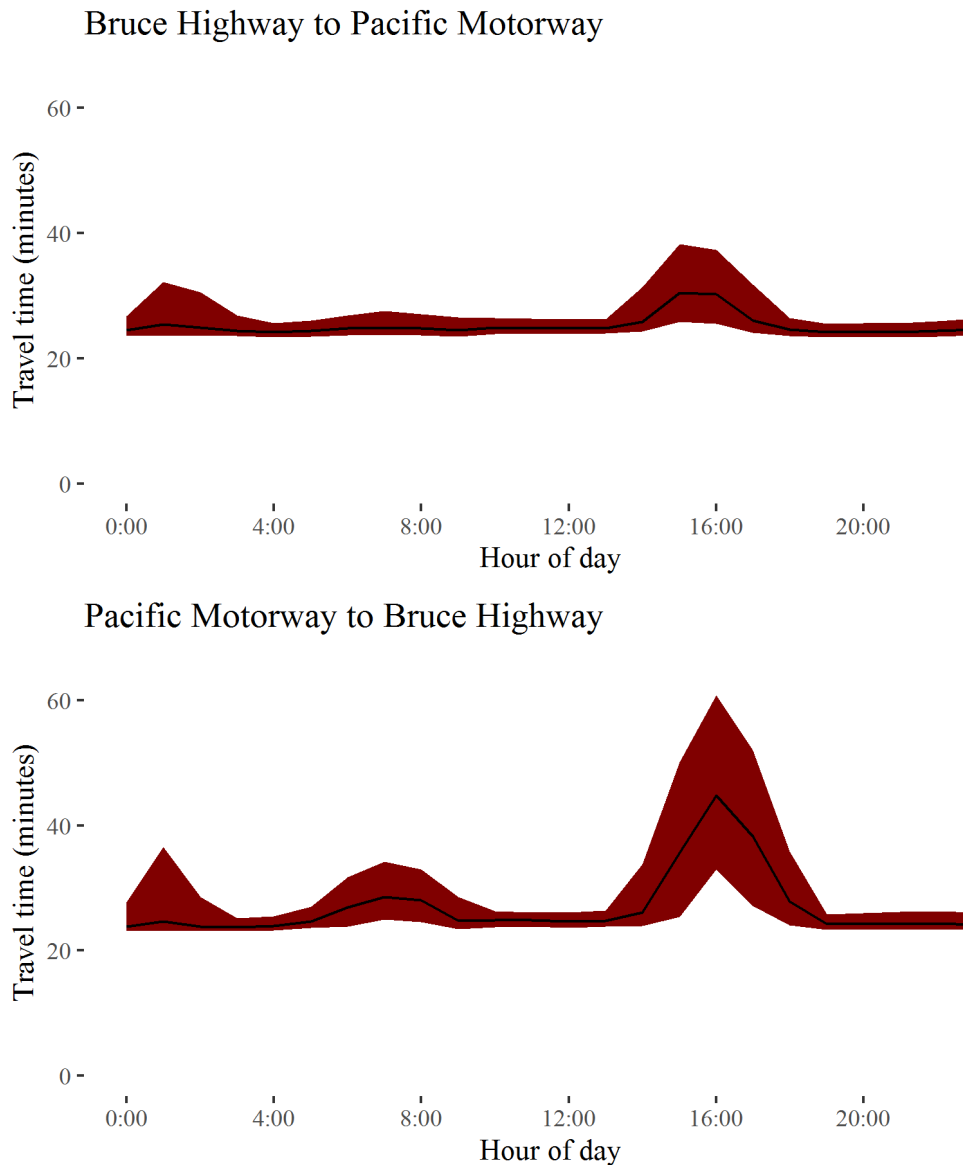
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Bruce Highway to Pacific Motorway	00:24:09	00:30:28	1.043	00:02:09	00:12:24	2.012	37.7
Pacific Motorway to Bruce Highway	00:23:44	00:44:48	1.134	00:02:04	00:27:52	3.717	37.5

Source: BITRE estimates.

The best median travel times and least uncertainty for journeys from the Bruce Highway to the Pacific Motorway were at 9pm, with a median travel time of 24 minutes and an interquartile range of 2 minutes. The longest median travel times and greatest uncertainty were at 3pm, with a median of 30 minutes and an interquartile range of 12 minutes.

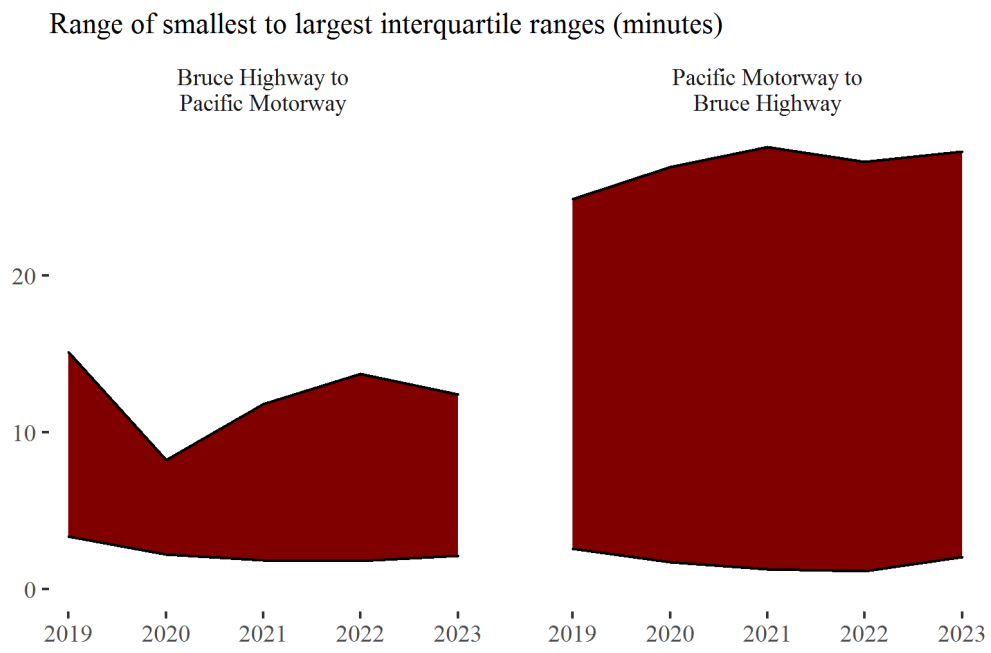
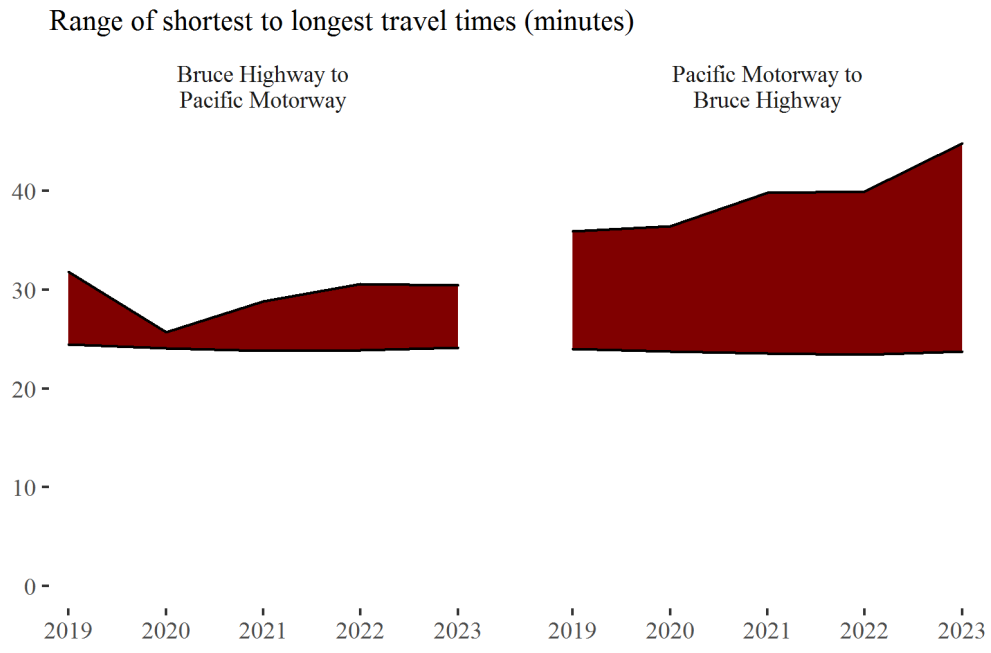
The best median travel time for journeys from the Pacific Motorway to the Bruce Highway was 24 minutes at 3am and the lowest uncertainty was at 3am with an interquartile range of 2 minutes. The longest median travel times and greatest uncertainty were at 4pmm with a median of 45 minutes and an interquartile range of 28 minutes.

**Figure A.128 M1 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.129 M1 Performance over time

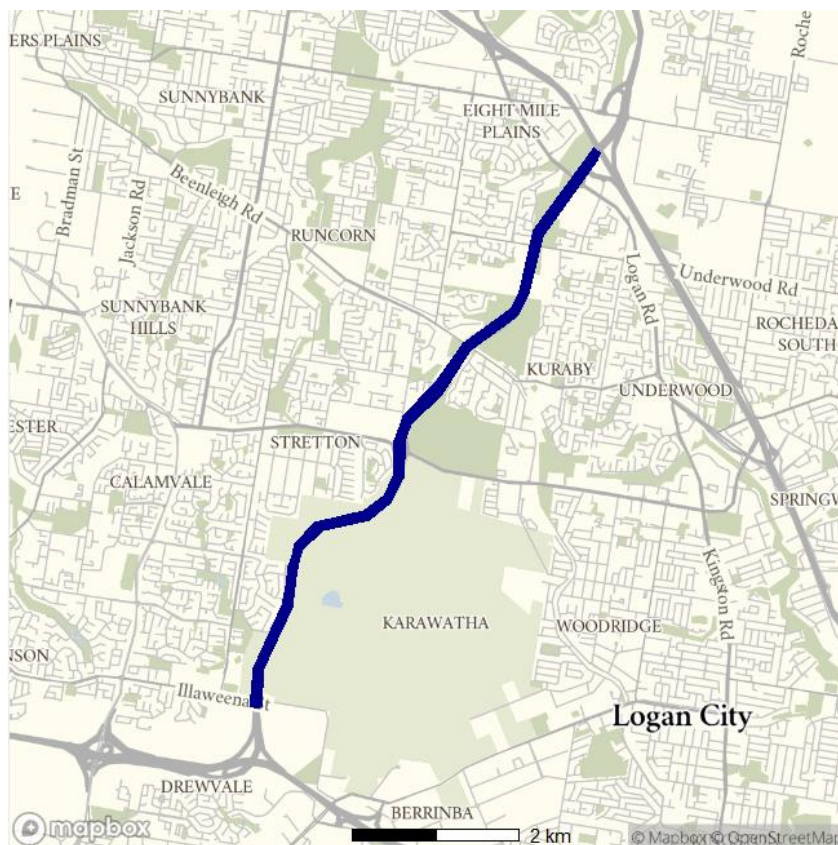


Source: BITRE estimates.

### M2 (North) - Logan Motorway to Pacific Motorway / Pacific Motorway to Logan Motorway

This short (8 kilometre) route consists of the Gateway Motorway section of the M2 linking the M1 and the Logan Motorway at Drewvale in Southern Brisbane.

**Figure A.130 M2 (North) route map**



Source: BITRE estimates.

**Table A.44 M2 (North) route travel times and congestion measures, 2023**

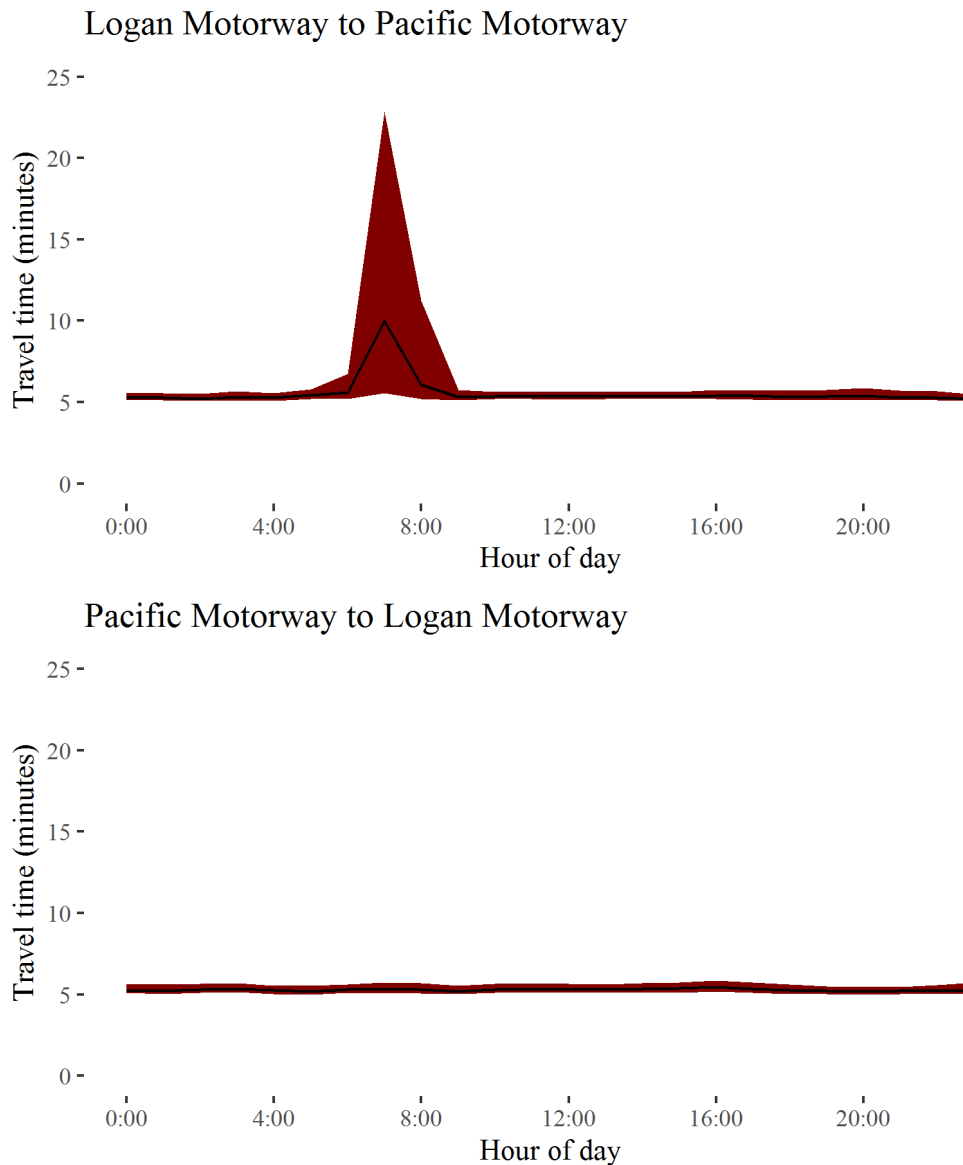
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Logan Motorway to Pacific Motorway	00:05:13	00:09:58	1.067	00:00:23	00:17:18	3.857	8.4
Pacific Motorway to Logan Motorway	00:05:11	00:05:28	1.020	00:00:26	00:00:43	1.304	8.3

Source: BITRE estimates.

The best median travel times and lowest uncertainty for journeys from Logan Motorway to Pacific Motorway were at 11pm, with a median travel time of 5 minutes and an interquartile range of 23 seconds. The longest median travel times and greatest uncertainty were at 7am, with a median of 10 minutes and an interquartile range of 17 minutes.

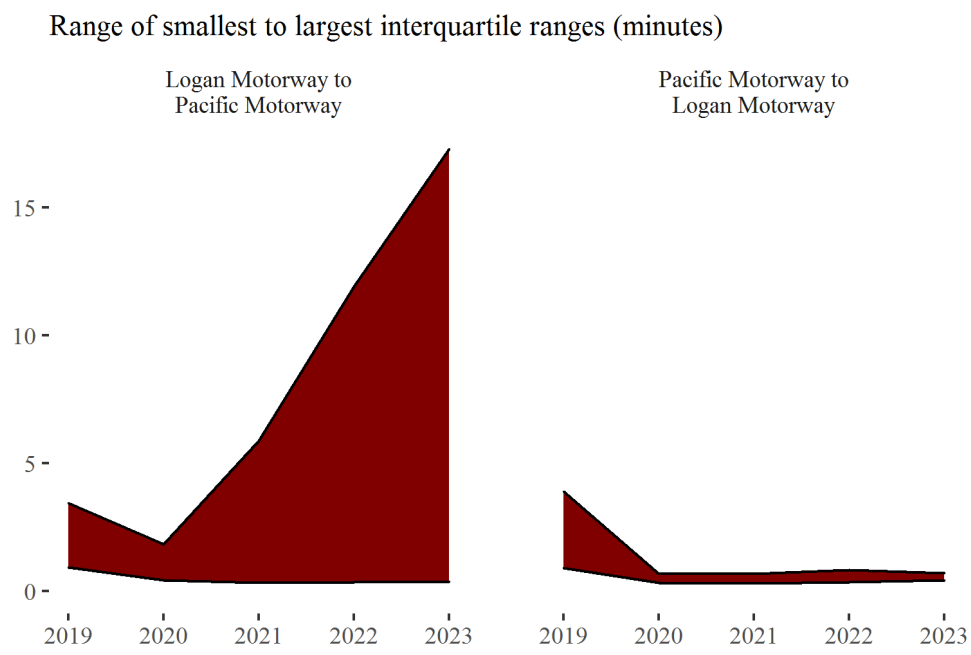
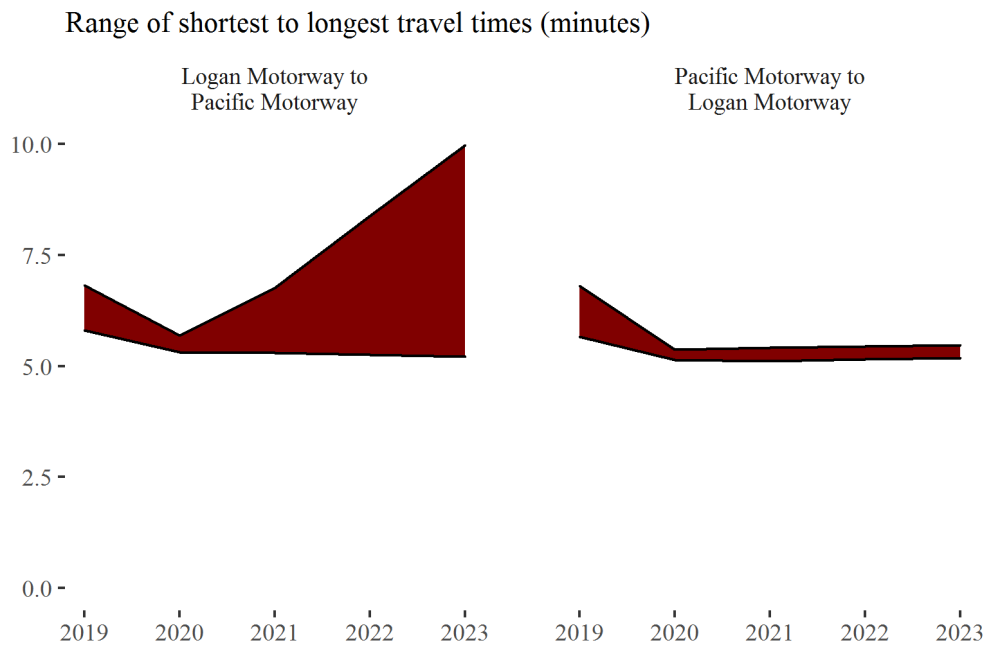
The best median travel times and least uncertainty for journeys from Pacific Motorway to Logan Motorway were at 8pm, with a median travel time of 5 minutes and an interquartile range of 26 seconds. The longest median travel time was at 4pm with a median of 5.5 minutes and the greatest uncertainty at 11pm with an interquartile range of 43 seconds.

**Figure A.131 M2 (North) route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.132 M2 (North) Performance over time



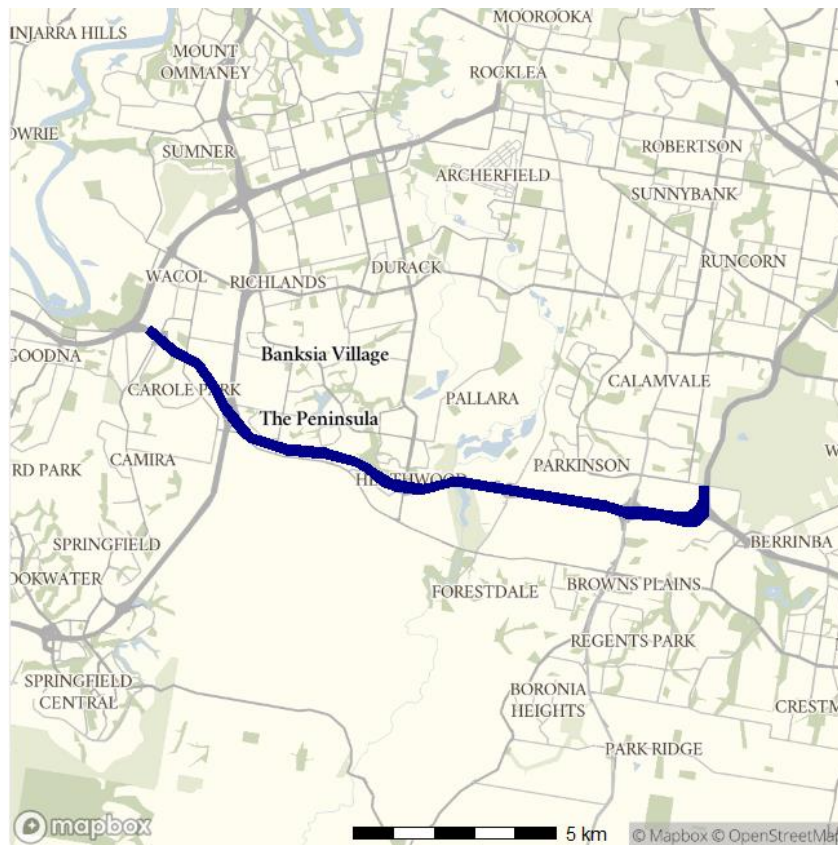
Source: BITRE estimates.



## M2 (West) - Gateway Motorway to Ipswich Motorway / Ipswich Motorway to Gateway

This route uses the Logan Motorway section of the M2 between its confluence with the Gateway Motorway (M2 North) and its junction with the M7 (Ipswich Motorway) at Gailes. It crosses the M5 (Centenary Highway) at Carole Park.

Figure A.133 M2 (West) route map



Source: BITRE estimates.

Table A.45 M2 (West) route travel times and congestion measures, 2023

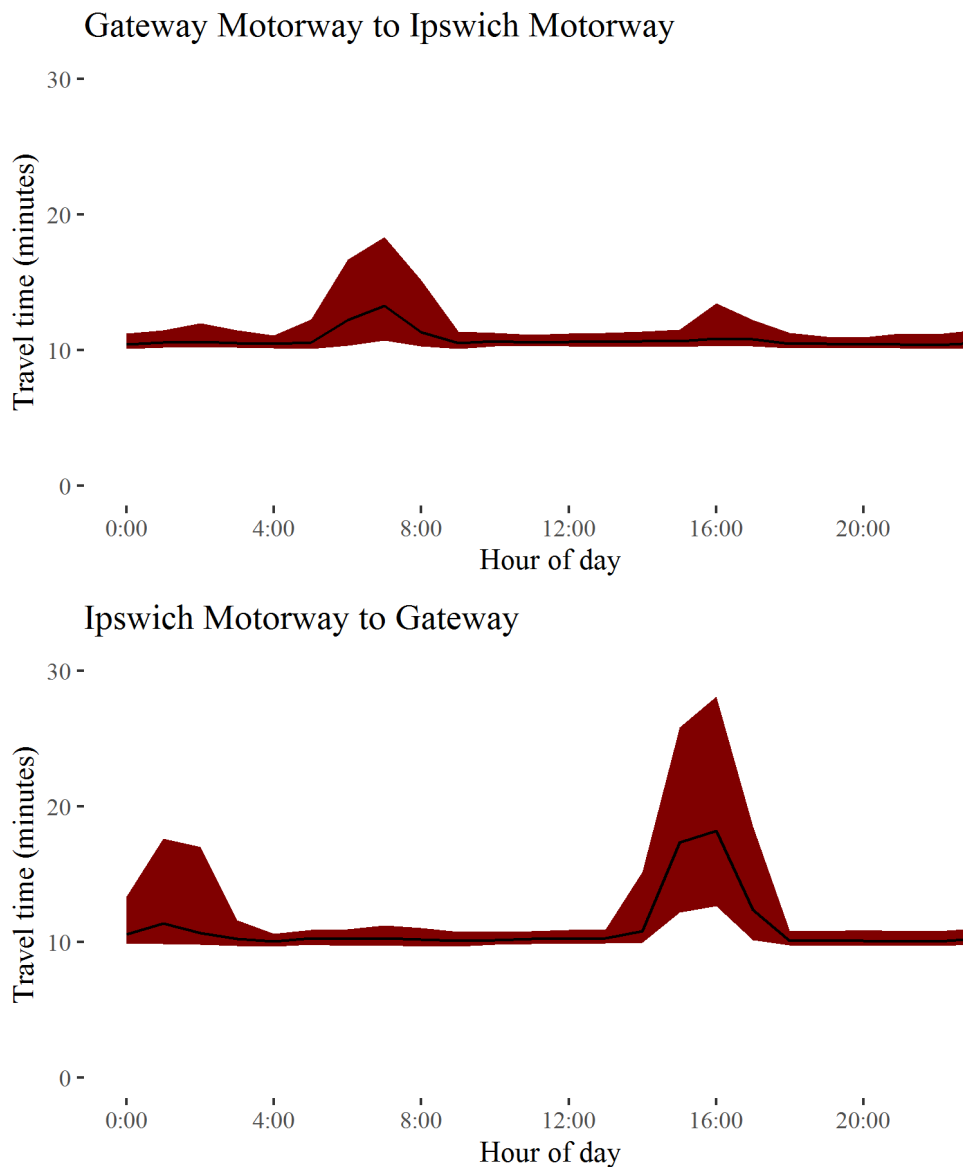
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Gateway Motorway to Ipswich Motorway	00:10:22	00:13:15	1.037	00:00:48	00:07:39	2.396	16.1
Ipswich Motorway to Gateway	00:10:03	00:18:13	1.097	00:00:56	00:15:25	3.646	15.8

Source: BITRE estimates.

The best travel times and lowest uncertainty travelling from the Gateway Motorway to the Ipswich Motorway were at 10pm and 8pm, respectively, with a median travel time of 10 minutes and an interquartile range of 48 seconds. The longest median travel times and greatest uncertainty were at 7am, with a median of 13 minutes and an interquartile range of 8 minutes.

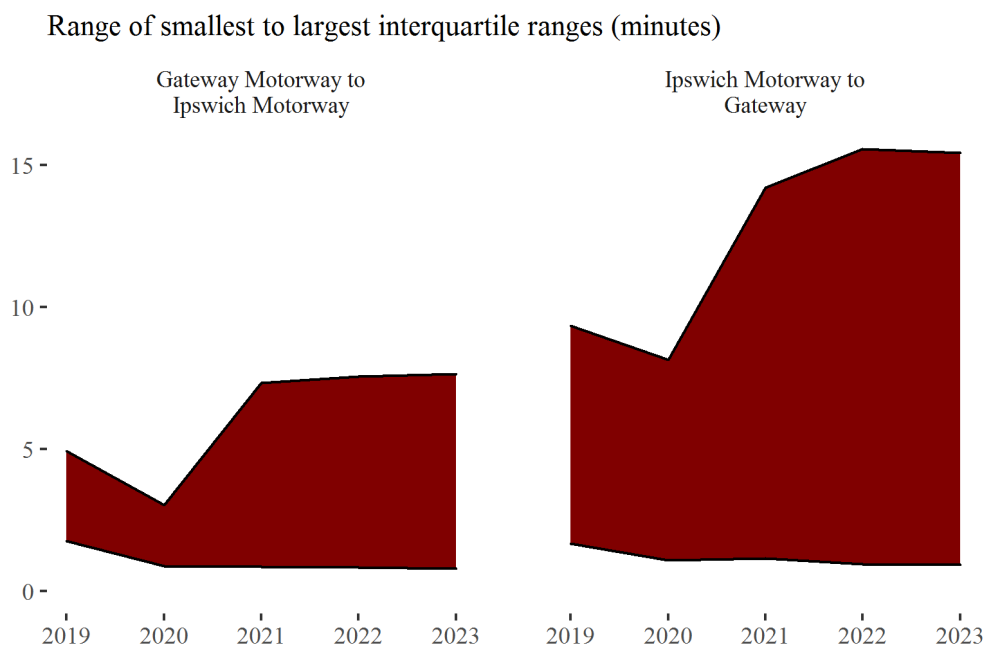
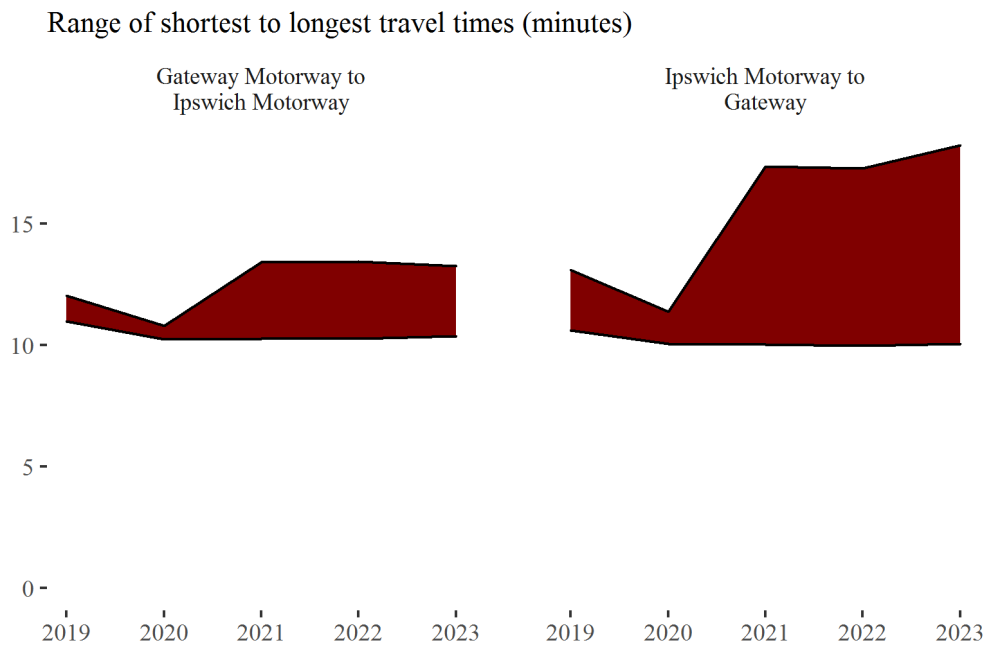
The best median travel times and lowest uncertainty for journeys from Ipswich Motorway to Gateway were at 9pm, with a median travel time of 10 minutes and an interquartile range of just under 1 minute. The longest median travel times and greatest uncertainty were at 4pm, with a median of 18 minutes and an interquartile range of 15 minutes.

**Figure A.134 M2 (West) route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.135 M2 (West) Performance over time

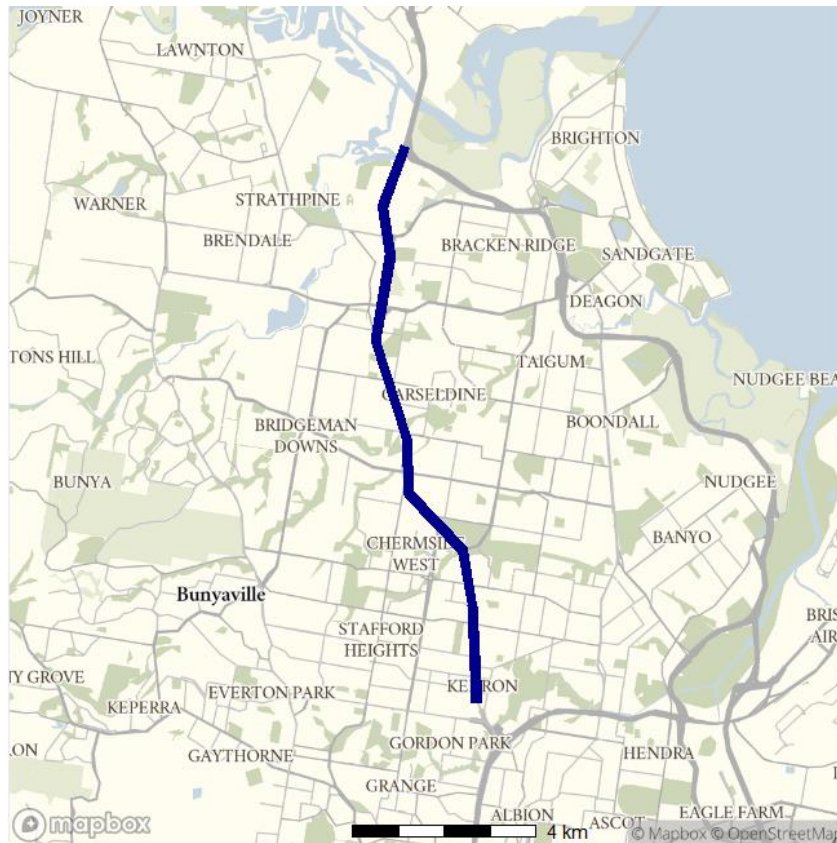


Source: BITRE estimates.

### M3-A3 - Airport Link to M1 / M1 to Airport Link

This route follows the M3 and the surface road A3 with one end merging with the M1 at Bald Hills and the other meeting Airport Link (M7) next to Gordon Park. It is known as Gympie Road when labelled as the A3 and the Gympie Arterial Road when labelled as the M3.

**Figure A.136 M3-A3 route map**



Source: BITRE estimates.

**Table A.46 M3-A3 route travel times and congestion measures, 2023**

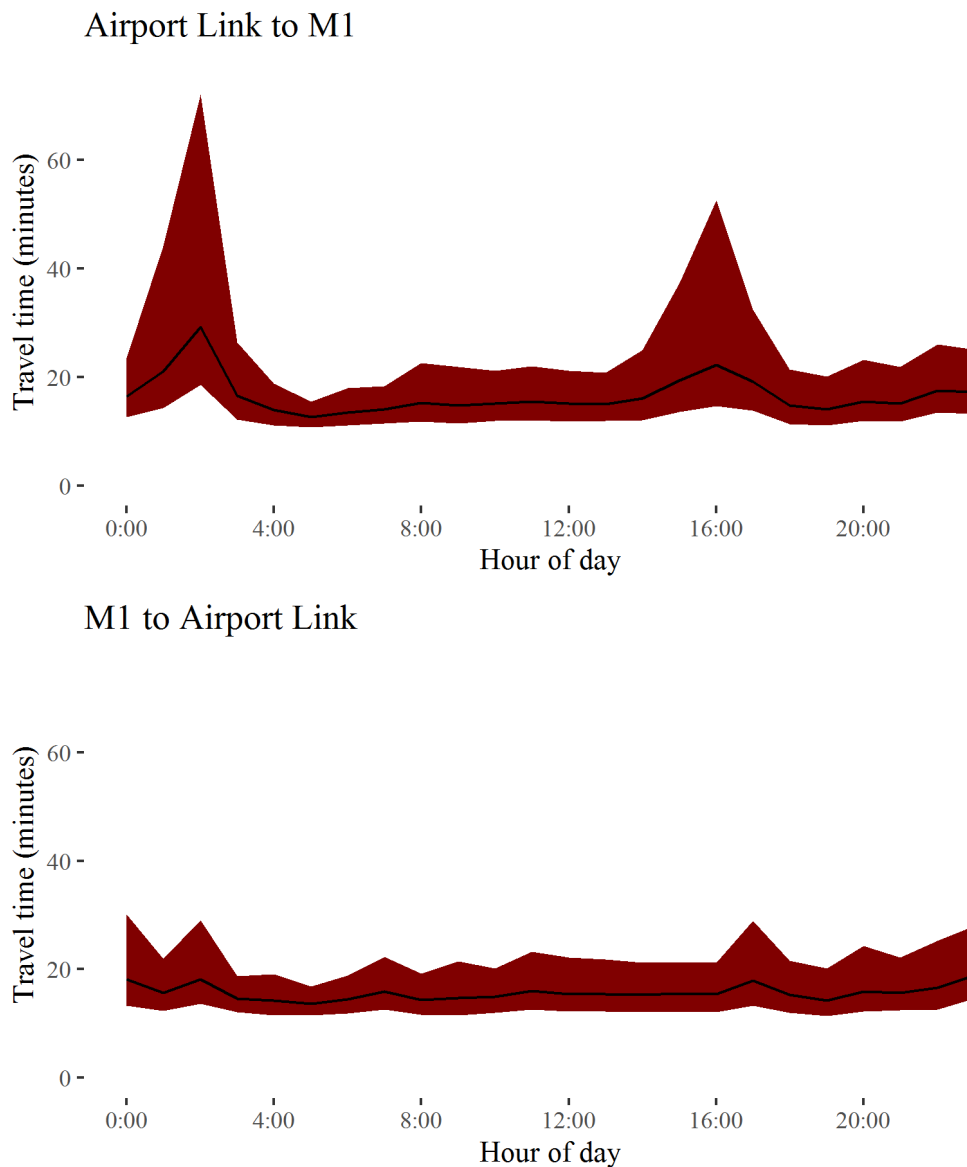
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Airport Link to M1	00:12:36	00:29:15	1.319	00:04:43	00:53:30	3.103	13
M1 to Airport Link	00:13:39	00:18:51	1.149	00:05:16	00:16:49	1.920	13

Source: BITRE estimates.

The best median travel times and least uncertainty for journeys from Airport Link to the M1 were at 5am with a median travel time of 13 minutes and an interquartile range of 5 minutes. The longest median travel times and greatest uncertainty were at 2am with a median of 29 minutes and an interquartile range of 54 minutes.

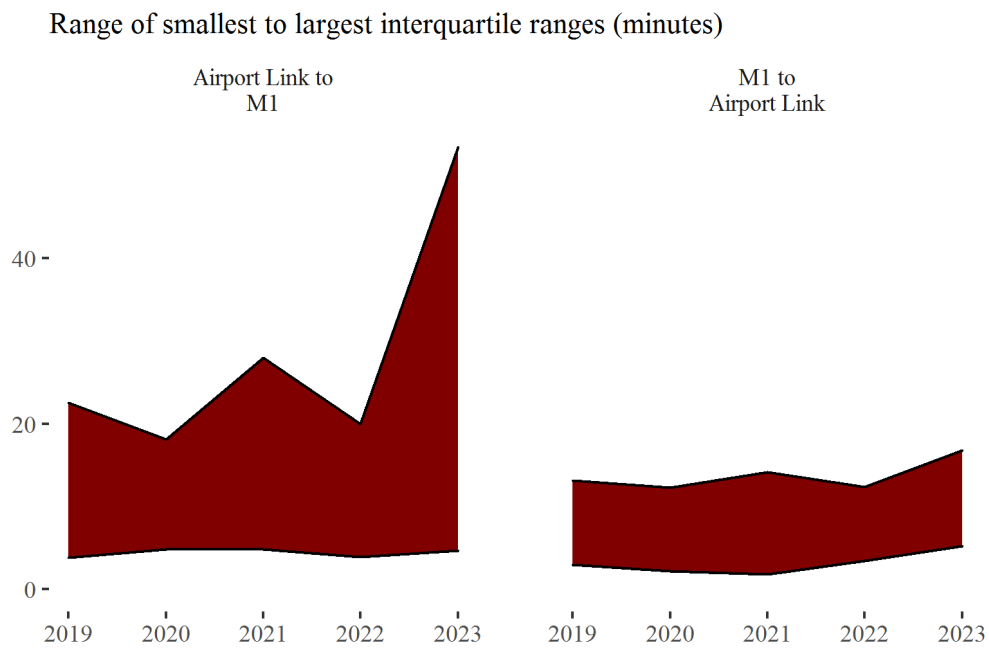
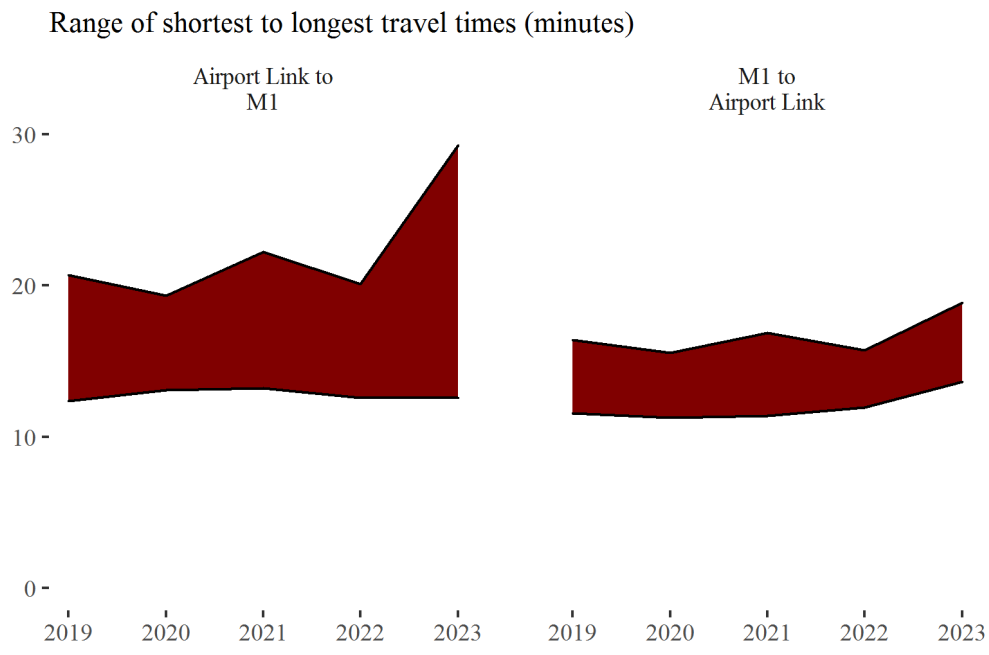
The best median travel time for journeys from the M1 to Airport Link was 14 minutes at 5am and the lowest uncertainty was at 5am with an interquartile range of 5 minutes. The longest median travel time was 19 minutes at 11pm and the greatest uncertainty was at midnight with an interquartile range of 17 minutes.

**Figure A.137 M3-A3 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.138 M3-A3 Performance over time

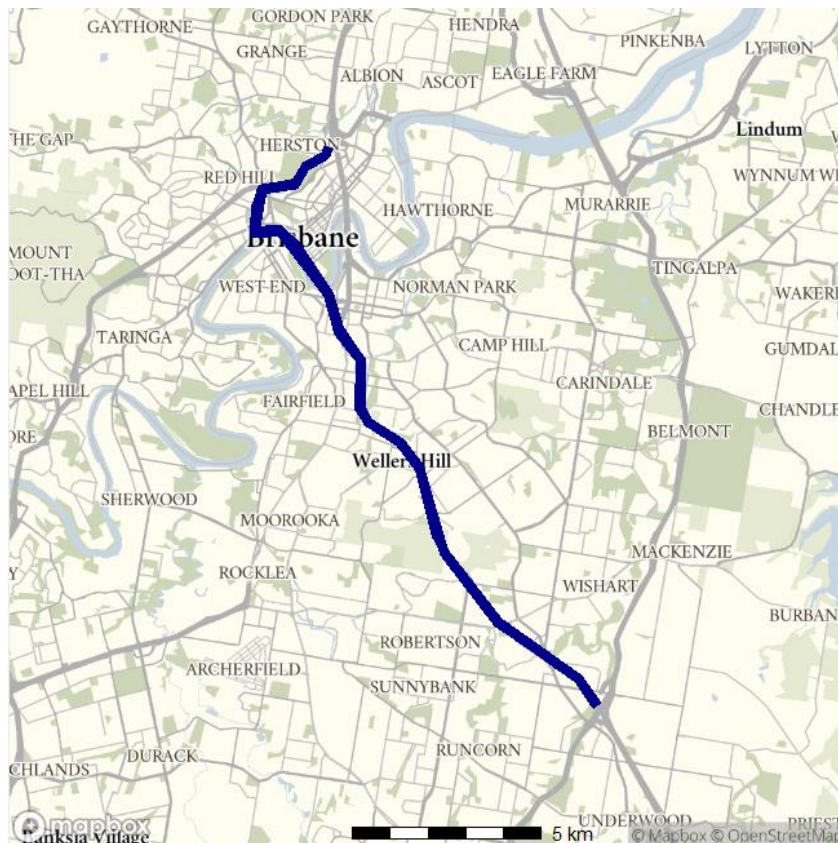


Source: BITRE estimates.

### M3 (South) - Inner City Bypass to Pacific Motorway / Pacific Motorway to Inner City Bypass

This route follows the M3 connecting the Inner City Bypass at Bowen Hills and the M1 (Pacific Motorway) at Springwood in Brisbane’s southeast. It passes around the western edge of the CBD and crosses the Brisbane River at Woolloongabba and follows the Pacific Motorway.

Figure A.139 M3 (South) route map



Source: BITRE estimates.

Table A.47 M3 (South) route travel times and congestion measures, 2023

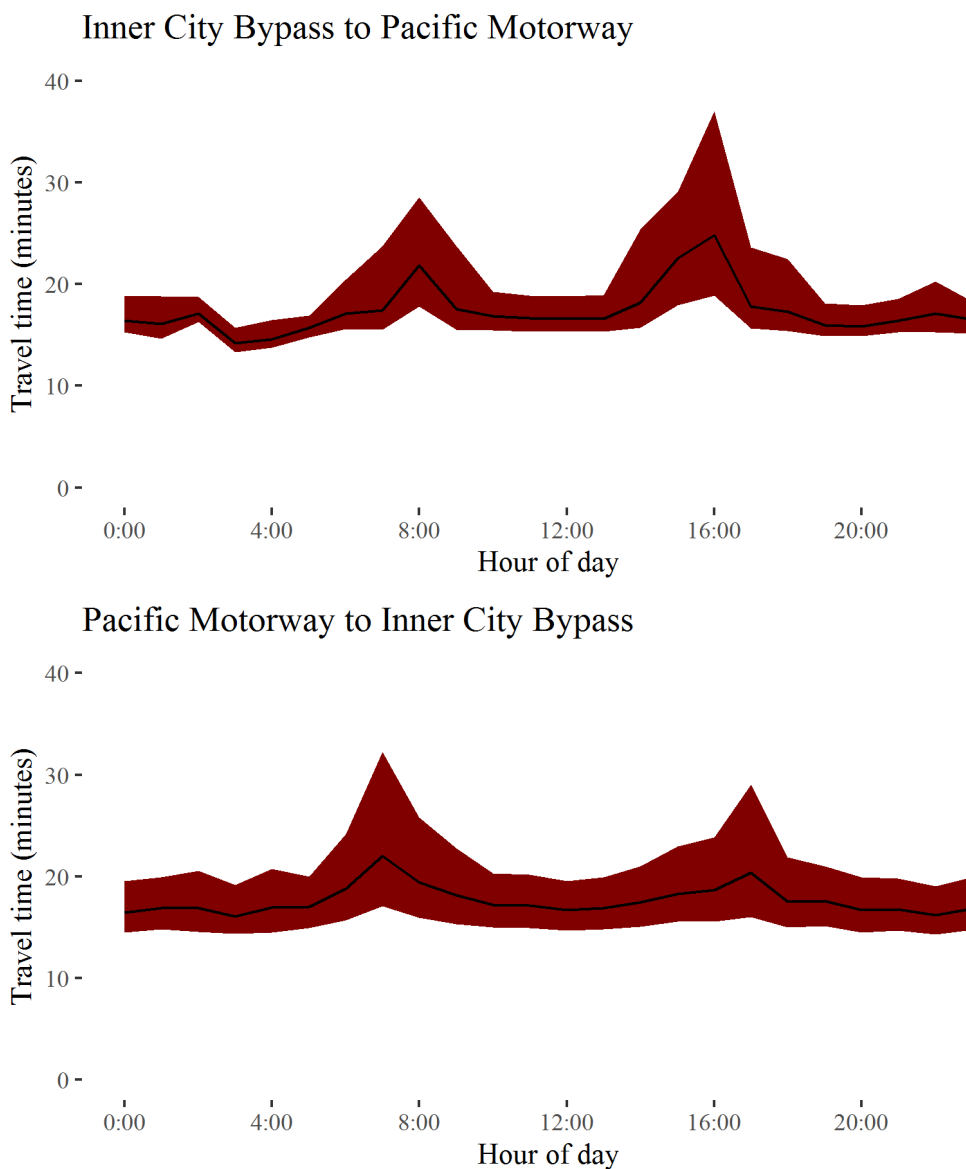
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Inner City Bypass to Pacific Motorway	00:14:13	00:24:48	1.224	00:02:11	00:18:09	2.582	20.1
Pacific Motorway to Inner City Bypass	00:16:04	00:21:59	1.097	00:04:43	00:15:10	1.426	20.1

Source: BITRE estimates.

The best median travel times and lowest uncertainty for journeys from Inner City Bypass to the Pacific Motorway were at 3am, with a median travel time of 14 minutes and an interquartile range of 2 minutes. The longest median travel times and greatest uncertainty were at 4pm, with a median of 25 minutes and an interquartile range of 18 minutes.

The best travel times and lowest uncertainty travelling from Pacific Motorway to Inner City Bypass were at 3am and 10pm, respectively, with a median travel time of 16 minutes and an interquartile range of 5 minutes. The longest median travel times and greatest uncertainty were at 7am, with a median of 22 minutes and an interquartile range of 15 minutes.

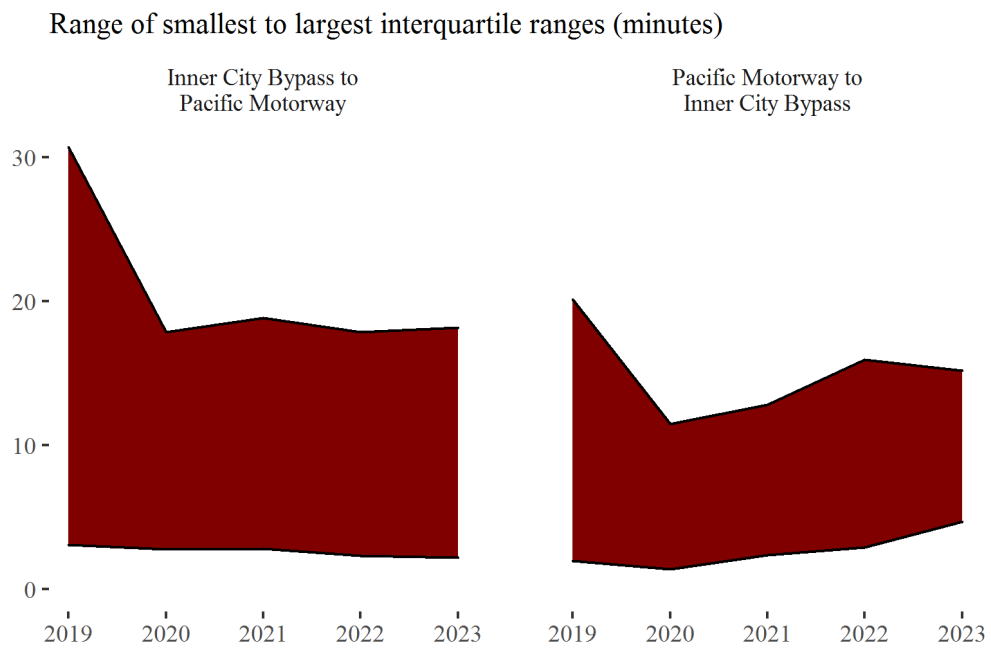
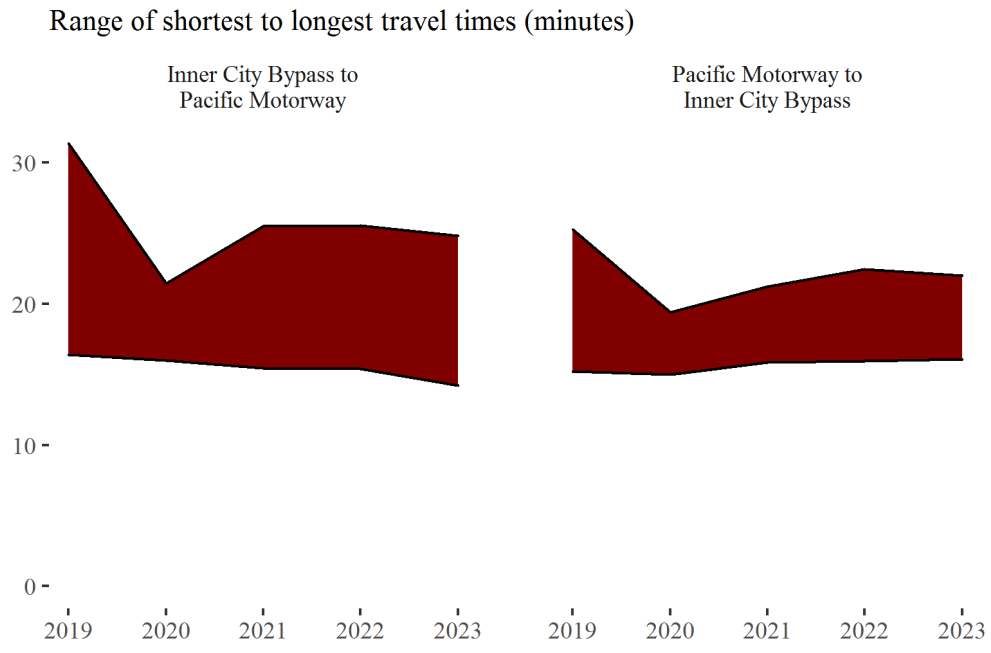
**Figure A.140 M3 (South) route median and interquartile range travel times**



Source: BITRE estimates.



**Figure A.141 M3 (South) Performance over time**



Source: BITRE estimates.

## M4 - Gateway Motorway to Port of Brisbane / Port of Brisbane to Gateway Motorway

This route links the Gateway Motorway (M1) at Murarrie and the Port of Brisbane via Port Drive and Port of Brisbane Motorway. It is an important route for freight to and from the port but is not a major commuter route.

Figure A.142 M4 route map



Source: BITRE estimates.

Table A.48 M4 route travel times and congestion measures, 2023

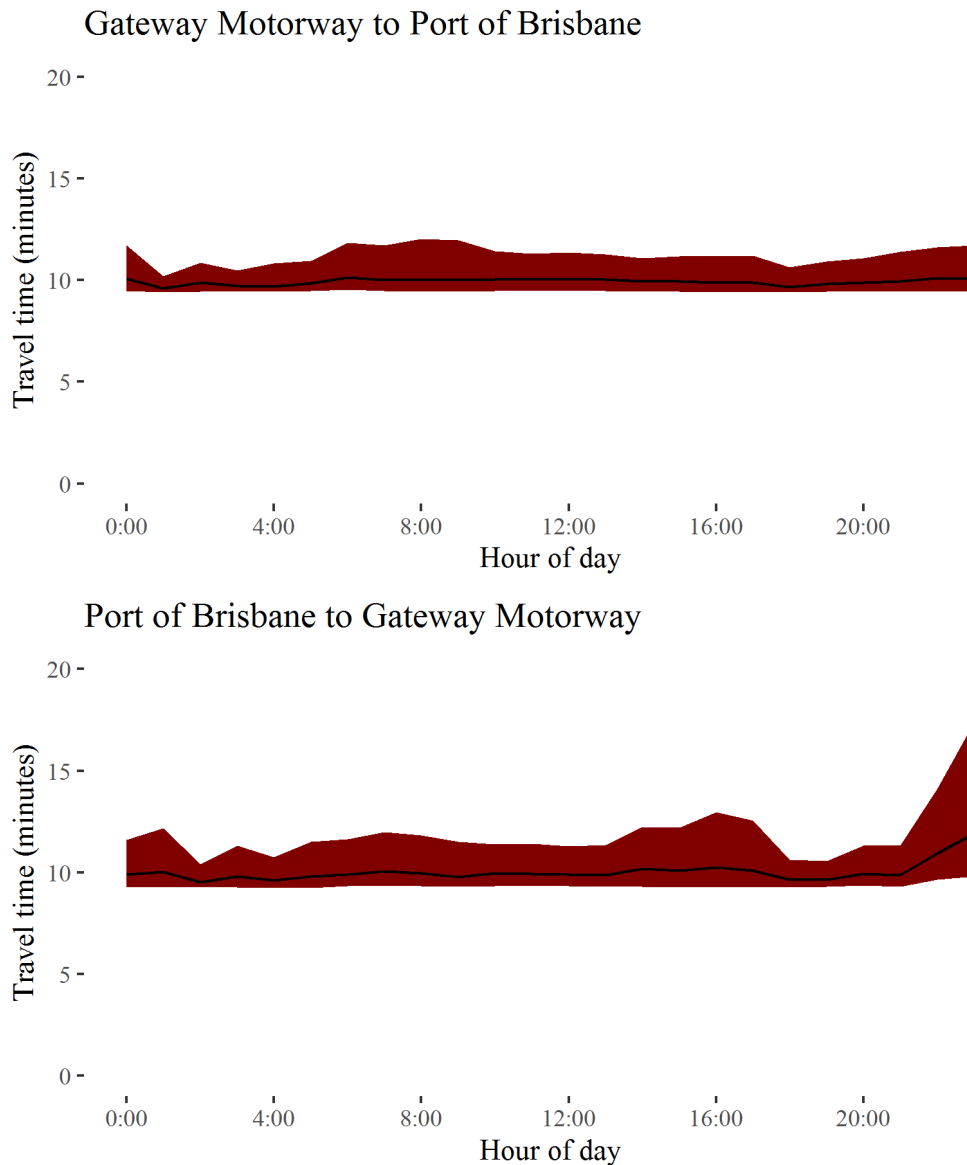
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Gateway Motorway to Port of Brisbane	00:09:35	00:10:07	1.036	00:00:48	00:02:36	2.252	11.7
Port of Brisbane to Gateway Motorway	00:09:31	00:11:55	1.054	00:01:08	00:07:36	2.254	11.7

Source: BITRE estimates.

The best median travel time for journeys from the Gateway Motorway to the Port of Brisbane was 10 minutes at 1am and the lowest uncertainty was at 1am with an interquartile range of 48 seconds. The longest median travel time was 10 minutes at 6am and the greatest uncertainty was at 8am with an interquartile range of 3 minutes.

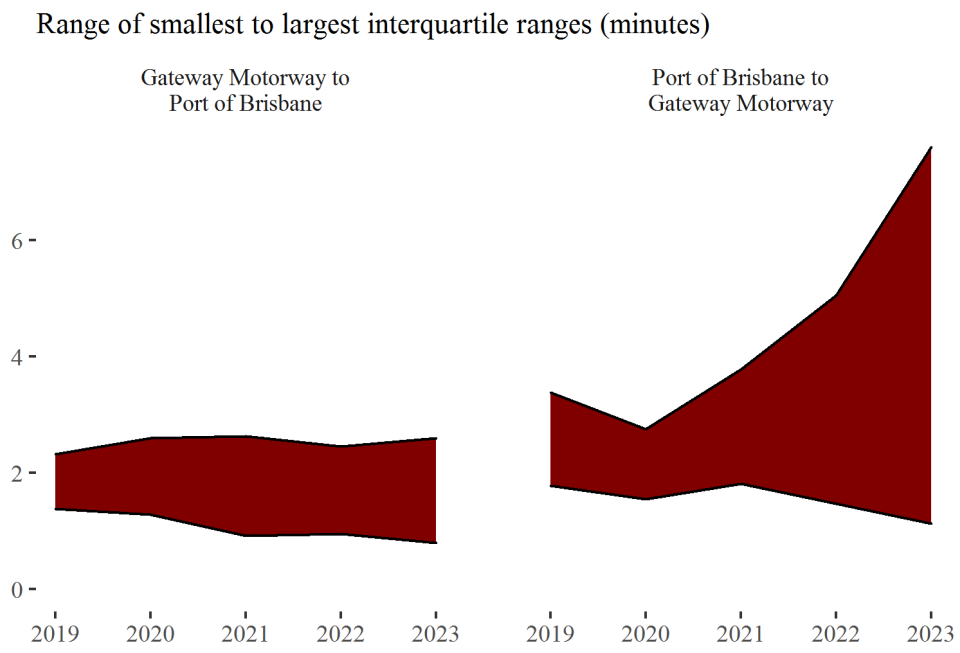
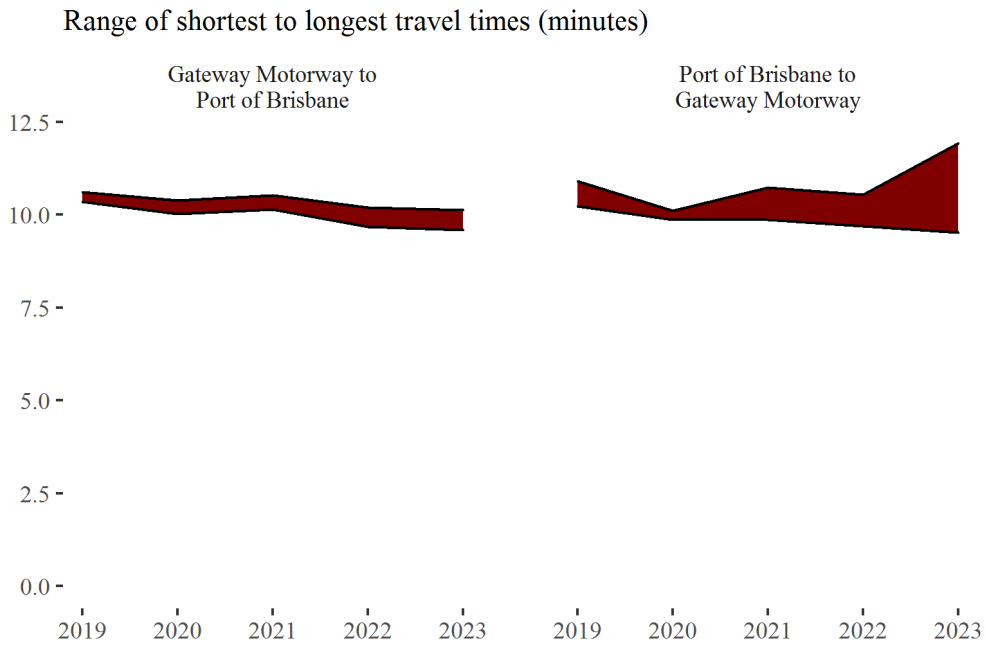
The best median travel times and lowest uncertainty for journeys from Port of Brisbane to Gateway Motorway were at 2am, with a median travel time of 9.5 minutes and an interquartile range of 68 seconds. The longest median travel times and greatest uncertainty were at 11pm, with a median of 12 minutes and an interquartile range of 8 minutes.

**Figure A.143 M4 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.144 M4 Performance over time

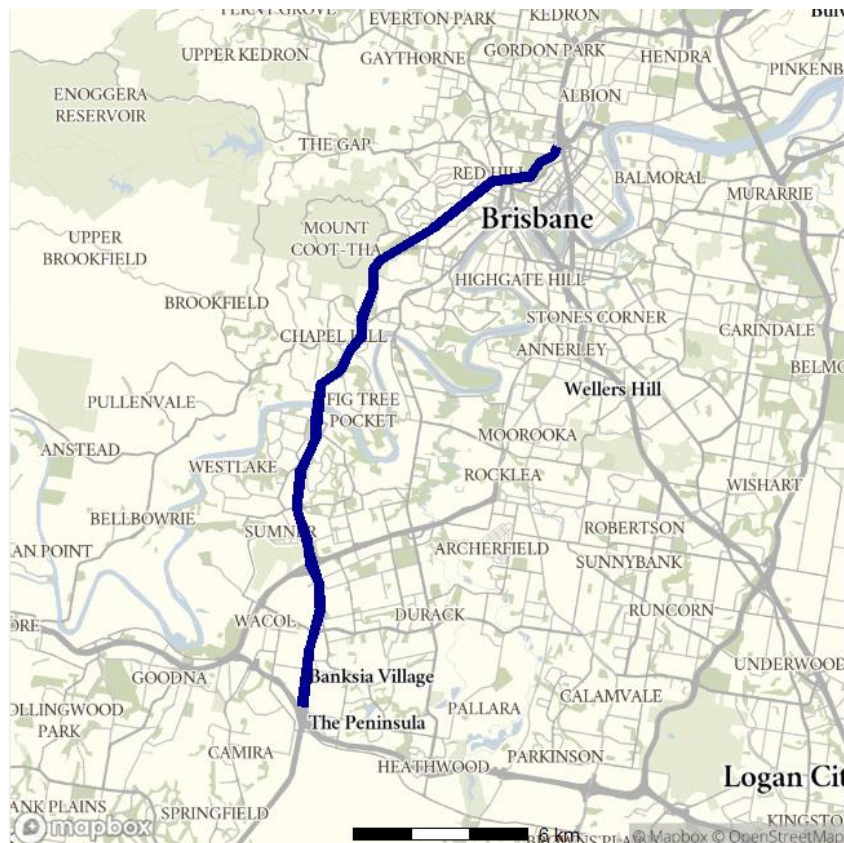


Source: BITRE estimates.

## M5 - Bowen Hills to Logan Motorway / Logan Motorway to Bowen Hills

This route follows the M5 from the M3 and M7 motorways at Bowen Hills and meets the Logan Motorway (M2) at Forest Lake. It traverses the southwest fringe of Brisbane and utilises the Inner City Bypass, Legacy Tunnel, Western Freeway and Centenary Highway.

Figure A.145 M5 route map



Source: BITRE estimates.

Table A.49 M5 route travel times and congestion measures, 2023

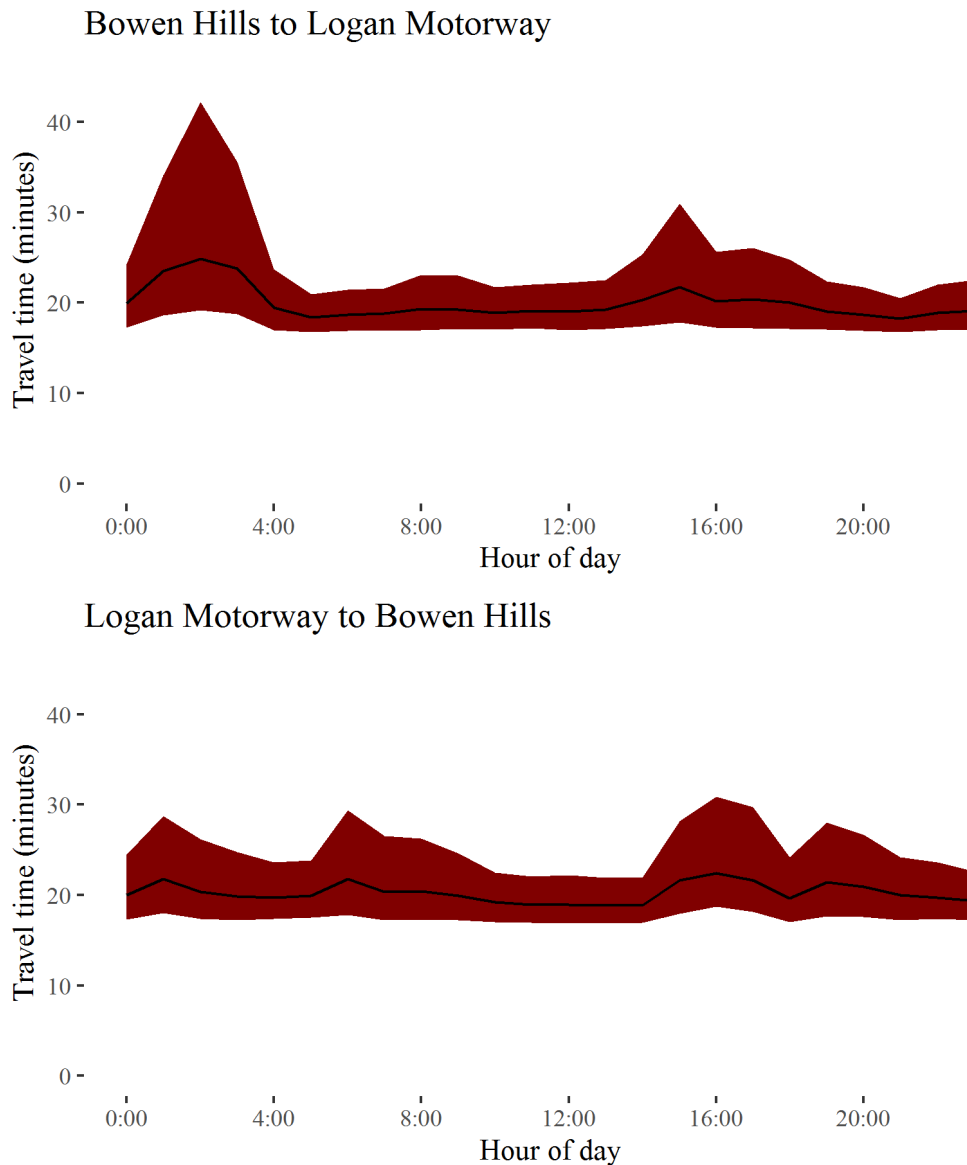
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Bowen Hills to Logan Motorway	00:18:14	00:24:51	1.094	00:03:45	00:23:02	2.064	24.1
Logan Motorway to Bowen Hills	00:18:51	00:22:23	1.073	00:05:02	00:12:12	1.569	24.2

Source: BITRE estimates.

The best median travel times and lowest uncertainty for journeys from Bowen Hills to Logan Motorway were at 9pm, with a median travel time of 18 minutes and an interquartile range of 4 minutes. The longest median travel times and greatest uncertainty were at 2am, with a median of 25 minutes and an interquartile range of 23 minutes.

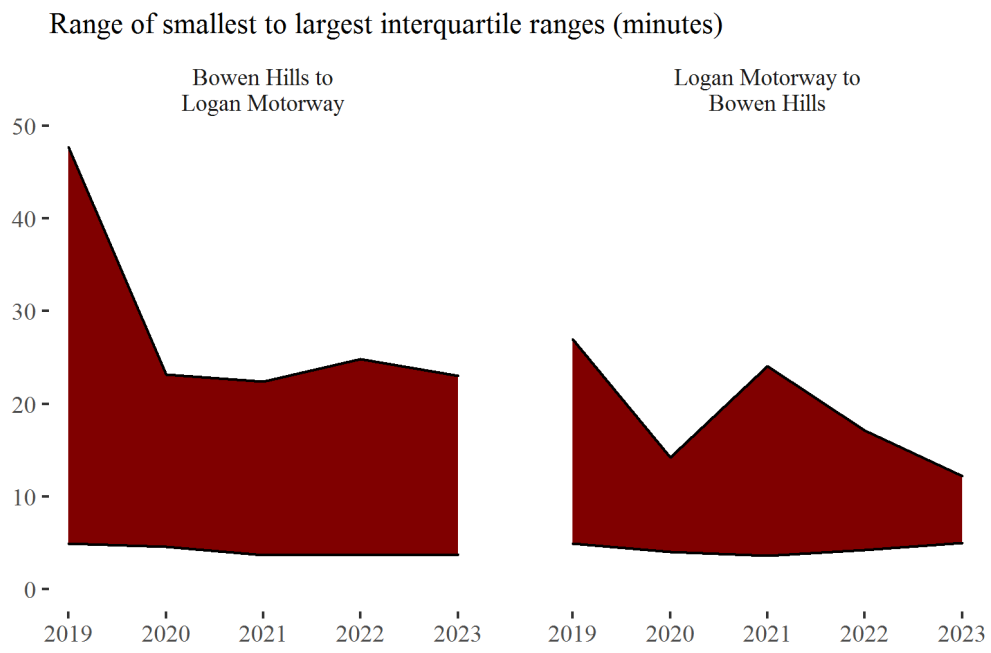
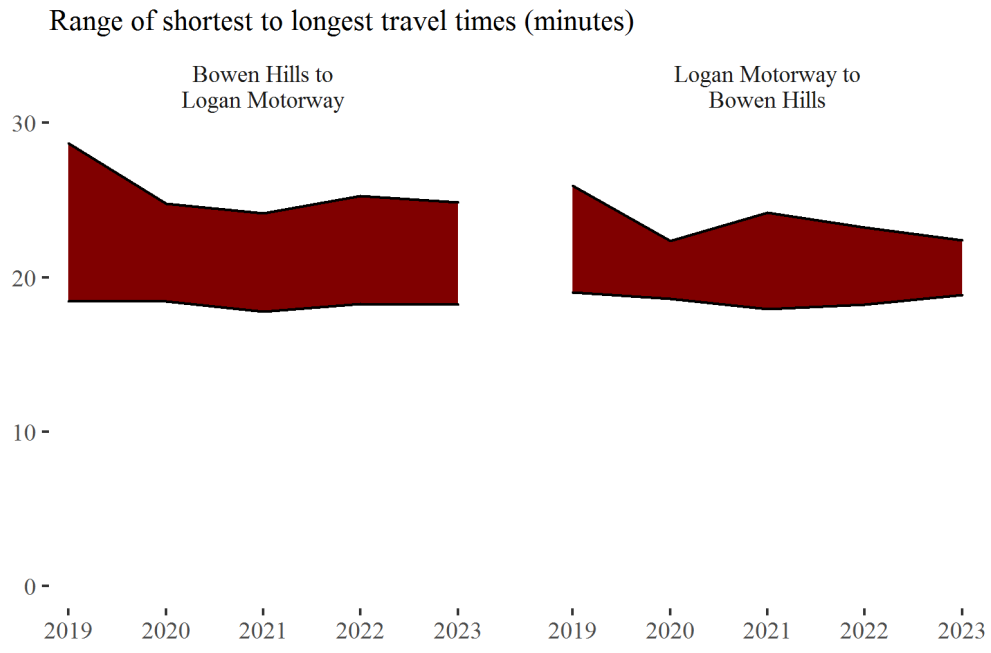
The best travel times and lowest uncertainty travelling from Logan Motorway to Bowen Hills were at 1pm and 2pm, respectively, with a median travel time of 19 minutes and an interquartile range of 5 minutes. The longest median travel times and greatest uncertainty were at 4pm, with a median of 22 minutes and an interquartile range of 12 minutes.

**Figure A.146 M5 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.147 M5 Performance over time



Source: BITRE estimates.

## M6 - Gateway Motorway to Pacific Motorway / Pacific Motorway to Gateway Motorway

The M6 route merges with the M2 at Drewvale and meets the Pacific Motorway (M1) at Loganholme using the Logan Motorway

**Figure A.148 M6 route map**



Source: BITRE estimates.

**Table A.50 M6 route travel times and congestion measures, 2023**

Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Gateway Motorway to Pacific Motorway	00:09:06	00:09:28	1.019	00:00:40	00:01:07	1.257	14.6
Pacific Motorway to Gateway Motorway	00:09:04	00:09:26	1.018	00:00:34	00:01:36	1.602	14.5

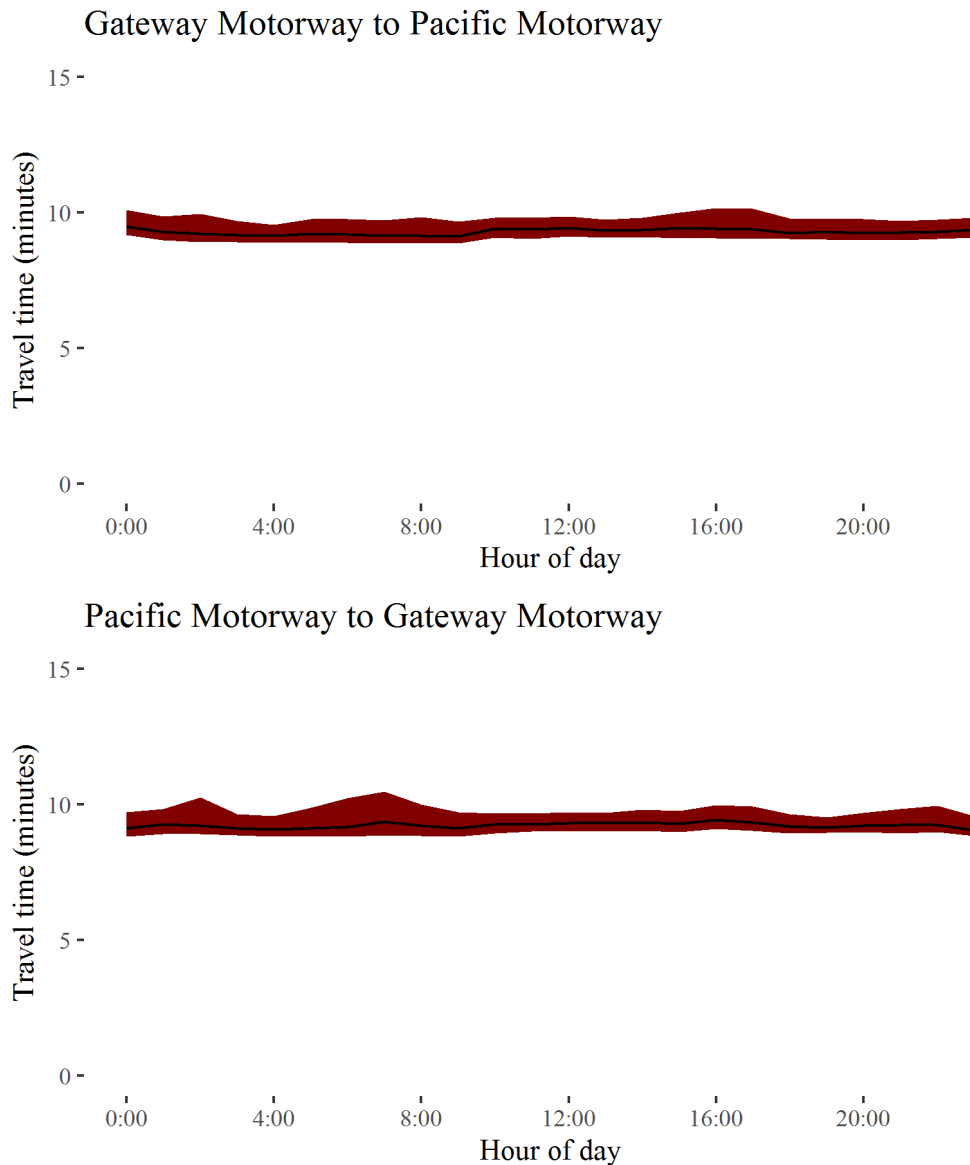
Source: BITRE estimates.



The best median travel times and least uncertainty for journeys from Gateway Motorway to Pacific Motorway were at 9am, with a median travel time of 9 minutes and an interquartile range of 40 seconds. The longest median travel time was 9.5 minutes at midnight and the greatest uncertainty was at 5pm with an interquartile range of approximately 67 seconds.

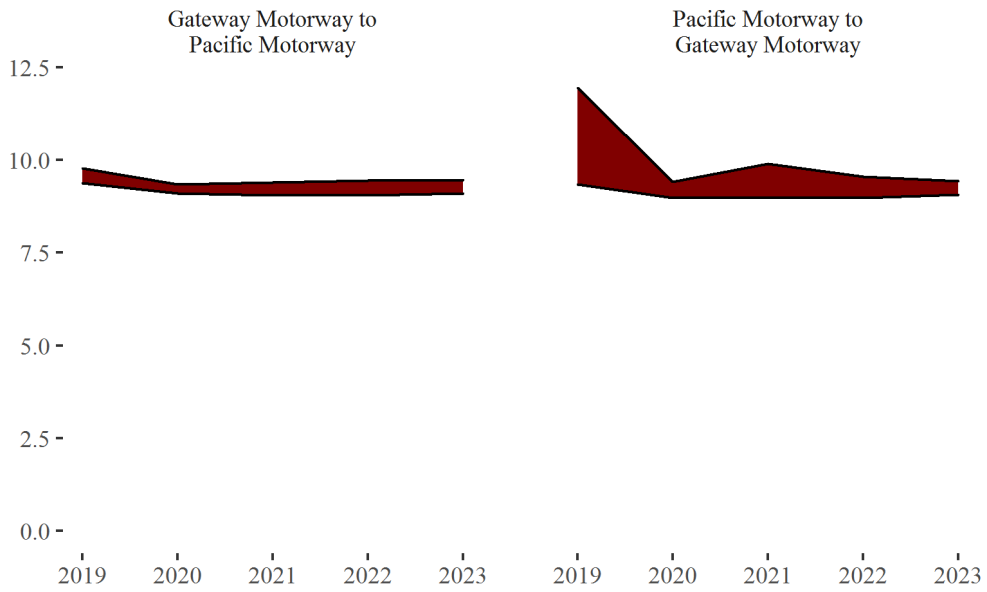
The best median travel times and least uncertainty for journeys from Pacific Motorway to Gateway Motorway were at 11pm, with a median travel time of 9 minutes and an interquartile range of 34 seconds. The longest median travel time was at 4pm with a median of 9.5 minutes and the greatest uncertainty at 7am with an interquartile range of 2 minutes.

**Figure A.149 M6 route median and interquartile range travel times**

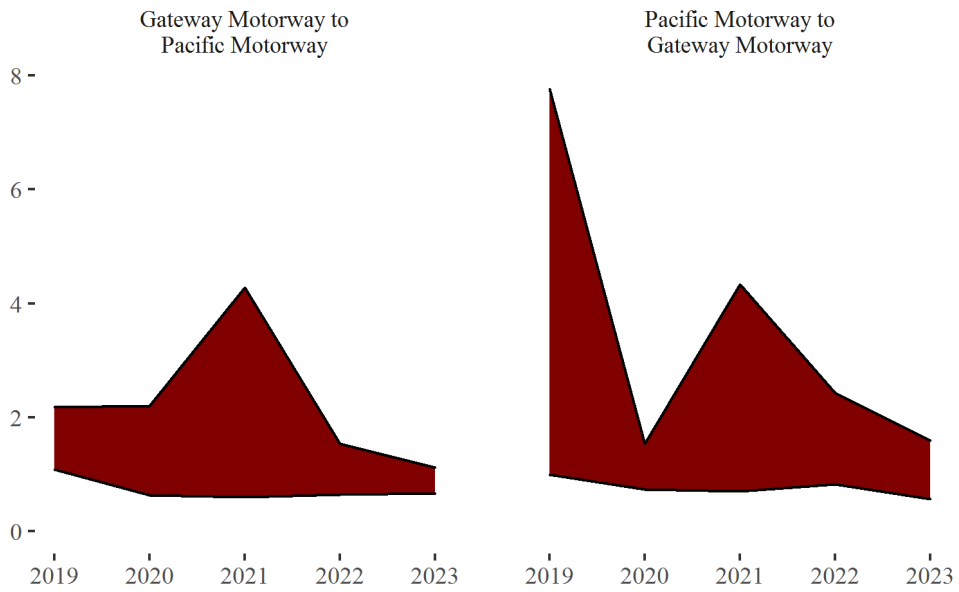


Source: BITRE estimates.

Figure A.150 M6 Performance over time



Range of smallest to largest interquartile ranges (minutes)

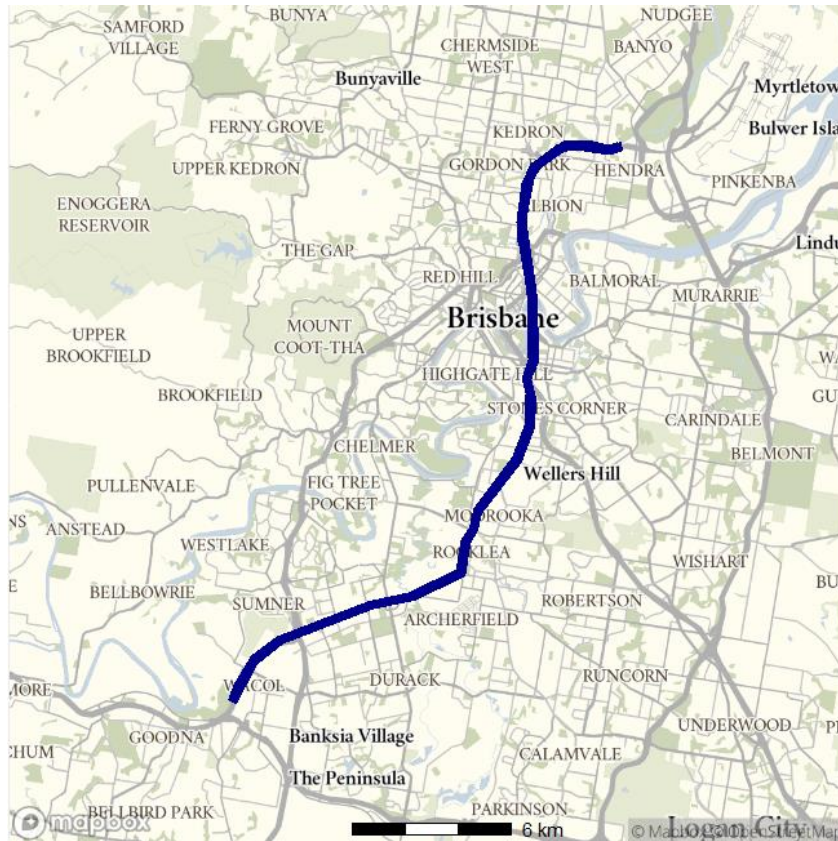


Source: BITRE estimates.

### M7-A7 - Logan Motorway to Southern Cross Way / Southern Cross Way to Logan Motorway

This route follows the A7 and M7 through central Brisbane and links the Logan Motorway (M2) at Gailles in the south and the Southern Cross Way branch of the Gateway Motorway near Brisbane Airport. It uses the Ipswich Motorway (M7), Ipswich Road (A7) and Airport Link M7 past the CBD and under the Brisbane River via the Clem Jones Tunnel along its way.

**Figure A.151 M7-A7 route map**



Source: BITRE estimates.

**Table A.51 M7-A7 route travel times and congestion measures, 2023**

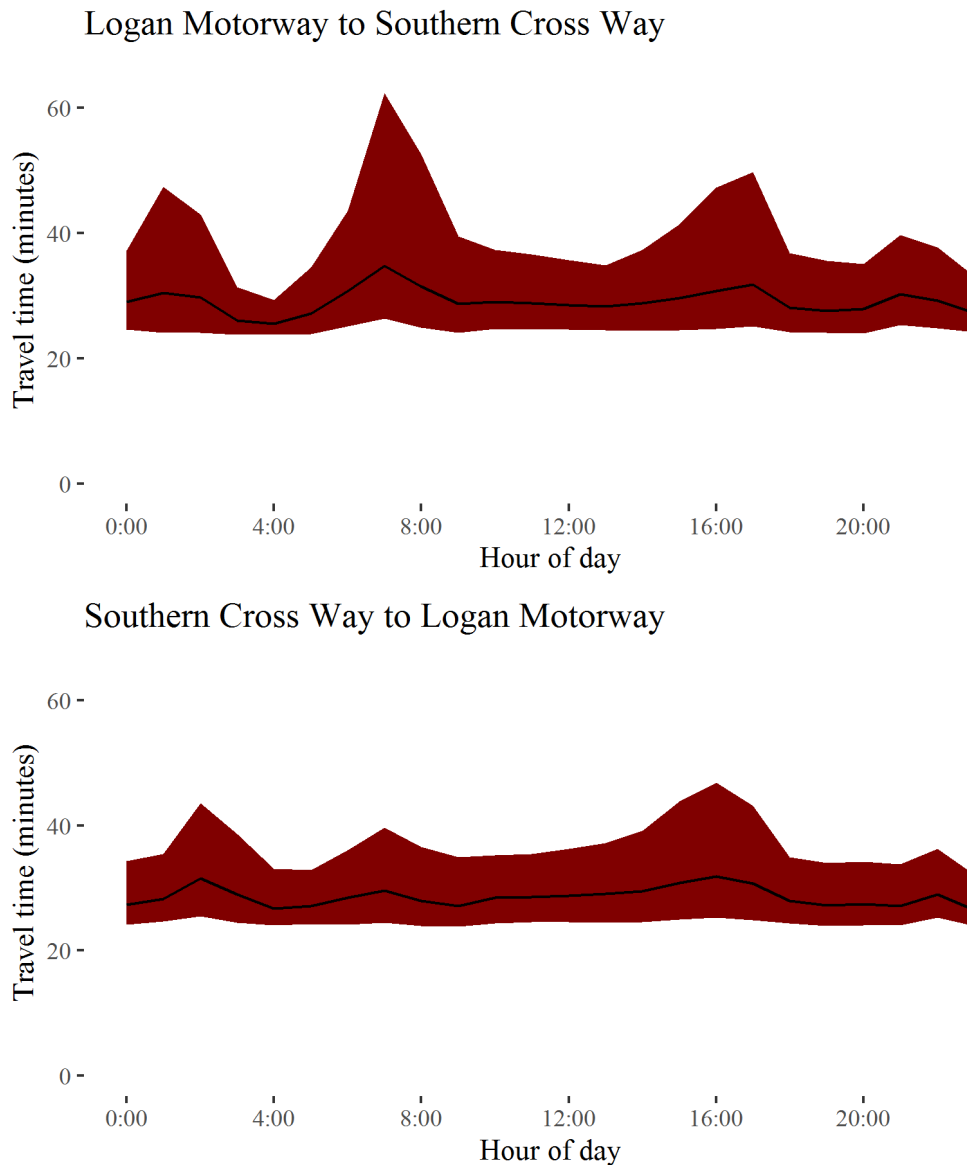
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Logan Motorway to Southern Cross Way	00:25:30	00:34:44	1.143	00:05:31	00:36:05	2.806	30.3
Southern Cross Way to Logan Motorway	00:26:33	00:31:52	1.076	00:08:14	00:21:33	1.524	30.4

Source: BITRE estimates.

The best median travel time for journeys from Logan Motorway to Southern Cross Way was 26 minutes at 4am and the lowest uncertainty was at 4am with an interquartile range of 5.5 minutes. The longest median travel times and greatest uncertainty were at 7am, with a median of 35 minutes and an interquartile range of 36 minutes.

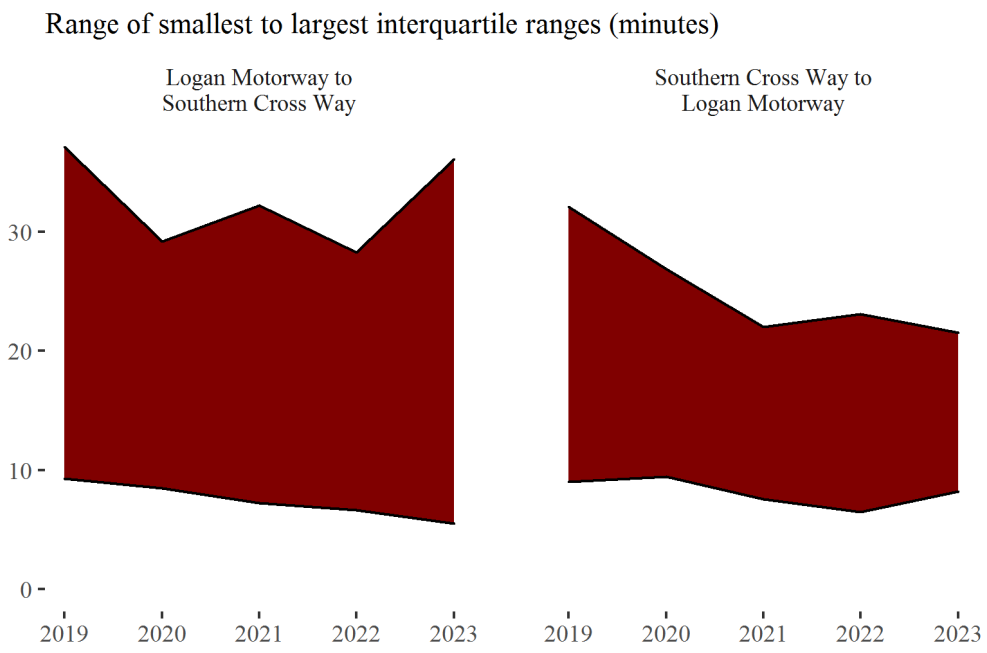
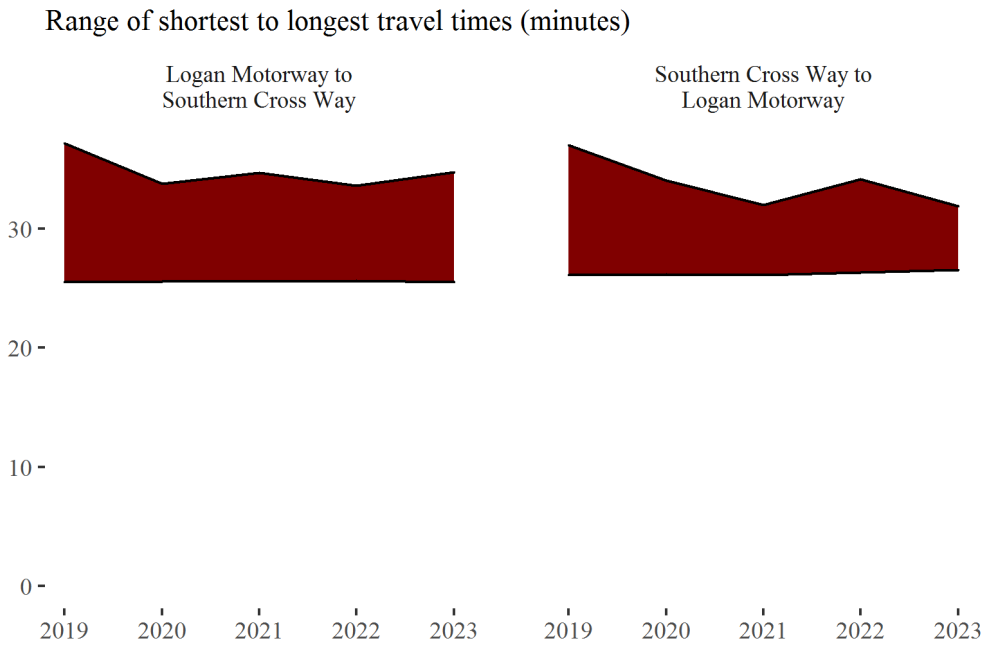
The best median travel times and least uncertainty for journeys from Southern Cross Way to Logan Motorway were at 11pm, with a median travel time of 27 minutes and an interquartile range of 8 minutes. The longest median travel times and greatest uncertainty were at 4pm, with a median of 32 minutes and an interquartile range of 22 minutes.

**Figure A.152 M7-A7 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.153 M7-A7 Performance over time

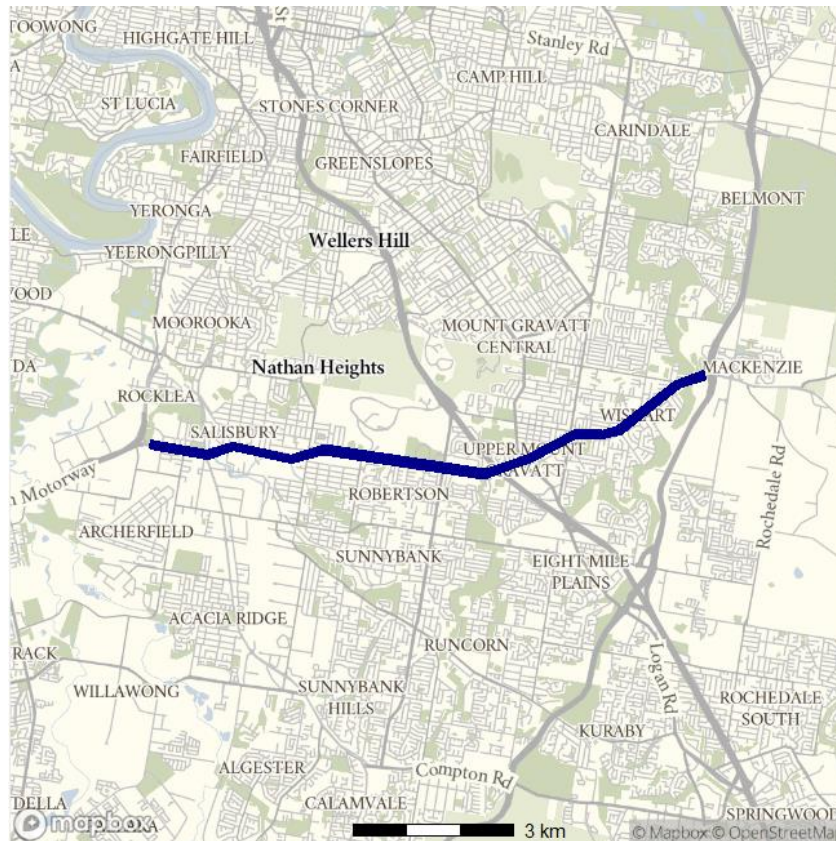


Source: BITRE estimates.

## Route 2 - A7 to Gateway / Gateway to A7

This short (11 kilometre) surface route links the M7/A7 at Rocklea with the Gateway Motorway (M1) at Mackenzie. It passes Robertson and under the Pacific Motorway (M3) along the way.

**Figure A.154** Route 2 route map



Source: BITRE estimates.

**Table A.52** Route 2 route travel times and congestion measures, 2023

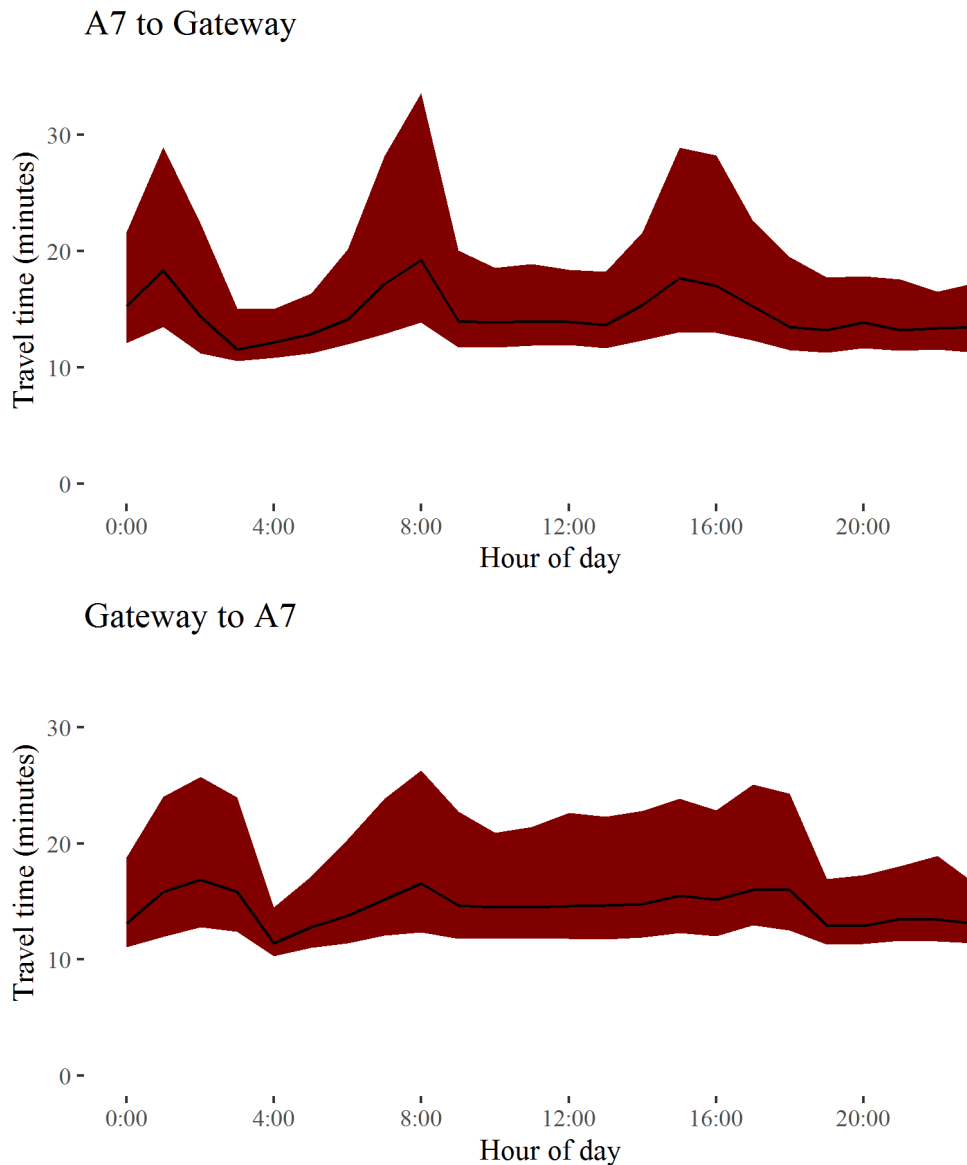
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
A7 to Gateway	00:11:33	00:19:13	1.264	00:04:13	00:19:44	2.148	11.1
Gateway to A7	00:11:23	00:16:52	1.272	00:04:14	00:13:56	2.243	11.1

Source: BITRE estimates.

The best travel times and lowest uncertainty travelling from A7 to Gateway were at 3am and 4am, respectively, with a median travel time of 12 minutes and an interquartile range of 4 minutes. The longest median travel times and greatest uncertainty were at 8am, with a median of 19 minutes and an interquartile range of 20 minutes.

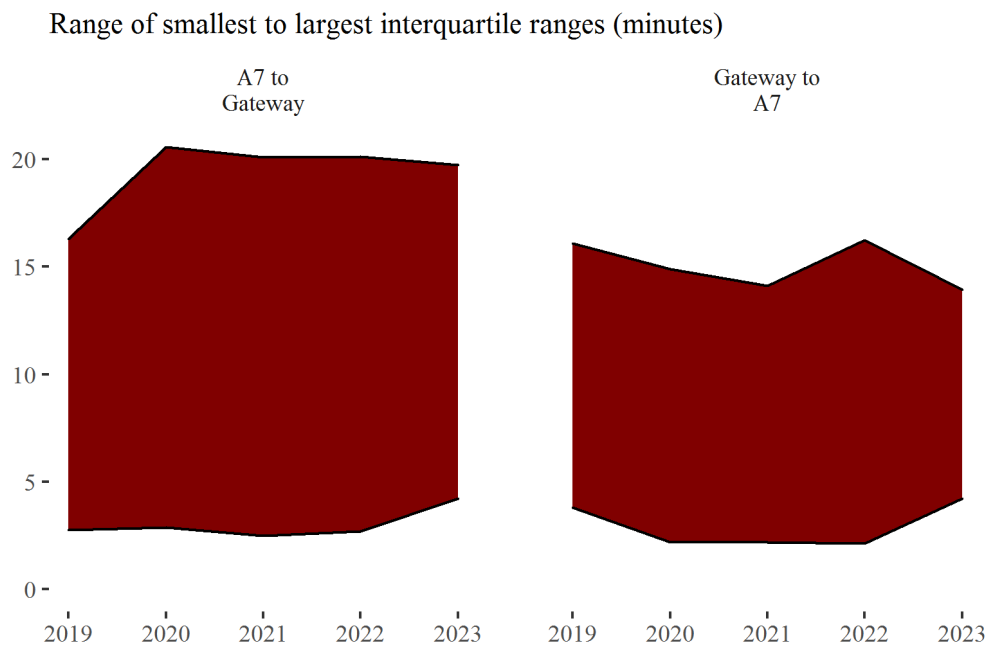
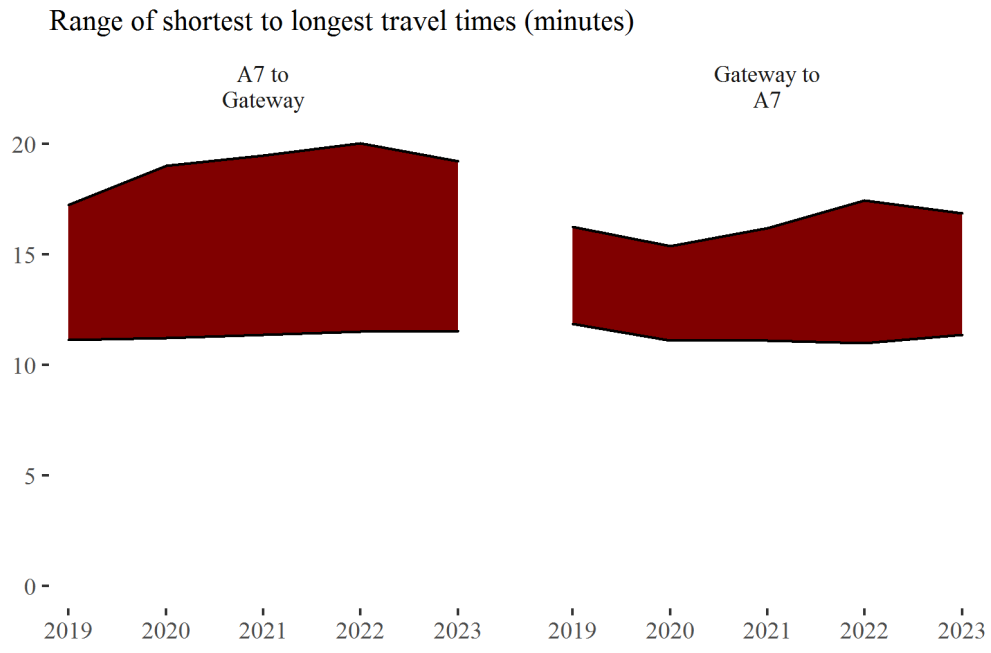
The best median travel times and lowest uncertainty for journeys from Gateway to A7 were at 4am, with a median travel time of 11 minutes and an interquartile range of 4 minutes. The longest median travel time was at 2am with a median of 17 minutes and the greatest uncertainty was at 8am with an interquartile range of 14 minutes.

**Figure A.155 Route 2 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.156 Route 2 Performance over time



Source: BITRE estimates.

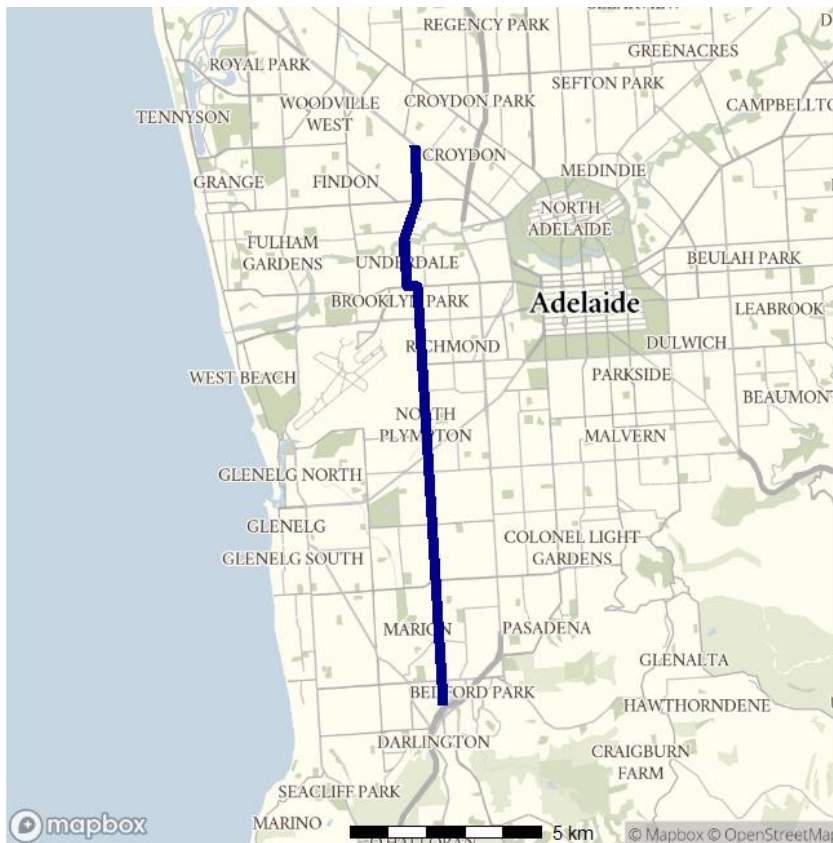


## Adelaide routes

### A14 - Port Road to Southern Expressway / Southern Expressway to Port Road

This surface route traverses Adelaide's eastern suburbs and links Port Road (A7) at West Croydon in the north with the A13 at Darlington in the south. It passes Richmond near the Adelaide Airport and Plympton along the way. The route comprises several different roads including Holbrooks Road, Marion Road and Henley Beach Road.

Figure A.157 A14 route map



Source: BITRE estimates.

Table A.53 A14 route travel times and congestion measures, 2023

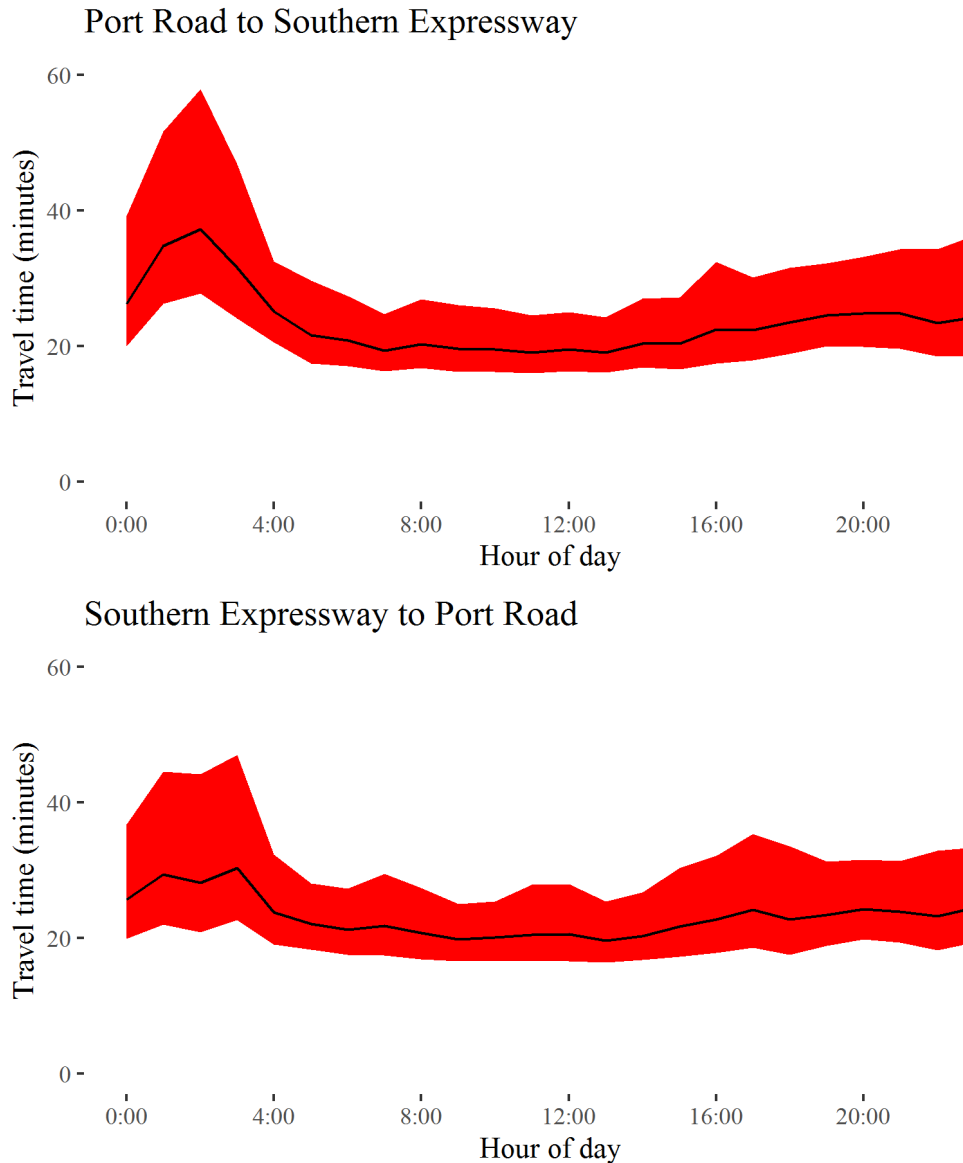
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Port Road to Southern Expressway	00:18:59	00:37:12	1.237	00:08:08	00:30:12	1.691	15
Southern Expressway to Port Road	00:19:39	00:30:20	1.177	00:08:26	00:24:23	1.612	15

Source: BITRE estimates.

The best median travel times and lowest uncertainty for journeys from Port Road to Southern Expressway were at 1pm, with a median travel time of 19 minutes and an interquartile range of 8 minutes. The longest median travel times and greatest uncertainty were at 2am, with a median of 37 minutes and an interquartile range of 30 minutes.

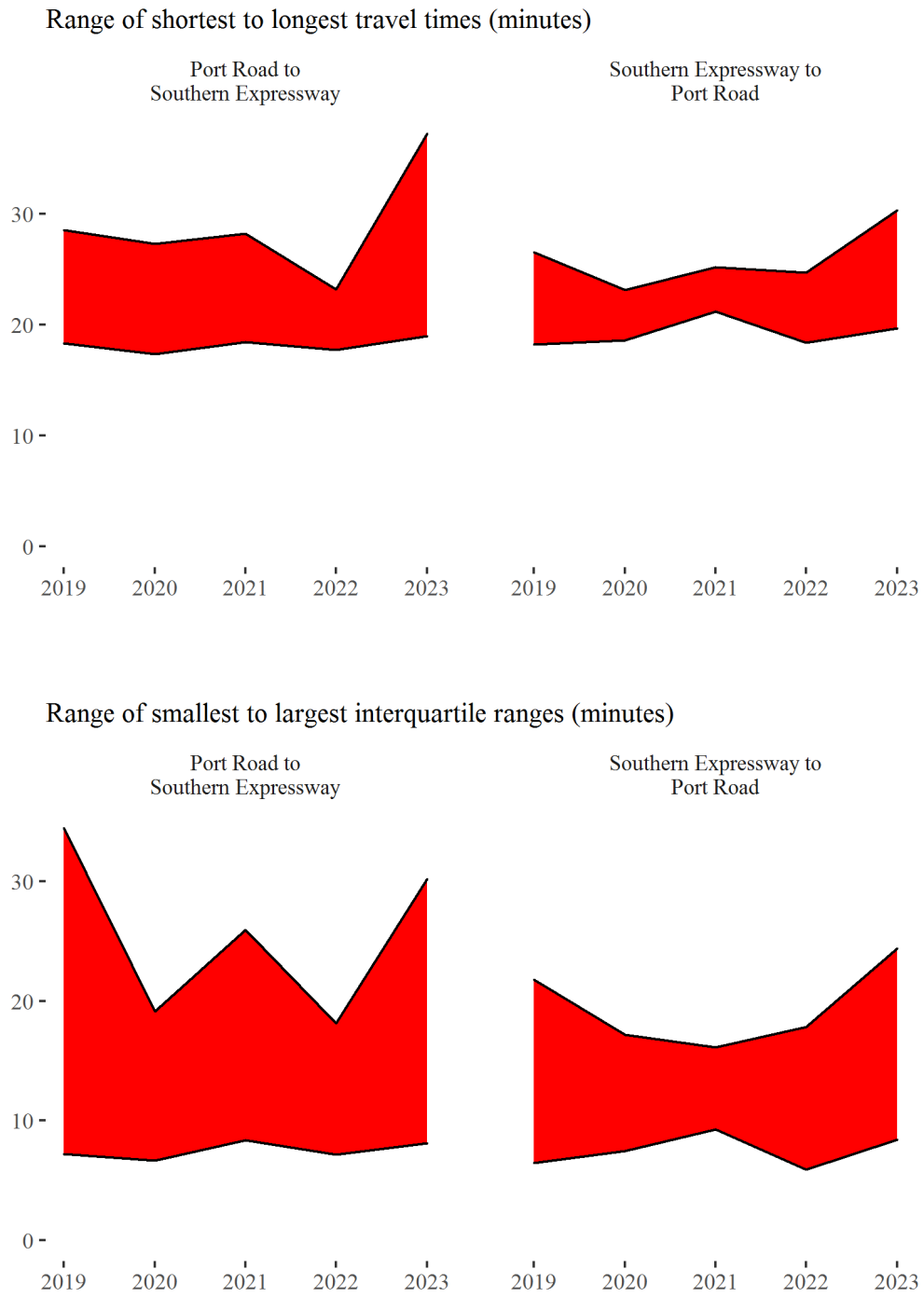
The best travel times and lowest uncertainty travelling from Southern Expressway to Port Road were at 1pm and 9am, respectively, with a median travel time of 20 minutes and an interquartile range of 8.5 minutes. The longest median travel times and greatest uncertainty were at 3am, with a median of 30 minutes and an interquartile range of 24 minutes.

**Figure A.158 A14 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.159 A14 Performance over time

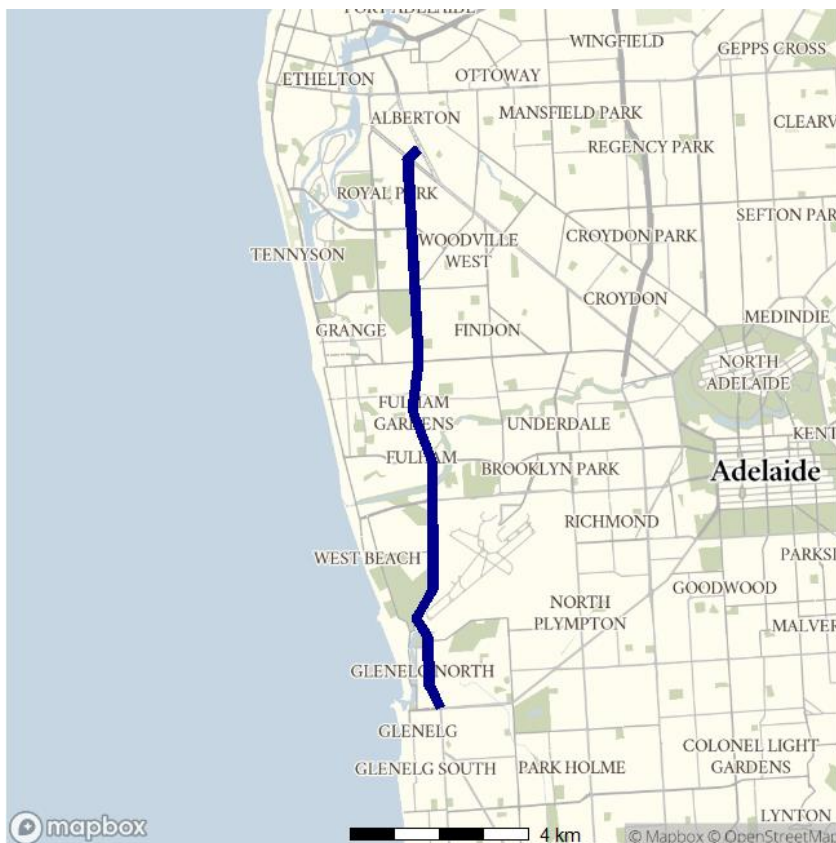


Source: BITRE estimates.

## A15 - ANZAC Highway to Port Road / Port Road to ANZAC Highway

This route traverses the western suburbs of Adelaide between Glenelg and Queenstown-Alberton. Its northern sections run parallel to the A14 route (presented above), but passes west of Adelaide Airport. This route is also known as Tapleys Hill Road.

**Figure A.160 A15 route map**



Source: BITRE estimates.

**Table A.54 A15 route travel times and congestion measures, 2023**

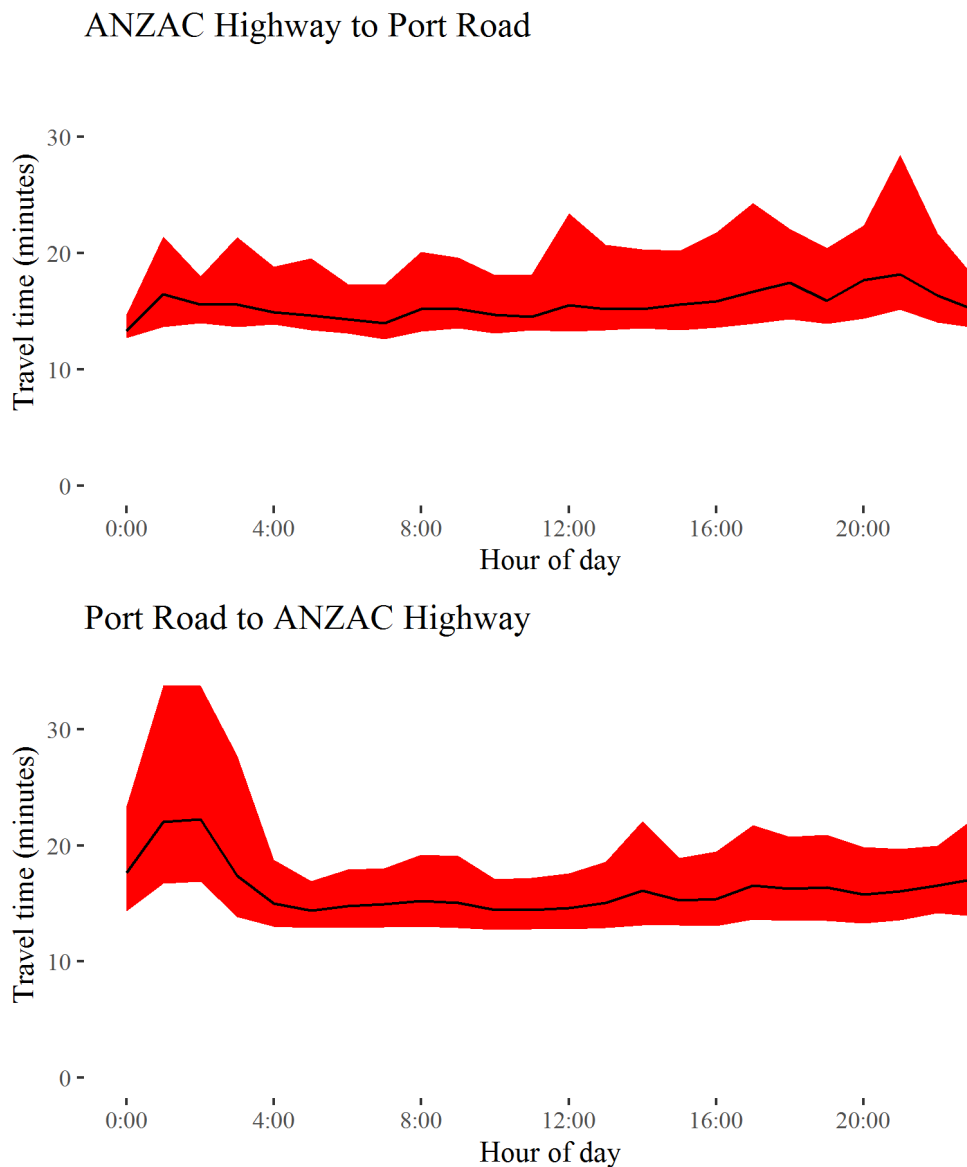
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
ANZAC Highway to Port Road	00:13:20	00:18:10	1.166	00:02:03	00:13:20	3.298	13.1
Port Road to ANZAC Highway	00:14:23	00:22:15	1.125	00:04:02	00:17:02	1.856	13.0

Source: BITRE estimates.

The best median travel times and lowest uncertainty for journeys from ANZAC Highway to Port Road were at midnight, with a median travel time of 13 minutes and an interquartile range of 2 minutes. The longest median travel times and greatest uncertainty were at 9pm, with a median of 18 minutes and an interquartile range of 13 minutes.

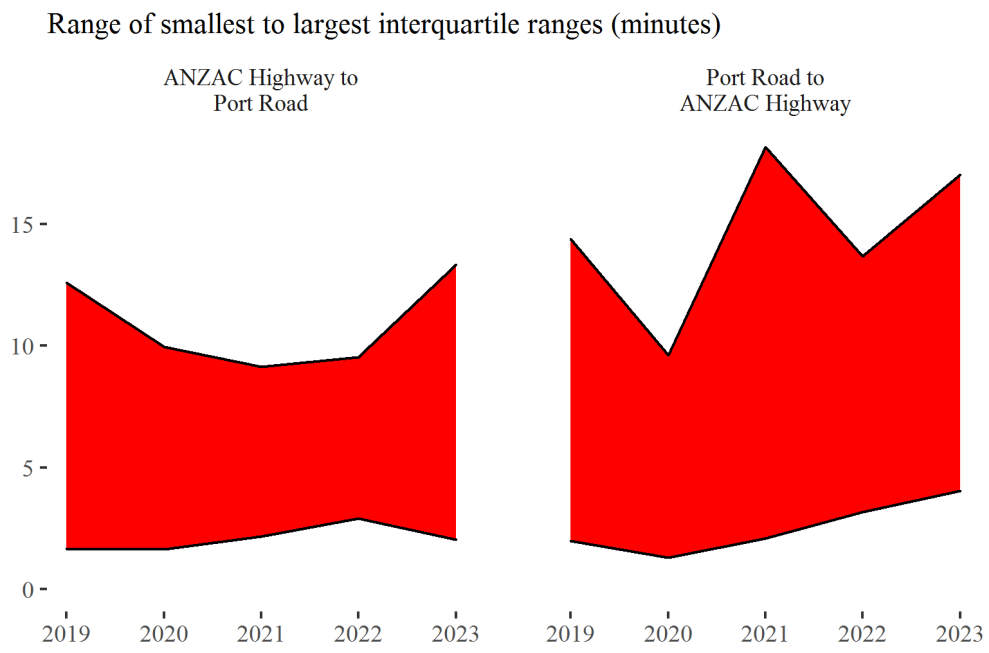
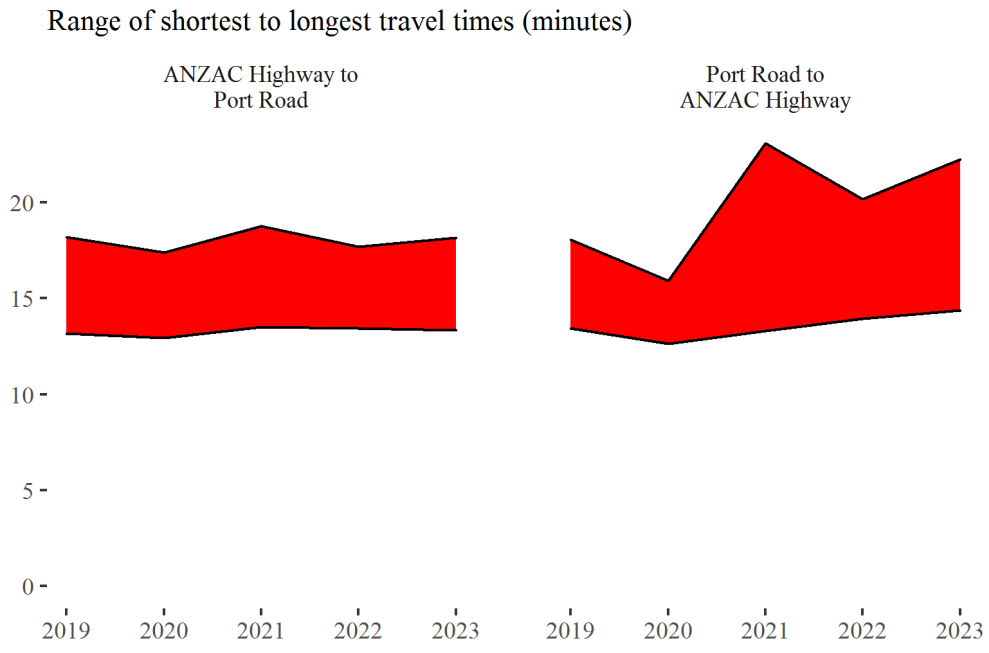
The best median travel time for journeys from Port Road to ANZAC Highway was 14 minutes at 5am and the lowest uncertainty was at 5am with an interquartile range of 4 minutes. The longest median travel time was 22 minutes at 2am and the greatest uncertainty was at 1am with an interquartile range of 17 minutes.

**Figure A.161 A15 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.162 A15 Performance over time

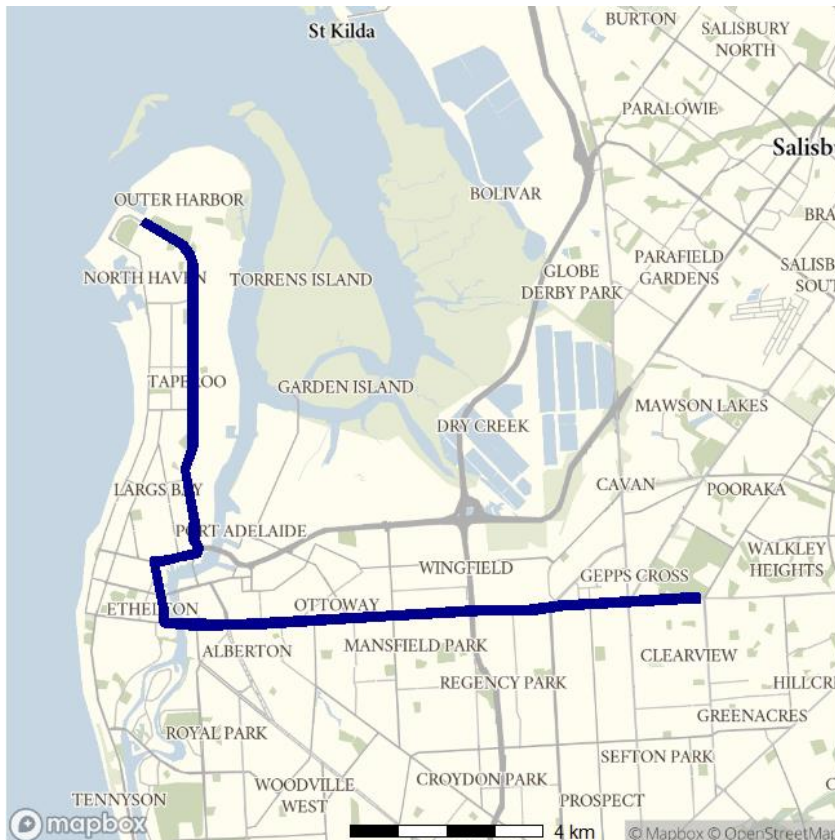


Source: BITRE estimates.

## A16 - Hampstead Road to Outer Harbor / Outer Harbor to Hampstead Road

This route connects Port of Adelaide, at Outer Harbor, to north Adelaide at Hampstead Road (A17). It uses Grand Junction Road, Causeway Road and Semaphore Road and Victoria Road through the suburbs of Ethelton and Birkenhead.

Figure A.163 A16 route map



Source: BITRE estimates.

Table A.55 A16 route travel times and congestion measures, 2023

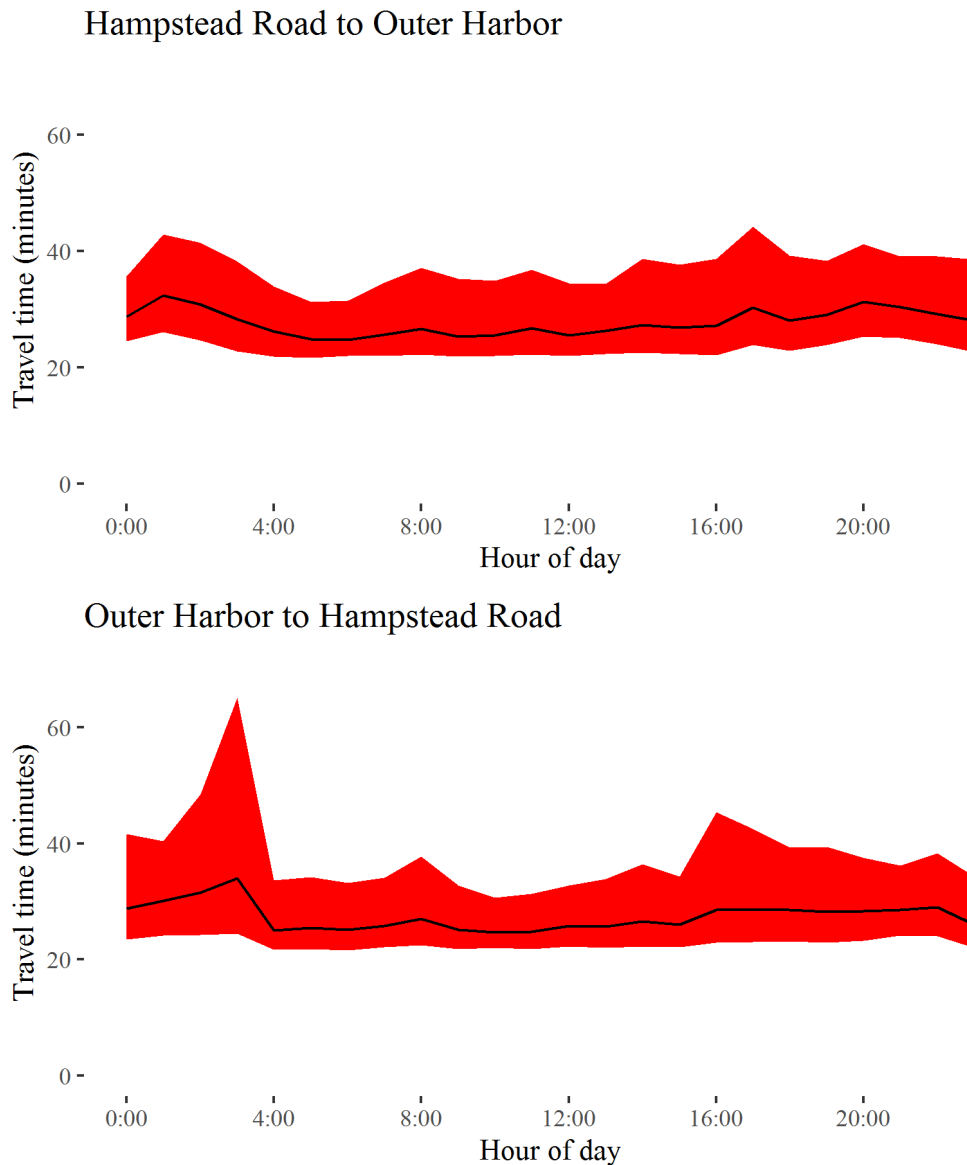
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Hampstead Road to Outer Harbor	00:24:46	00:32:22	1.118	00:09:30	00:20:24	1.513	20.7
Outer Harbor to Hampstead Road	00:24:44	00:34:01	1.108	00:08:37	00:40:36	1.776	20.8

Source: BITRE estimates.

The best median travel time for journeys from Hampstead Road to Outer Harbor was 25 minutes at 6am and the lowest uncertainty also at 6am with an interquartile range of 9.5 minutes. The longest median travel time was at 1am with a median of 32 minutes and the greatest uncertainty at 5pm with an interquartile range of 20 minutes.

The best median travel times and least uncertainty for journeys from Outer Harbor to Hampstead Road were at 10am, with a median travel time of 25 minutes and an interquartile range of 9 minutes. The longest median travel times and greatest uncertainty were at 3am, with a median of 34 minutes and an interquartile range of 41 minutes.

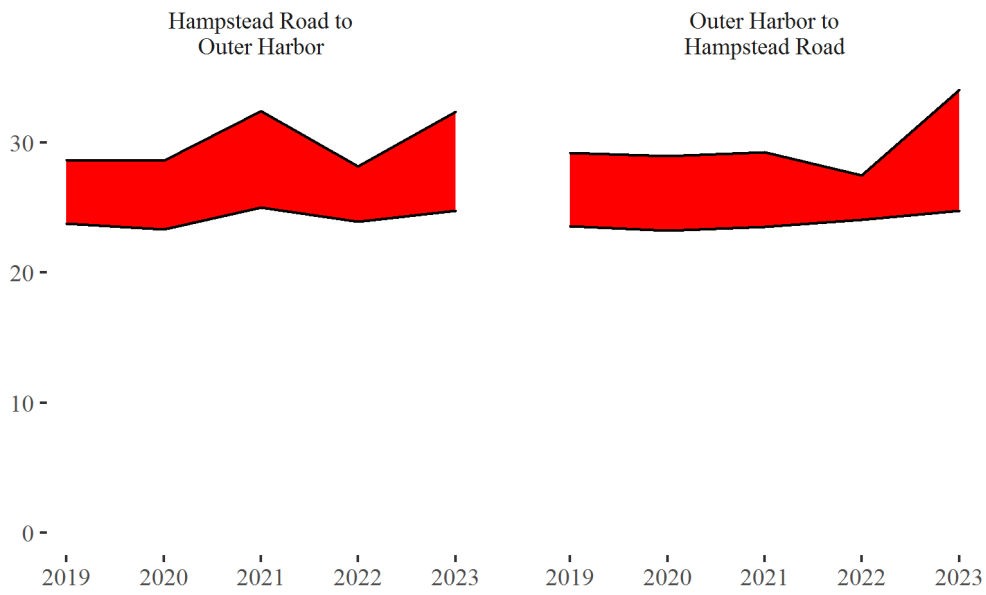
**Figure A.164 A16 route median and interquartile range travel times**



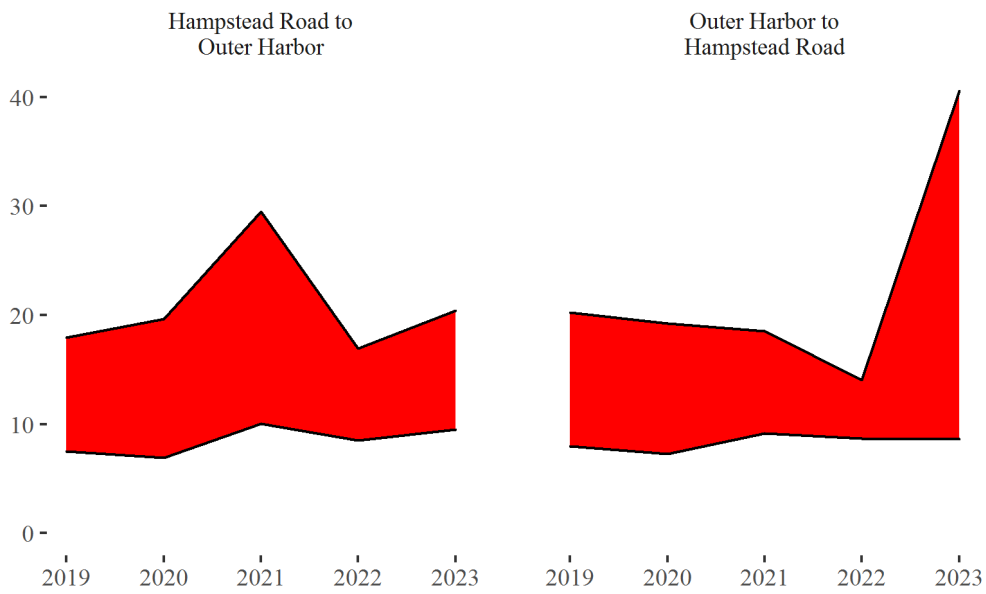
Source: BITRE estimates.



Figure A.165 A16 Performance over time



Range of smallest to largest interquartile ranges (minutes)

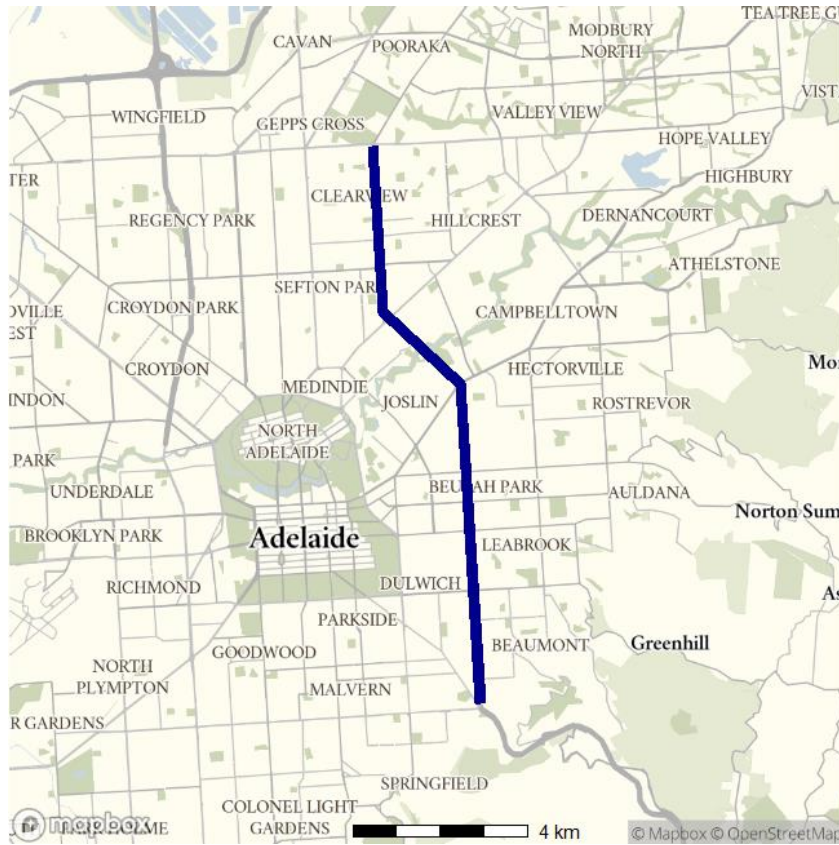


Source: BITRE estimates.

### A17 - Grand Junction Road to South Eastern Freeway / South Eastern Freeway to Grand Junction Road

This route extends from the A16 (Grand Junction Road) south through Adelaide’s eastern suburbs to the junction of the South Eastern Freeway and Cross Road at Glen Osmond. The route traverses Hampstead Road, Ascot Avenue and Portrush Road along its length.

Figure A.166 A17 route map



Source: BITRE estimates.

Table A.56 A17 route travel times and congestion measures, 2023

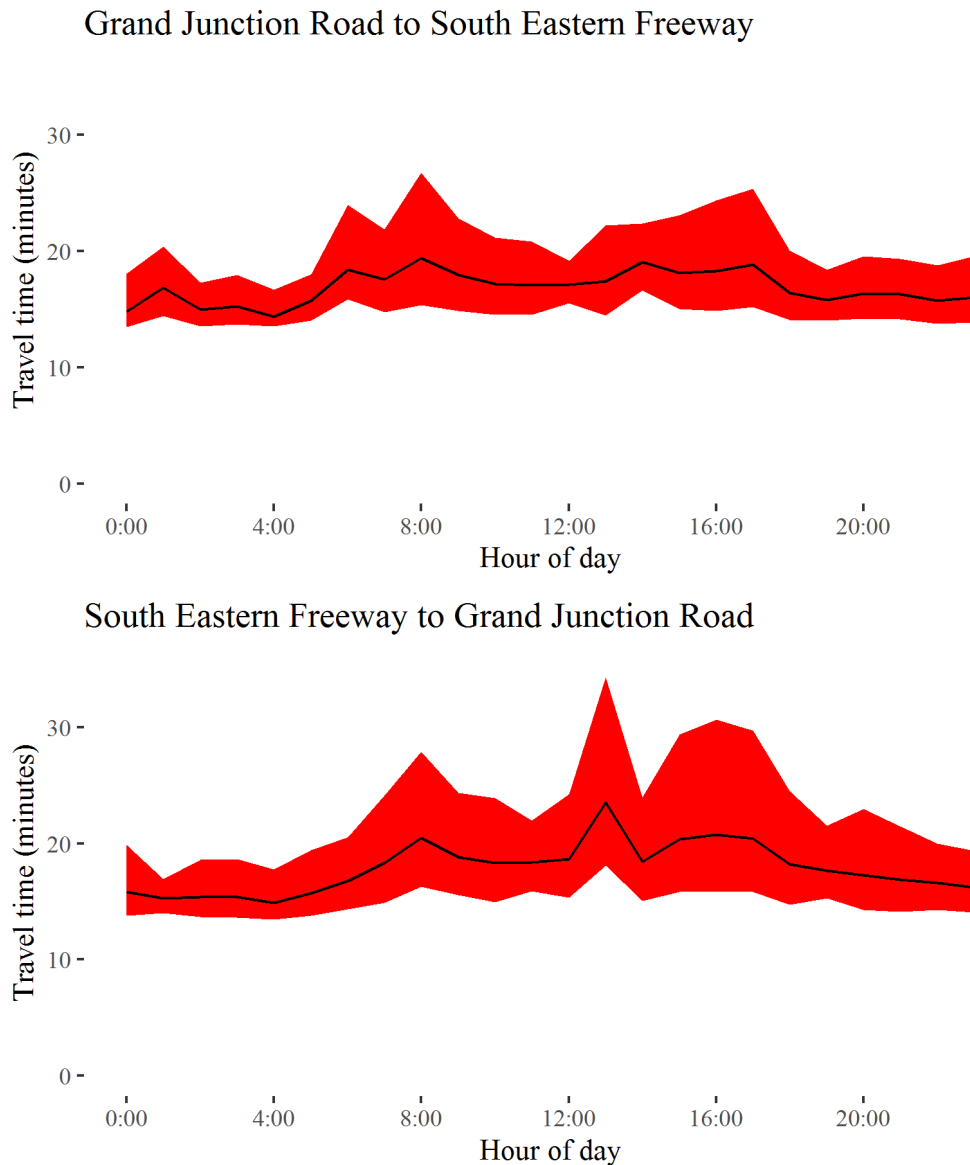
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Grand Junction Road to South Eastern Freeway	00:14:22	00:19:22	1.173	00:03:09	00:11:21	1.982	13.6
South Eastern Freeway to Grand Junction Road	00:14:54	00:23:32	1.198	00:02:56	00:16:10	2.826	13.6

Source: BITRE estimates.

The best median travel times and least uncertainty for journeys from Grand Junction Road to the South Eastern Freeway were at 4am, with a median travel time of 14 minutes and an interquartile range of 3 minutes. The longest median travel times and greatest uncertainty were at 8am, with a median of 19 minutes and an interquartile range of 11 minutes.

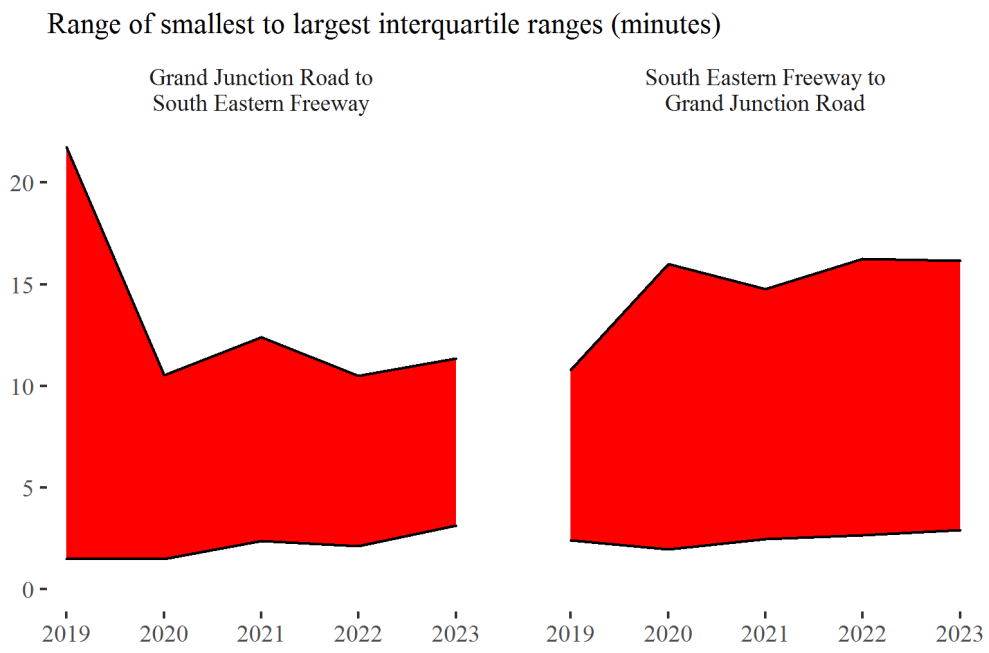
The best median travel times and lowest uncertainty for journeys from South Eastern Freeway to Grand Junction Road were at 4am, with a median travel time of 15 minutes and an interquartile range of 3 minutes. The longest median travel times and greatest uncertainty were at 1pm, with a median of 24 minutes and an interquartile range of 16 minutes.

**Figure A.167 A17 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.168 A17 Performance over time

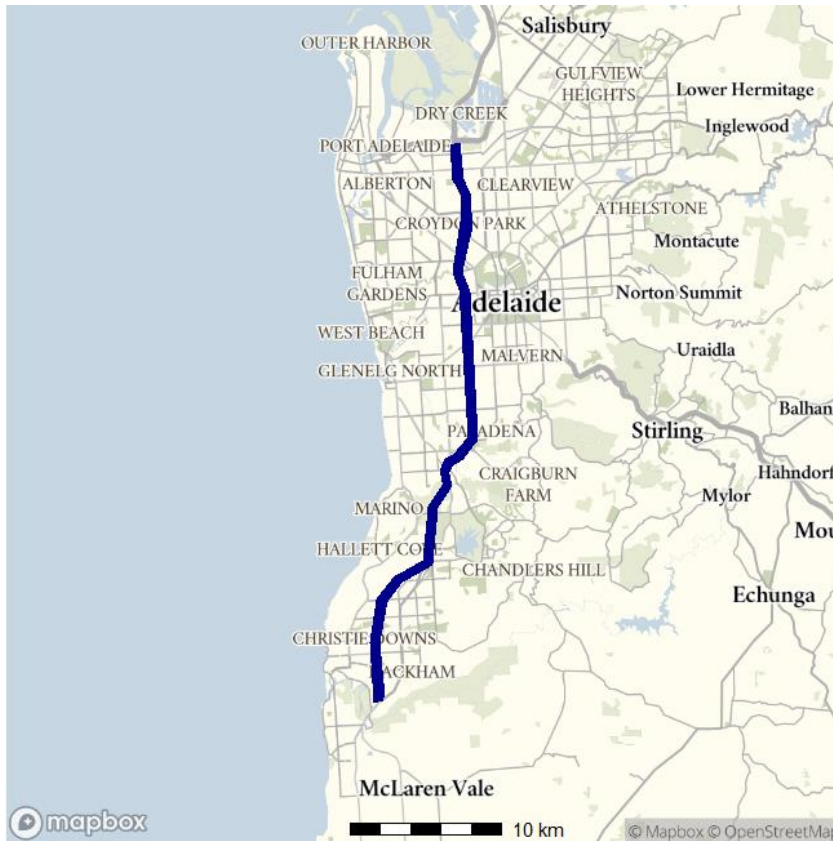


Source: BITRE estimates.

## A2-M2 - Main South Road to Port River Expressway / Port River Expressway to Main South Road

This route, the only Adelaide route in this report with motorway sections, traverses Adelaide north to south. It follows the A2 and the M2, from the Port River Expressway (A9) at Angle Park to the Main South Road at Noarlunga Downs. This route uses the Southern Expressway (M2), South Road (A2) and the North-South Motorway (M2). It does not include the Northern Connector opened in March 2020.

**Figure A.169 A2-M2 route map**



Source: BITRE estimates.

**Table A.57 A2-M2 route travel times and congestion measures, 2023**

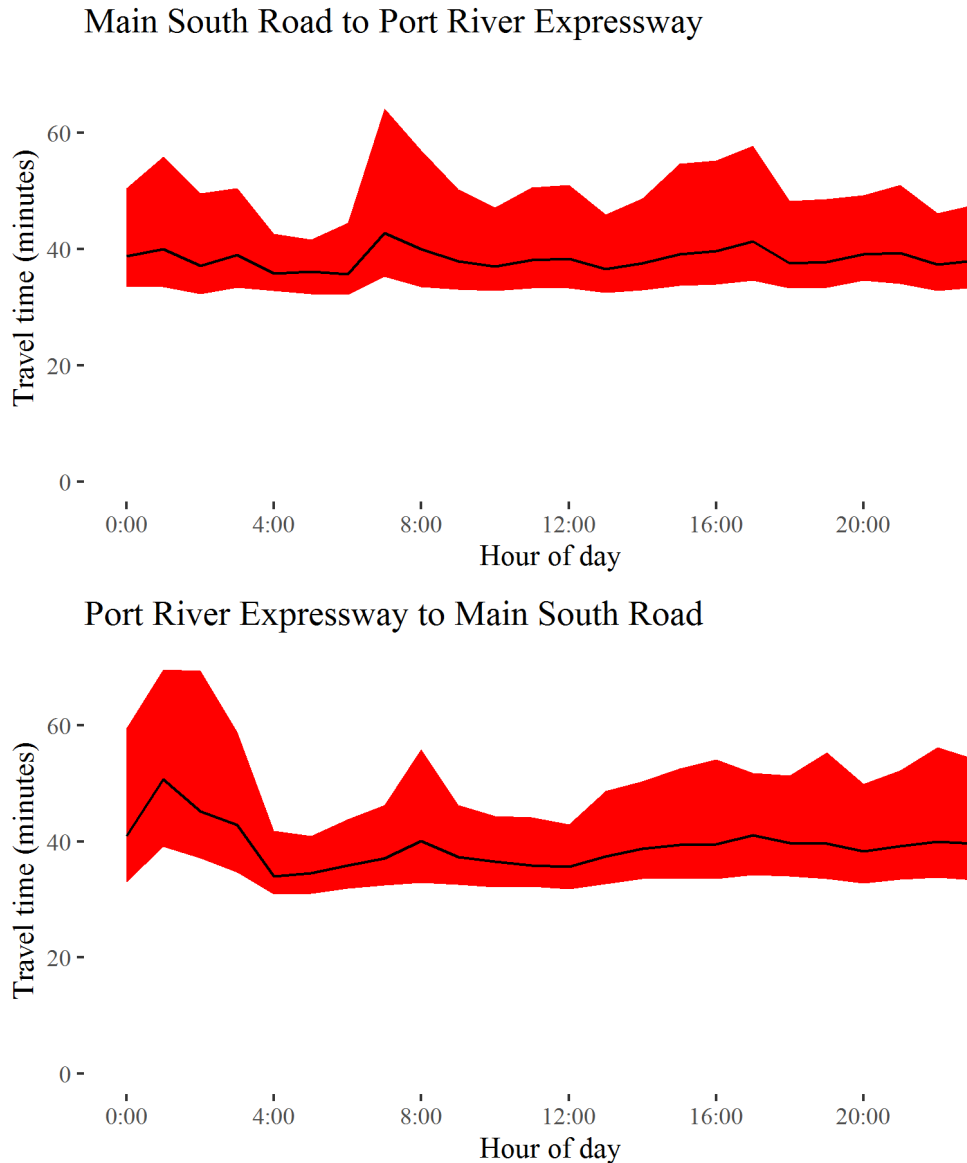
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Main South Road to Port River Expressway	00:35:43	00:42:48	1.074	00:09:28	00:28:55	1.804	40.1
Port River Expressway to Main South Road	00:33:57	00:50:44	1.152	00:09:56	00:32:23	1.847	39.8

Source: BITRE estimates.

The best travel times and lowest uncertainty travelling from Main South Road to Port River Expressway were at 6am and 5am, respectively, with a median travel time of 36 minutes and an interquartile range of 9.5 minutes. The longest median travel times and greatest uncertainty were at 7am, with a median of 43 minutes and an interquartile range of 29 minutes.

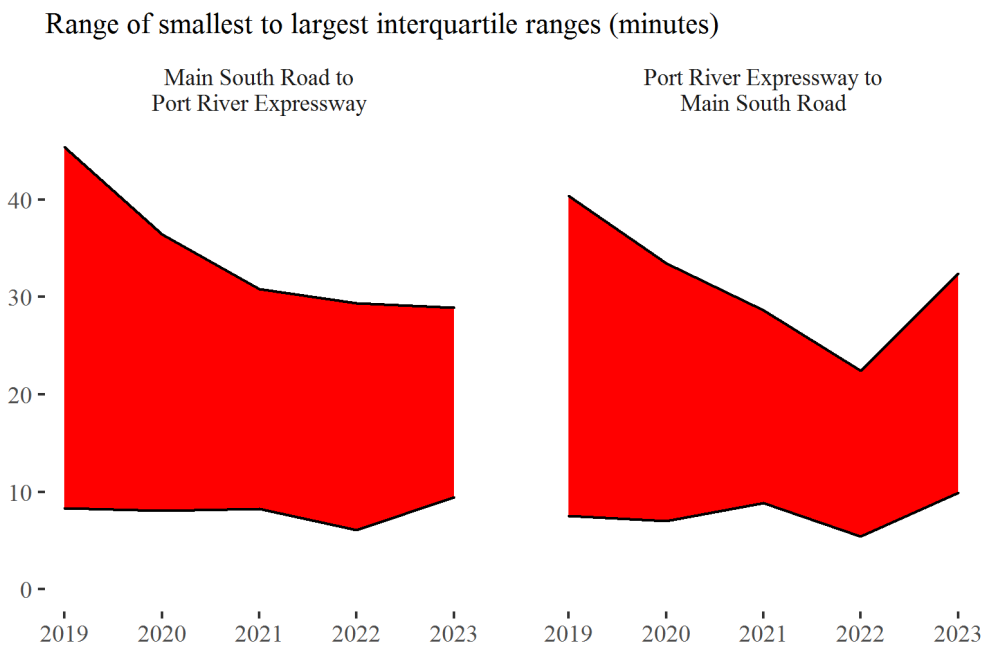
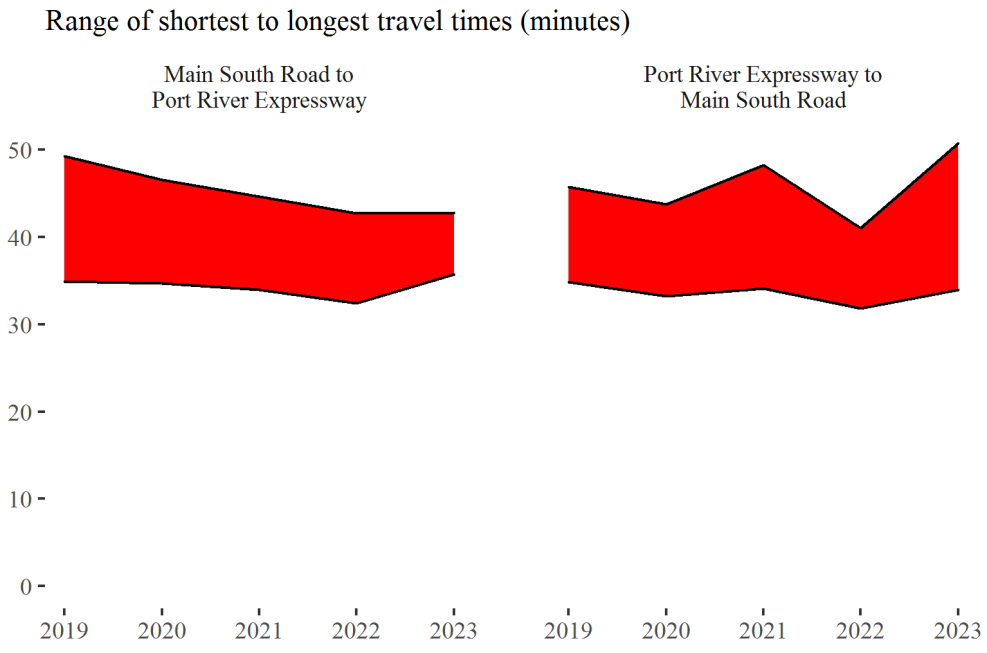
The best median travel times and least uncertainty for journeys from Port River Expressway to Main South Road were at 4am, with a median travel time of 34 minutes and an interquartile range of 10 minutes. The longest median travel time was 51 minutes at 1am and the greatest uncertainty was at 2am with an interquartile range of 32 minutes.

**Figure A.170 A2-M2 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.171 A2-M2 Performance over time

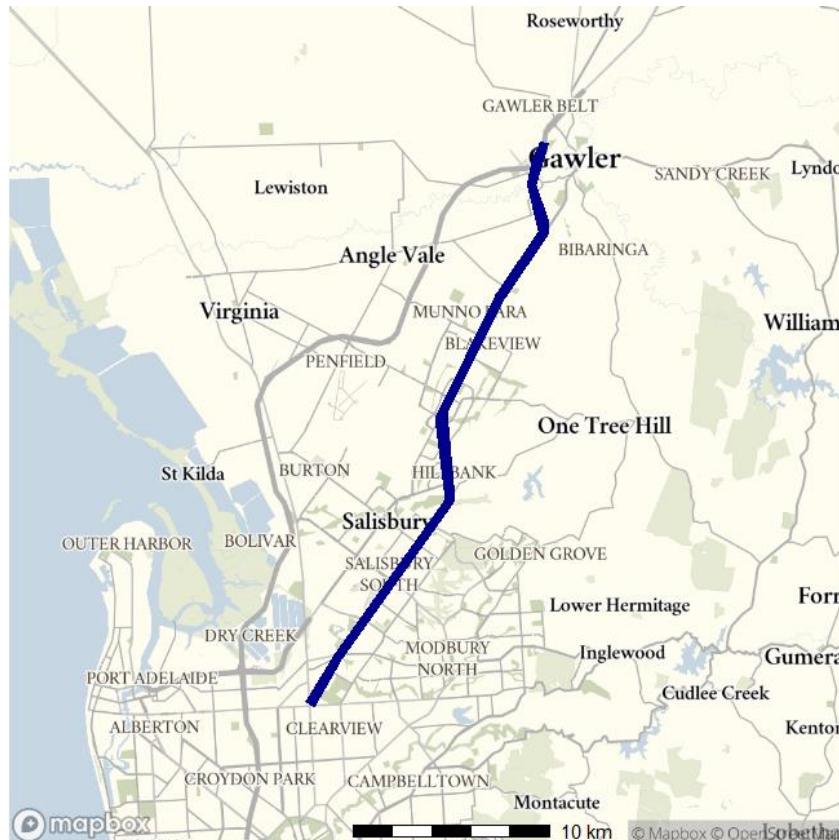


Source: BITRE estimates.

### A20 - Grand Junction Road to Sturt Highway / Sturt Highway to Grand Junction Road

This route follows the A20 (comprising Main North Road and the Gawler Bypass) from Grand Junction Road at Gepps Cross north to the Sturt Highway near Gawler, and passes through Evanston Park, Blakeview, Elizabeth, Salisbury Park and Mawson Lakes.

Figure A.172 A20 route map



Source: BITRE estimates.

Table A.58 A20 route travel times and congestion measures, 2023

Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Grand Junction Road to Sturt Highway	00:28:51	00:49:54	1.186	00:11:06	00:37:01	1.595	32.4
Sturt Highway to Grand Junction Road	00:28:44	00:47:32	1.136	00:09:19	00:38:07	1.912	32.6

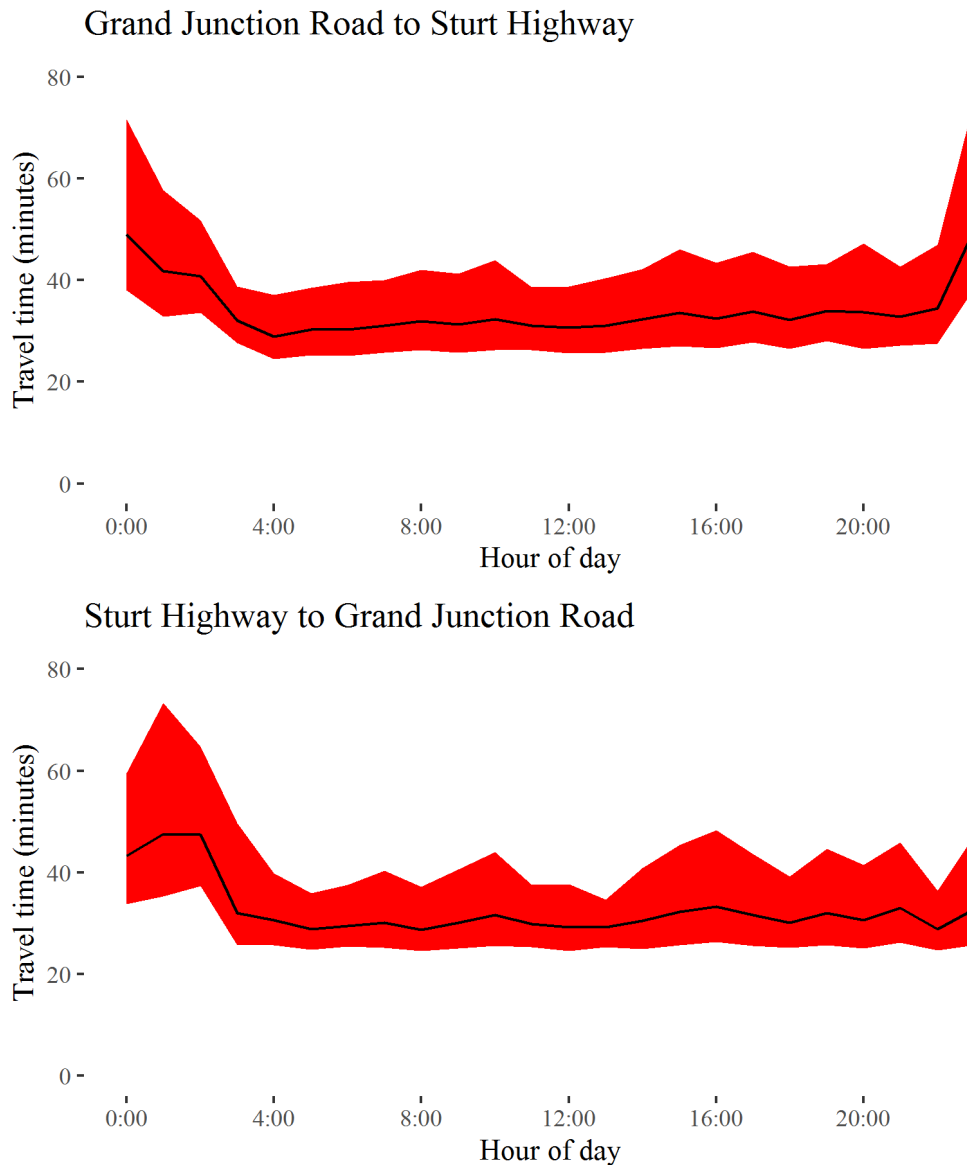
Source: BITRE estimates.



The best median travel times and least uncertainty for journeys from Grand Junction Road to Sturt Highway were at 4am, with a median travel time of 29 minutes and an interquartile range of 11 minutes. The longest median travel times and greatest uncertainty were at 11pm, with a median of 50 minutes and an interquartile range of 37 minutes.

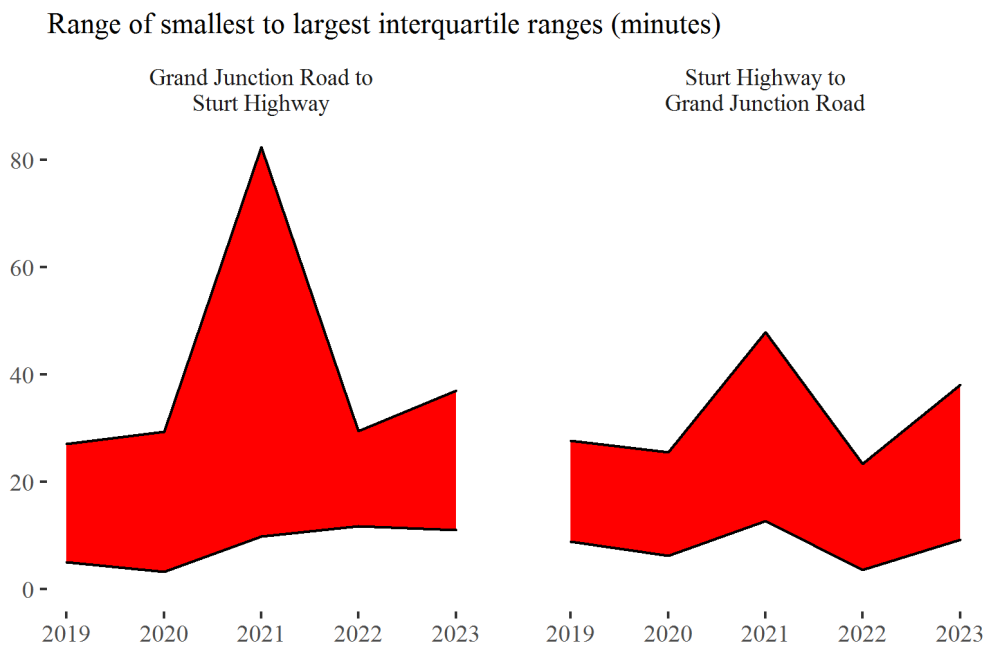
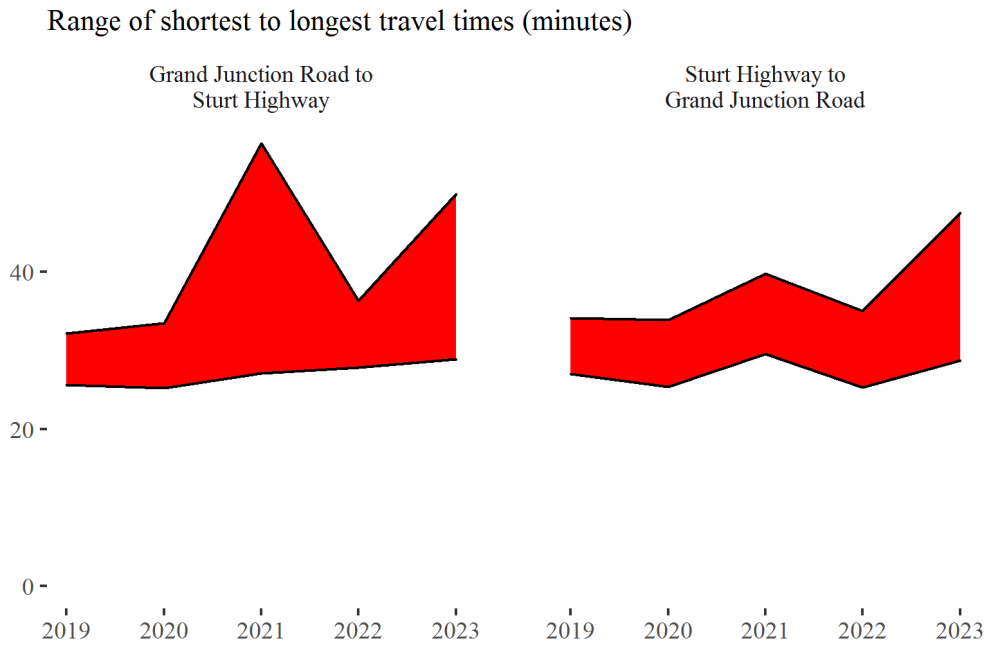
The best median travel times and lowest uncertainty for journeys from Sturt Highway to Grand Junction Road were at 8am, with a median travel time of 29 minutes and an interquartile range of 9 minutes. The longest median travel times and greatest uncertainty were at 1am, with a median of 48 minutes and an interquartile range of 38 minutes.

**Figure A.173 A20 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.174 A20 Performance over time

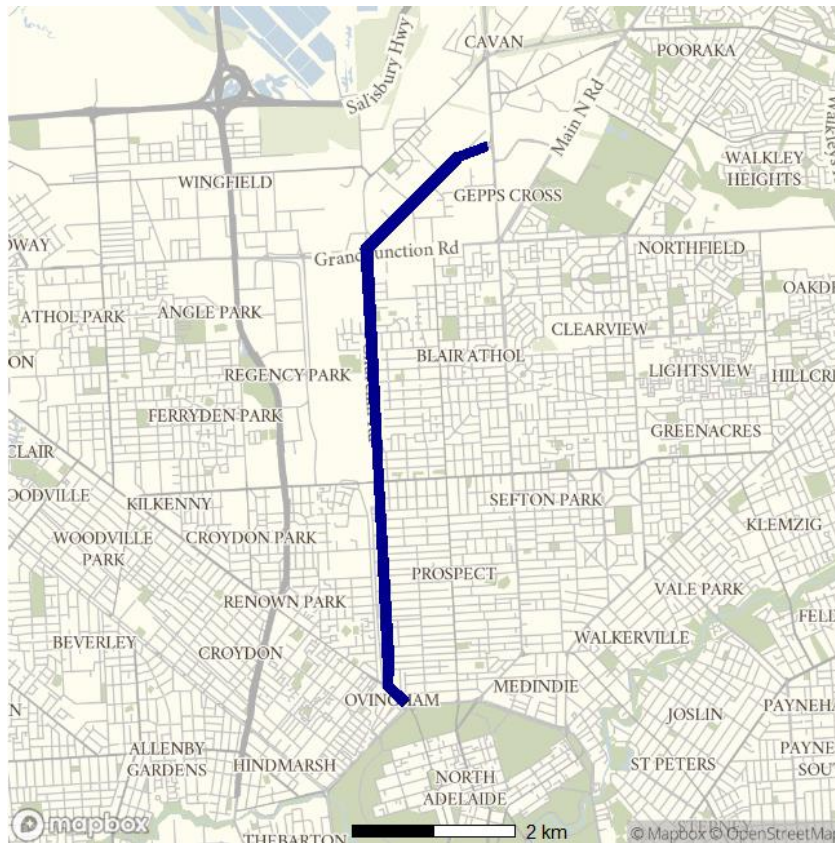


Source: BITRE estimates.

## A22 - Park Terrace to Port Wakefield Road / Port Wakefield Road to Park Terrace

This route extends from Park Terrace at north Adelaide north to the Princes Highway (A1, Port Wakefield Road) at Gepps Cross. It uses Churchill Road and Cavan Road, crossing Grand Junction Road (A16) along its length.

Figure A.175 A22 route map



Source: BITRE estimates.

Table A.59 A22 route travel times and congestion measures, 2023

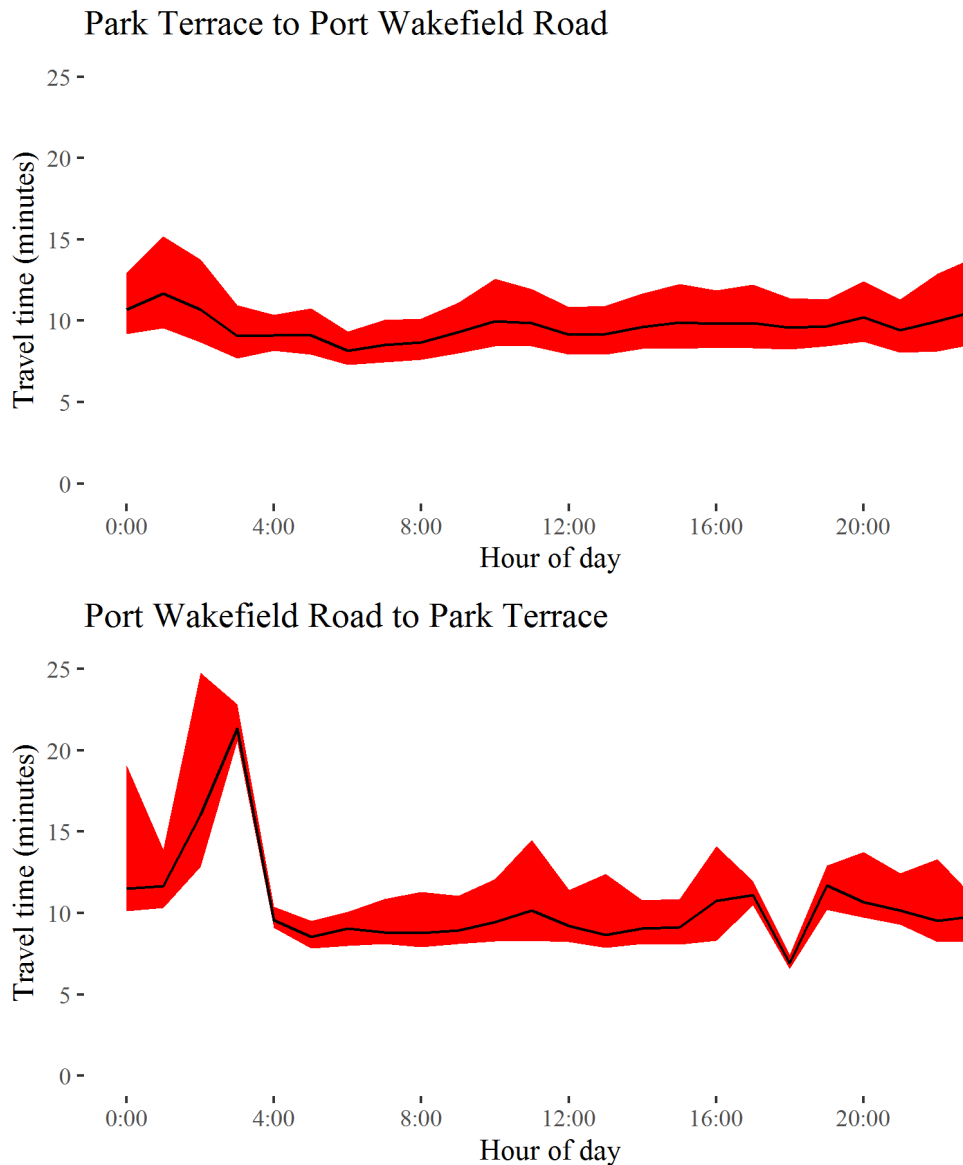
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Park Terrace to Port Wakefield Road	00:08:10	00:11:41	1.181	00:02:04	00:05:40	1.709	7.7
Port Wakefield Road to Park Terrace	00:06:56	00:21:20	1.505	00:00:51	00:11:56	4.398	7.6

Source: BITRE estimates.

The best median travel time for journeys from Park Terrace to Port Wakefield Road was 8 minutes at 6am and the lowest uncertainty was at 6am with an interquartile range of 2 minutes. The longest median travel times and greatest uncertainty were at 1am, with a median of 12 minutes and an interquartile range of 6 minutes.

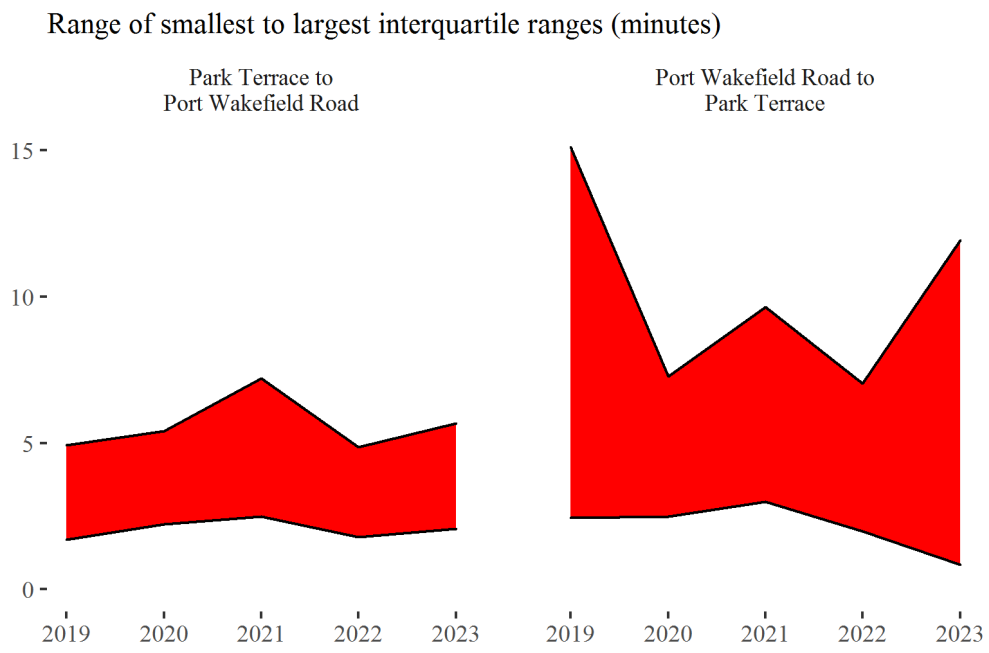
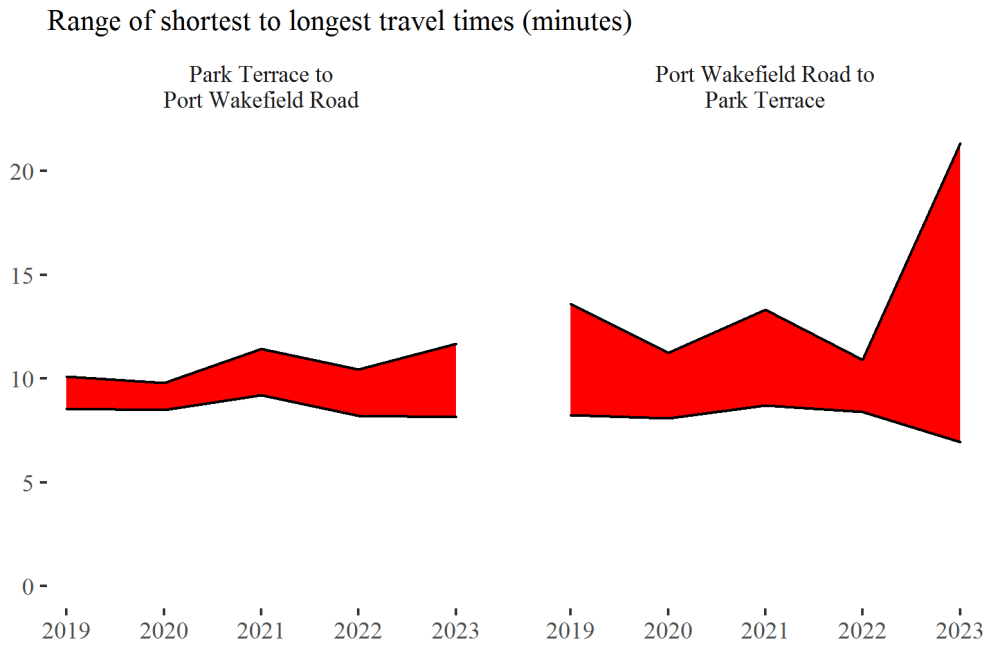
The best median travel time for journeys from Port Wakefield Road to Park Terrace was 7 minutes at 6pm and the lowest uncertainty was also at 6pm with an interquartile range of 51 seconds. The longest median travel time was at 3am with a median of 21 minutes and the greatest uncertainty at 2am with an interquartile range of 12 minutes.

**Figure A.176 A22 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.177 A22 Performance over time



Source: BITRE estimates.

## A3 - ANZAC Highway to South Eastern Freeway / South Eastern Freeway to ANZAC Highway

This route follows Cross Road (A3) between the ANZAC Highway (A5) and the South Eastern Freeway at Glen Osmond. It traverses Adelaide's Southern Suburbs.

**Figure A.178 A3 route map**



Source: BITRE estimates.

**Table A.60 A3 route travel times and congestion measures, 2023**

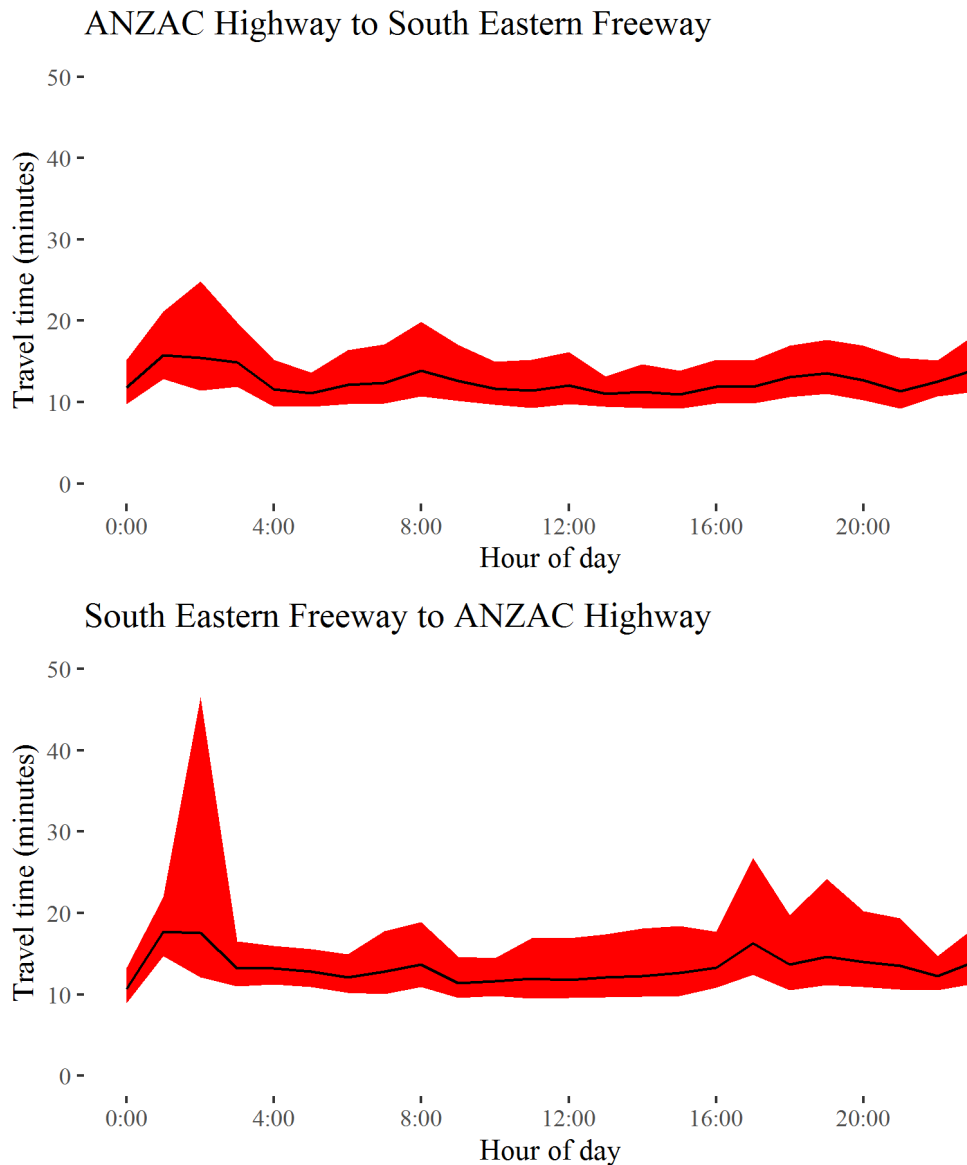
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
ANZAC Highway to South Eastern Freeway	00:10:58	00:15:45	1.144	00:03:41	00:13:26	1.747	8.7
South Eastern Freeway to ANZAC Highway	00:10:40	00:17:42	1.248	00:04:14	00:34:25	1.999	8.7

Source: BITRE estimates.

The best median travel times and least uncertainty for journeys from ANZAC Highway to the South Eastern Freeway were at 3pm, with a median travel time of 11 minutes and an interquartile range of 4 minutes. The longest median travel time was 16 minutes at 1am and the greatest uncertainty was at 2am with an interquartile range of 13 minutes.

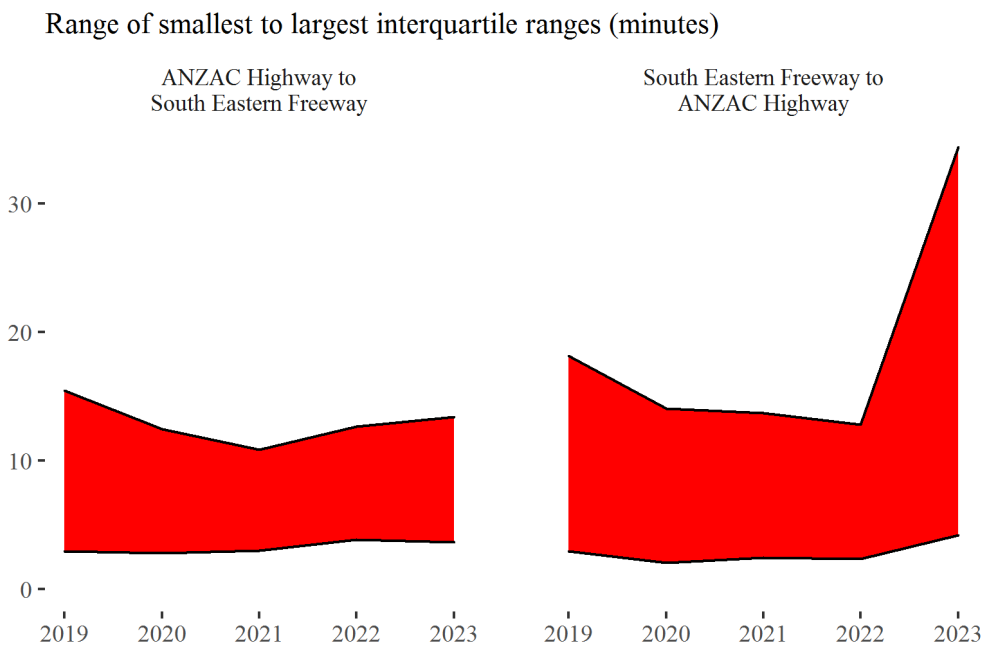
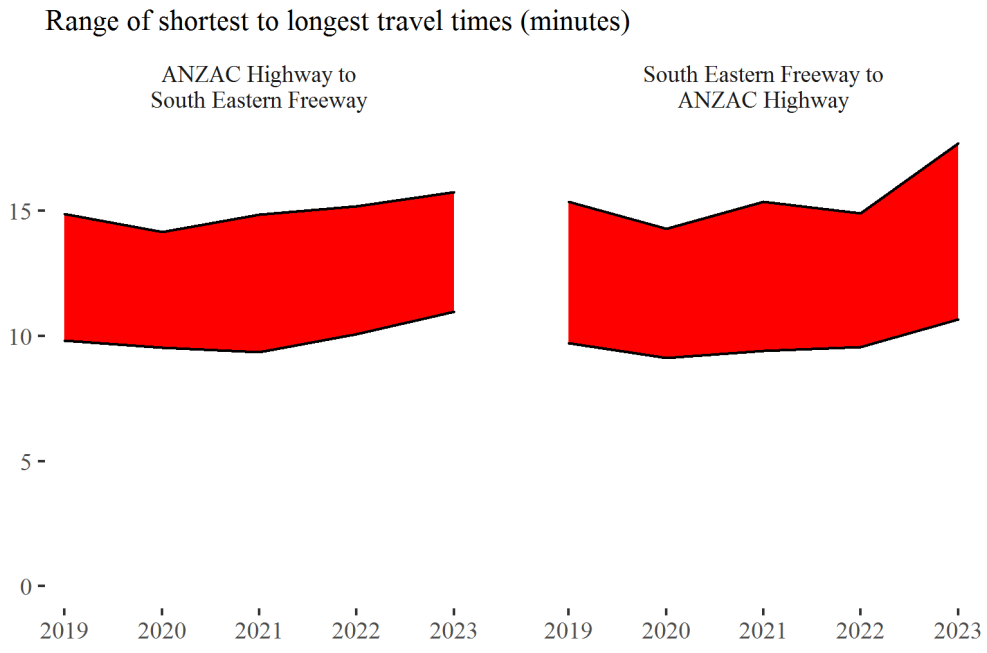
The best median travel times and lowest uncertainty for journeys from the South Eastern Freeway to ANZAC Highway were at midnight, with a median travel time of 11 minutes and an interquartile range of 4 minutes. The longest median travel time were at 1am with a median of 18 minutes and the greatest uncertainty at 2am with an interquartile range of 34 minutes.

**Figure A.179 A3 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.180 A3 Performance over time



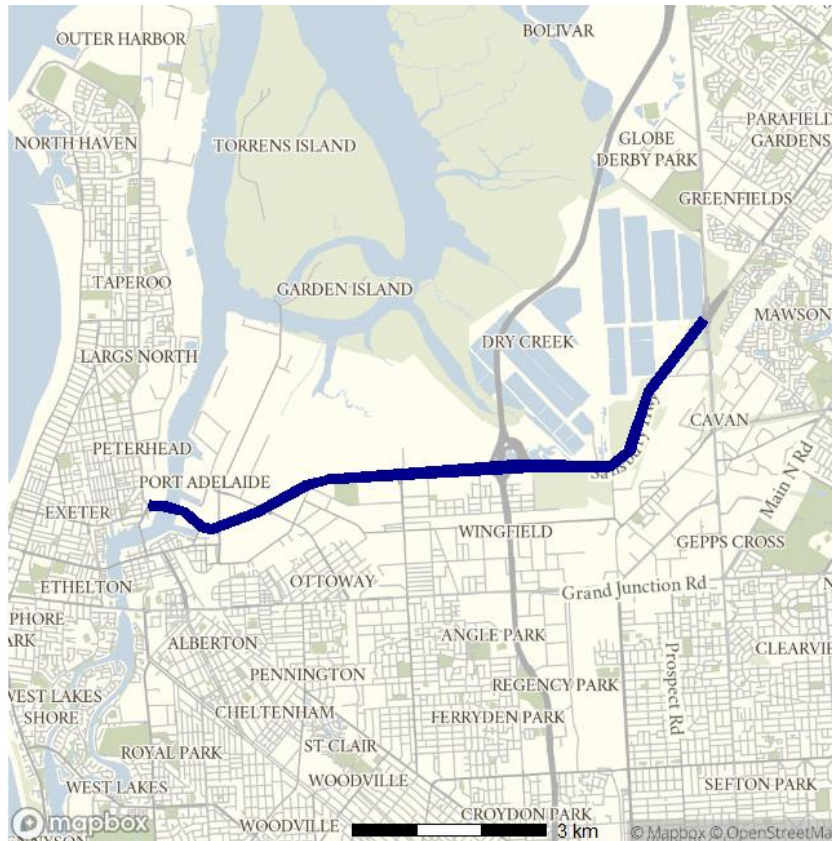
Source: BITRE estimates.



## A9 - Nelson St to Port Wakefield Road / Port Wakefield Road to Nelson Street

This route traverses the light industrial areas on Adelaide's northern fringe. It links Victoria Road and Nelson Street at Birkenhead and the Princes Highway (Port Wakefield Road, A1) at Mawson Lakes, and is an important link for freight from northern Adelaide to the port. It is known at different points on its route as the Port River Expressway and the Salisbury Highway.

**Figure A.181 A9 route map**



Source: BITRE estimates.

**Table A.61 A9 route travel times and congestion measures, 2023**

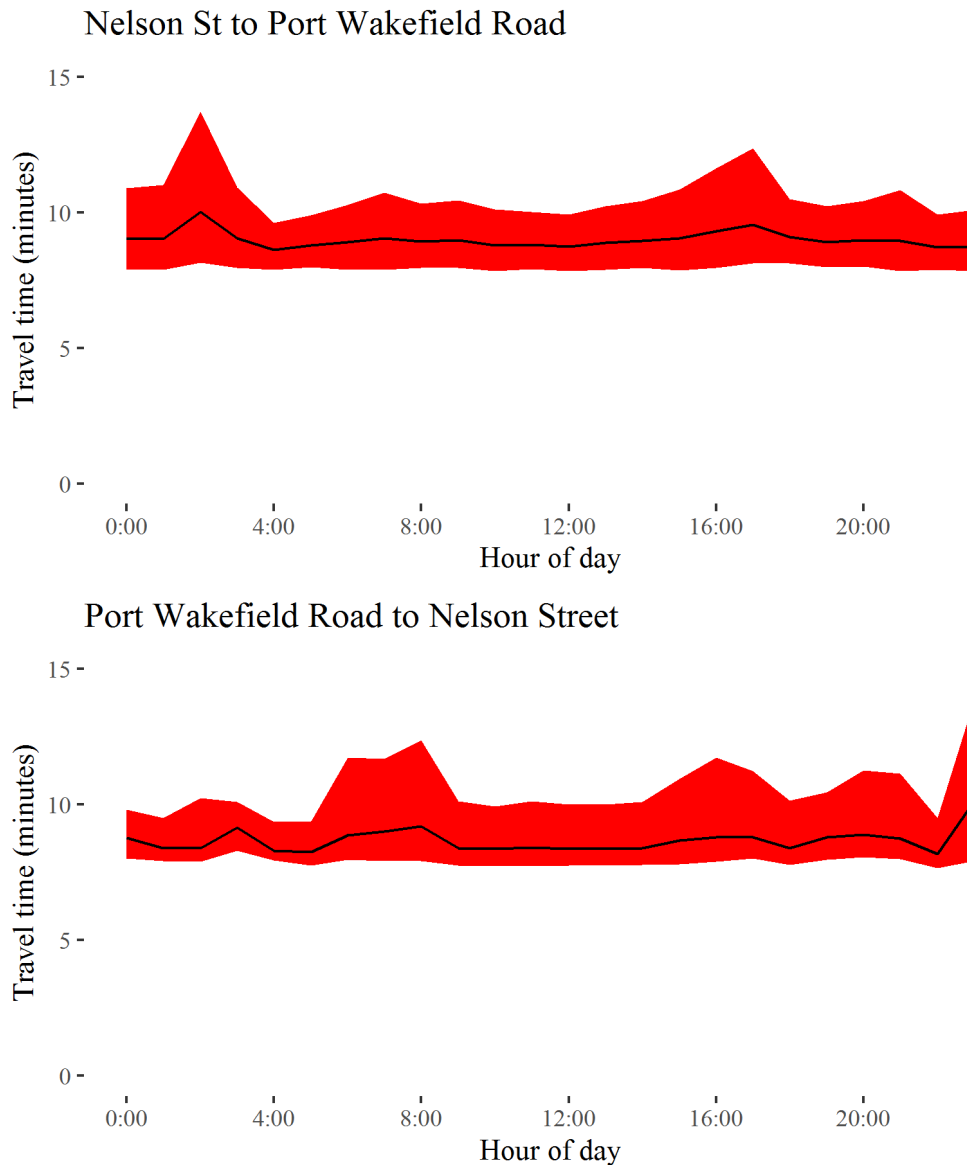
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Nelson St to Port Wakefield Road	00:08:37	00:10:01	1.044	00:01:44	00:05:33	1.563	10.2
Port Wakefield Road to Nelson Street	00:08:11	00:10:08	1.061	00:01:24	00:05:56	1.942	10.2

Source: BITRE estimates.

The best median travel time for journeys from Nelson St to Port Wakefield Road was 9 minutes at 4am and the lowest uncertainty was at 4am with an interquartile range of 2 minutes. The longest median travel times and greatest uncertainty were at 2am, with a median of 10 minutes and an interquartile range of 5.5 minutes.

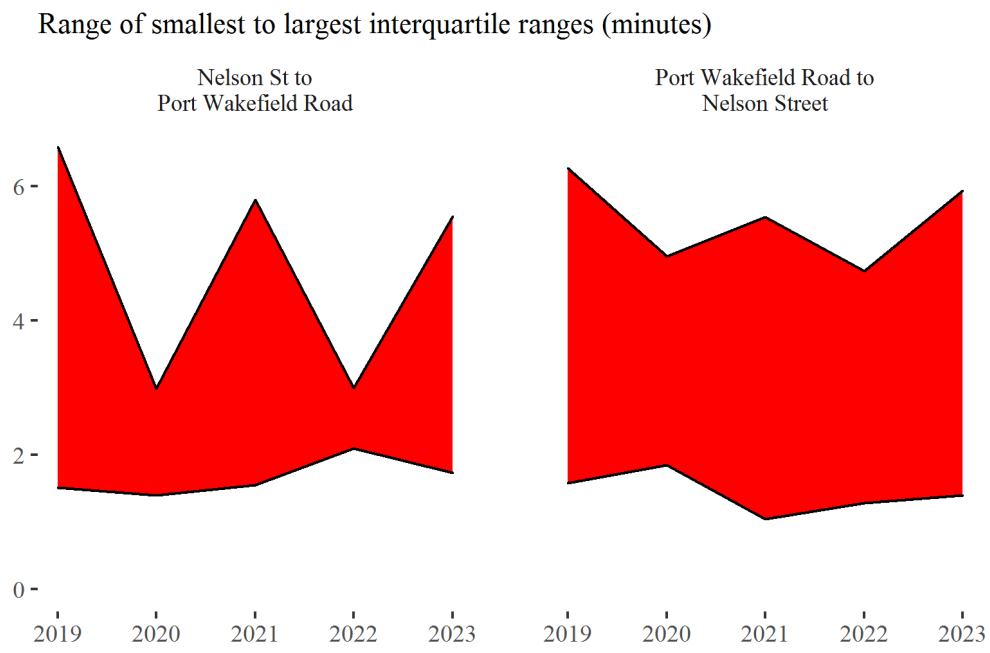
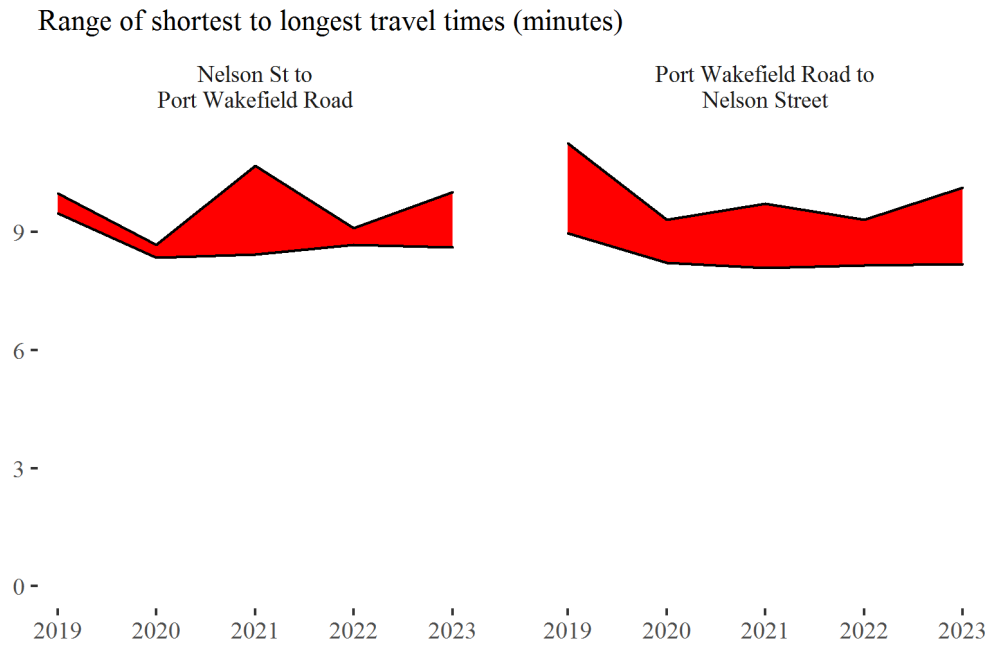
The best median travel times and least uncertainty for journeys from Port Wakefield Road to Nelson Street were at 10pm, with a median travel time of 8 minutes and an interquartile range of 84 seconds. The longest median travel times and greatest uncertainty were at 11pm, with a median of 10 minutes and an interquartile range of 6 minutes.

**Figure A.182 A9 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.183 A9 Performance over time



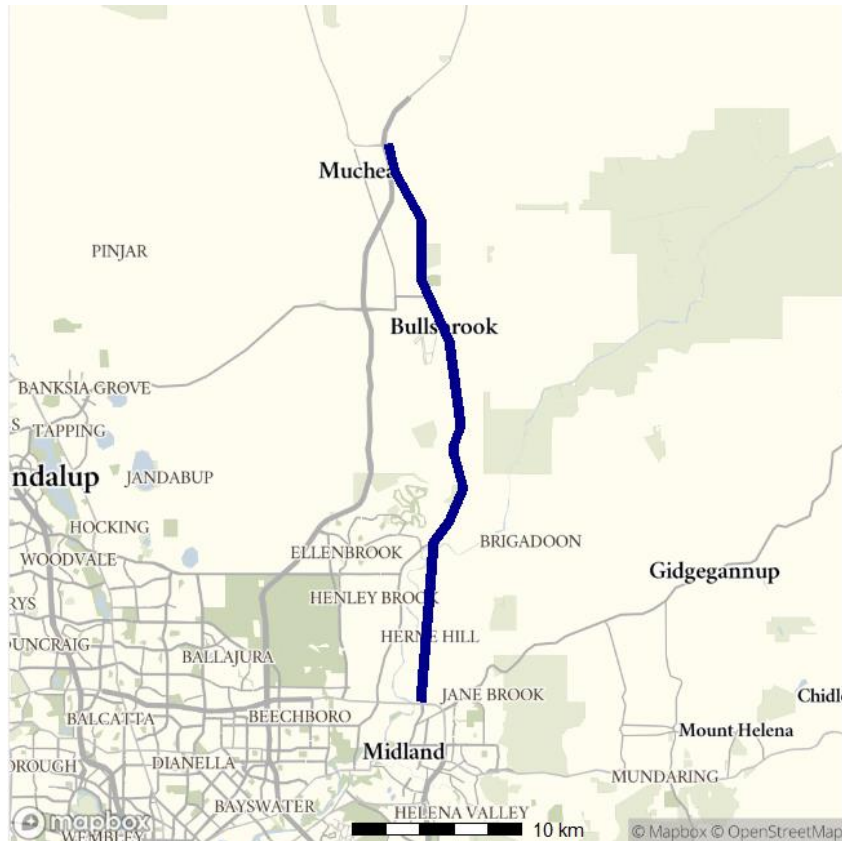
Source: BITRE estimates.

## Perth routes

### Route 1 - Roe Highway to Tonkin Highway / Tonkin Highway to Roe Highway

This route follows the Great Northern Highway north-south between the Tonkin Highway at Muchea and the Roe Highway–Reid Highway junction at Middle Swan. It passes Herne Hill, Upper Swan and Bullsbrook along its length. The BITRE telematics data shows it is a major route for freight heading north out of Perth.

**Figure A.184** Route 1 route map



Source: BITRE estimates.

**Table A.62** Route 1 route travel times and congestion measures, 2023

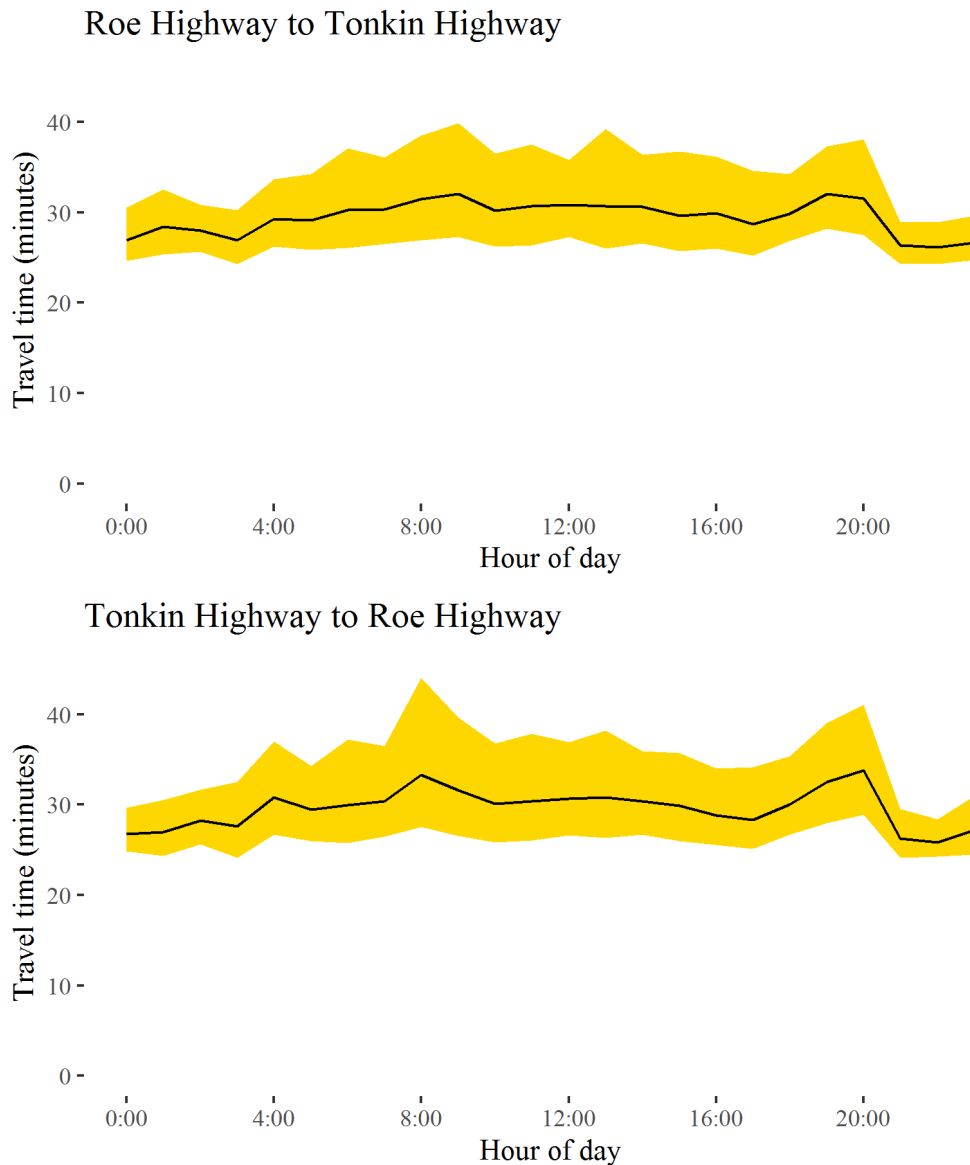
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Roe Highway to Tonkin Highway	00:26:08	00:32:03	1.126	00:04:37	00:13:11	1.892	34.6
Tonkin Highway to Roe Highway	00:25:48	00:33:46	1.146	00:04:06	00:16:31	2.283	34.6

Source: BITRE estimates.

The best median travel times and lowest uncertainty for journeys from Roe Highway to Tonkin Highway were at 10pm, with a median travel time of 26 minutes and an interquartile range of 5 minutes. The longest median travel time was 32 minutes at 9am and the greatest uncertainty was at 1pm with an interquartile range of 13 minutes.

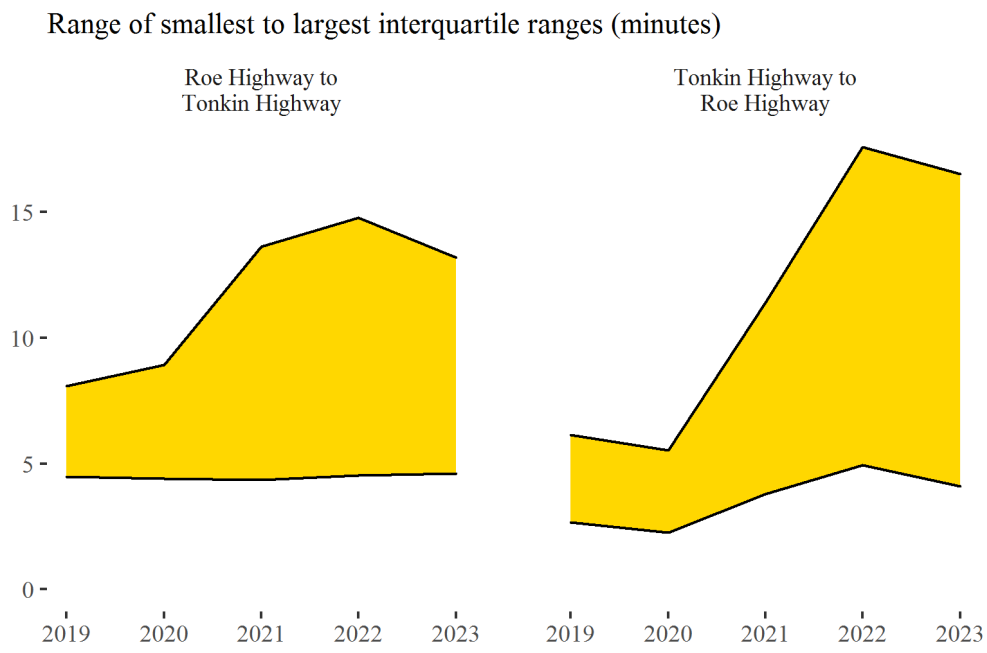
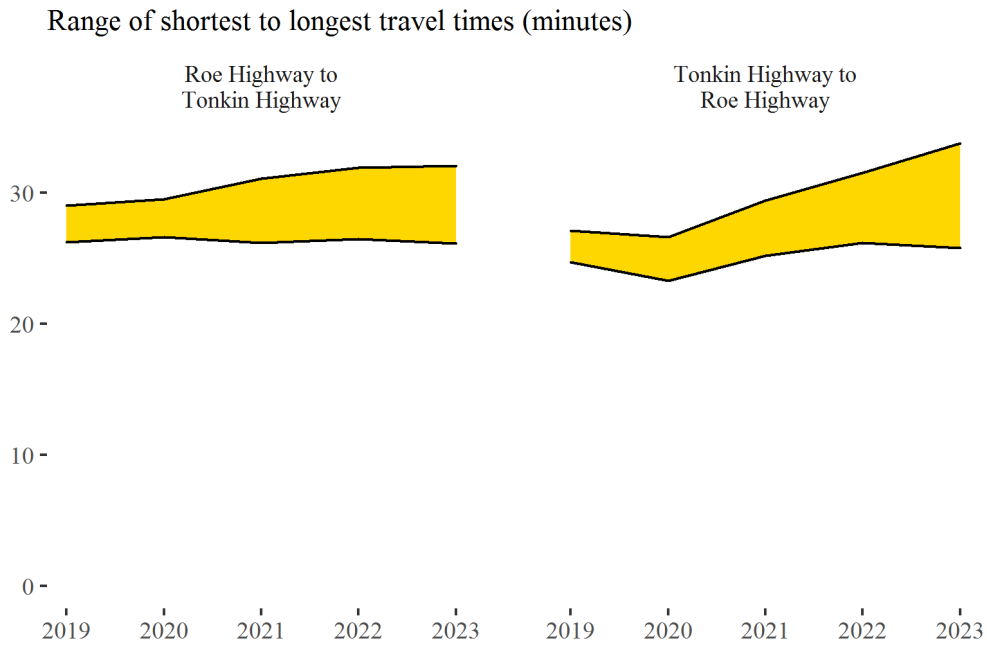
The best median travel time for journeys from Tonkin Highway to Roe Highway was 26 minutes at 10pm and the lowest uncertainty was at 10pm with an interquartile range of 4 minutes. The longest median travel time was at 8pm with a median of 34 minutes and the greatest uncertainty at 8am with an interquartile range of 17 minutes.

**Figure A.185 Route 1 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.186 Route 1 Performance over time

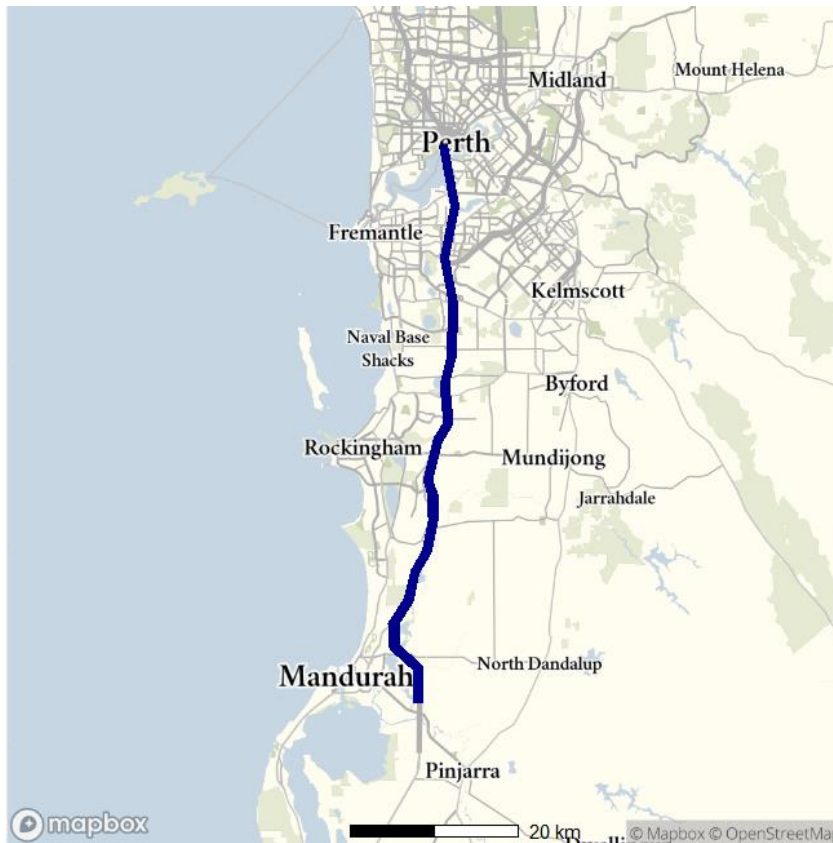


Source: BITRE estimates.

## Route 2 (Kwinana) - Forrest Highway to Mitchell Freeway / Mitchell Freeway to Forrest Highway

This route follows the Kwinana Highway connecting the Forrest Highway south of Mandurah and the Mitchell Highway at the Swan River near the Perth CBD. It is one of the main routes servicing Perth's southern suburbs and Rockingham and Mandurah south of Perth.

Figure A.187 Route 2 (Kwinana) route map



Source: BITRE estimates.

Table A.63 Route 2 (Kwinana) route travel times and congestion measures, 2023

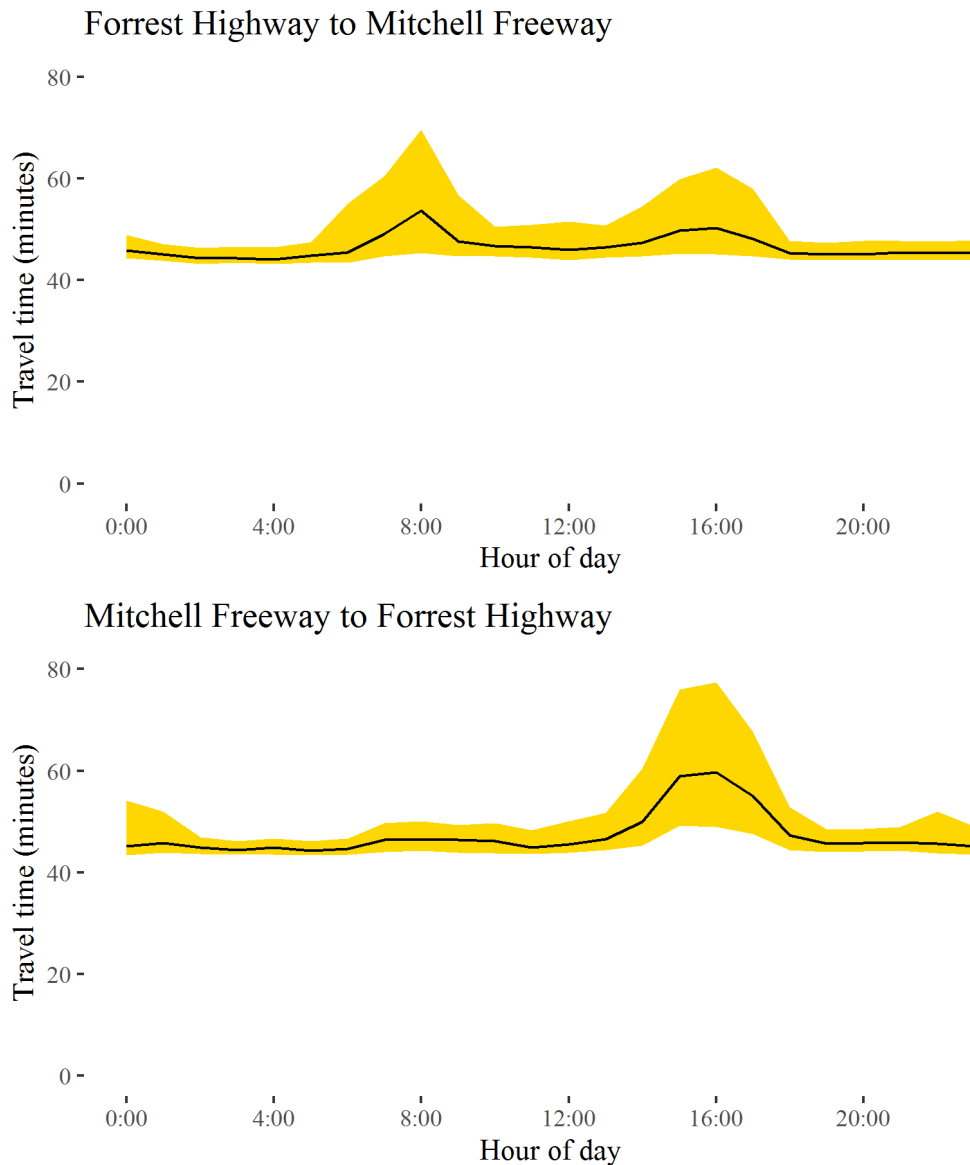
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Forrest Highway to Mitchell Freeway	00:44:03	00:53:42	1.056	00:03:07	00:24:15	2.518	70.7
Mitchell Freeway to Forrest Highway	00:44:19	00:59:42	1.067	00:02:41	00:28:26	3.112	70.7

Source: BITRE estimates.

The best travel times and lowest uncertainty travelling from Forrest Highway to Mitchell Freeway were at 4am and 3am, respectively, with a median travel time of 44 minutes and an interquartile range of 3 minutes. The longest median travel times and greatest uncertainty were at 8am, with a median of 54 minutes and an interquartile range of 24 minutes.

The best travel times and lowest uncertainty travelling from Mitchell Freeway to Forrest Highway were at 5am and 3am, respectively, with a median travel time of 44 minutes and an interquartile range of 3 minutes. The longest median travel times and greatest uncertainty were at 4pm, with a median of 1 hour and an interquartile range of 28 minutes.

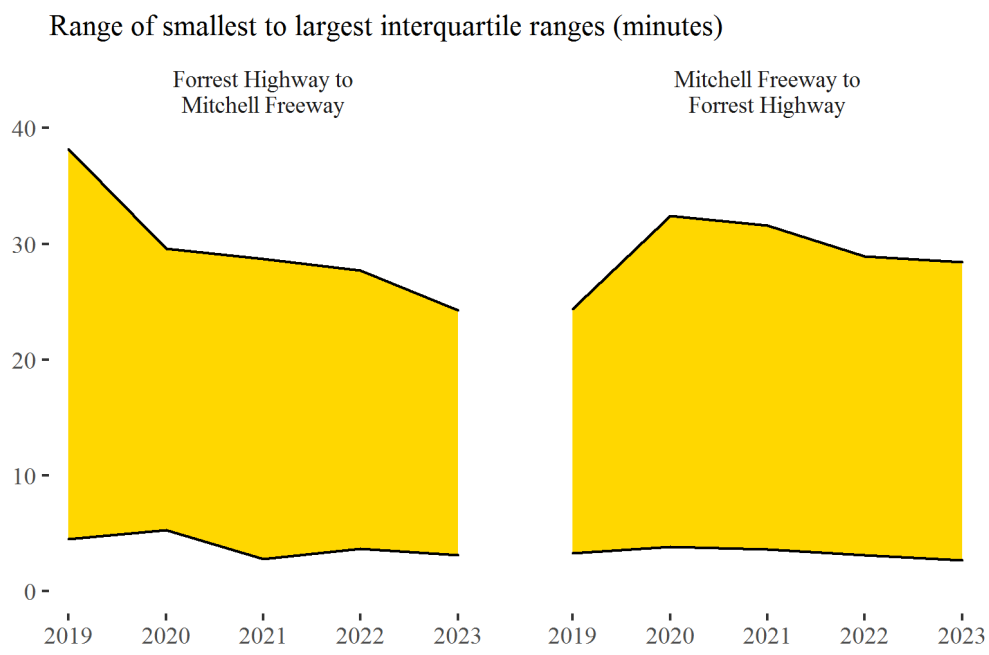
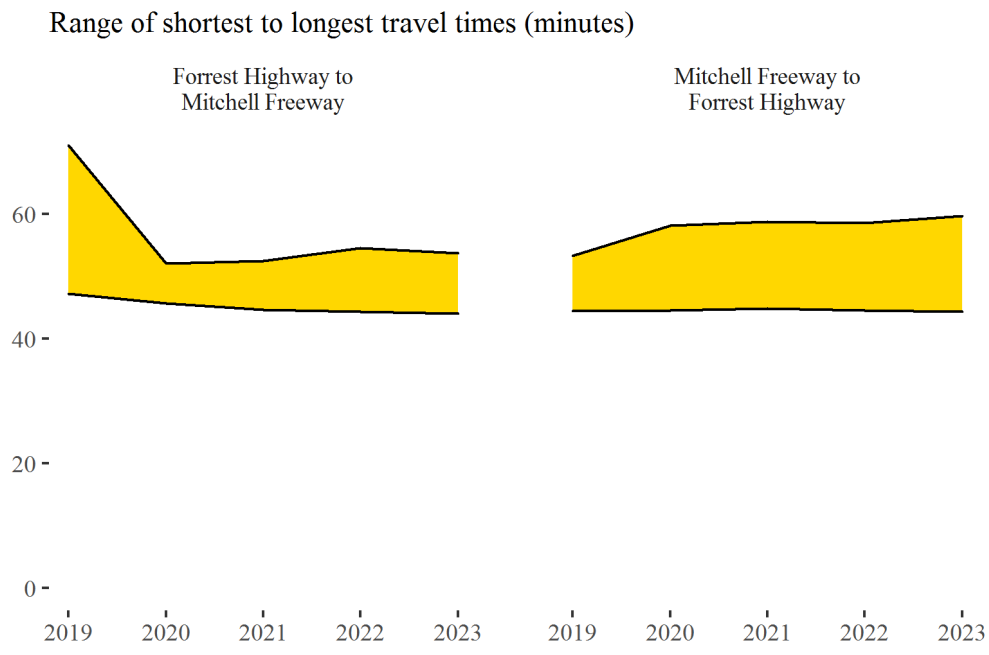
**Figure A.188 Route 2 (Kwinana) route median and interquartile range travel times**



Source: BITRE estimates.



Figure A.189 Route 2 (Kwinana) Performance over time

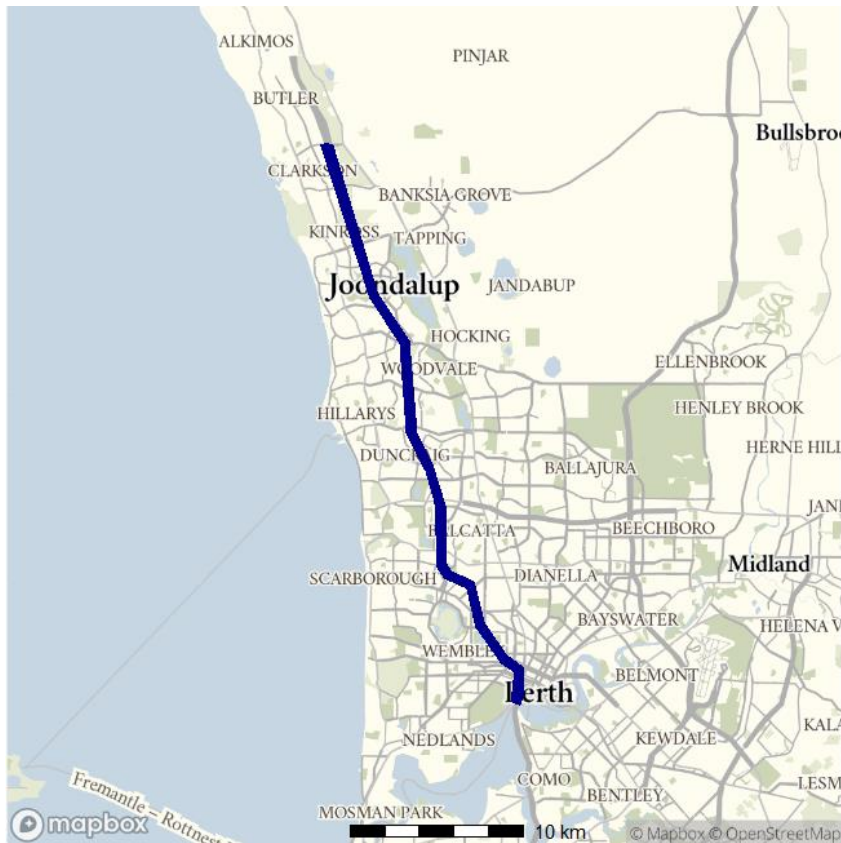


Source: BITRE estimates.

## Route 2 (Mitchell) - Hester Avenue to Swan River / Swan River to Hester Avenue

This route follows the Mitchell Highway (Route 2) between Hester Avenue near Ridgewood in Perth's northern suburbs, and the Swan River near the Perth CBD, and is one of the main routes servicing Perth's northern suburbs. It also carries traffic to and from the north coast of Western Australia.

**Figure A.190** Route 2 (Mitchell) route map



Source: BITRE estimates.

**Table A.64** Route 2 (Mitchell) route travel times and congestion measures, 2023

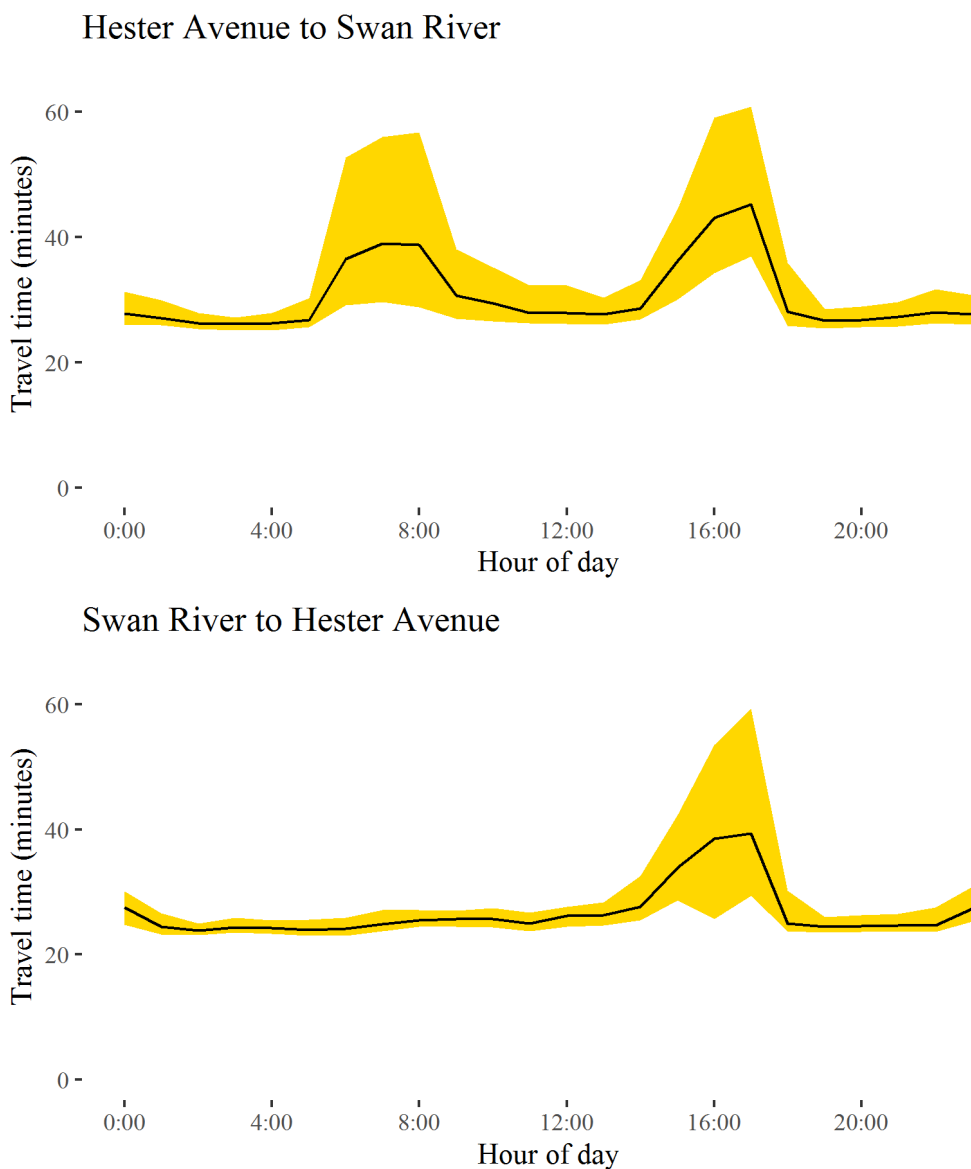
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Hester Avenue to Swan River	00:26:06	00:45:16	1.174	00:02:02	00:27:55	4.811	35.9
Swan River to Hester Avenue	00:23:48	00:39:20	1.124	00:01:48	00:29:49	3.343	35.9

Source: BITRE estimates.

The best median travel time for journeys from Hester Avenue to Swan River was 26 minutes at 3am and the lowest uncertainty was at 3am with an interquartile range of 2 minutes. The longest median travel time was 45 minutes at 5pm and the greatest uncertainty was at 8am with an interquartile range of 28 minutes.

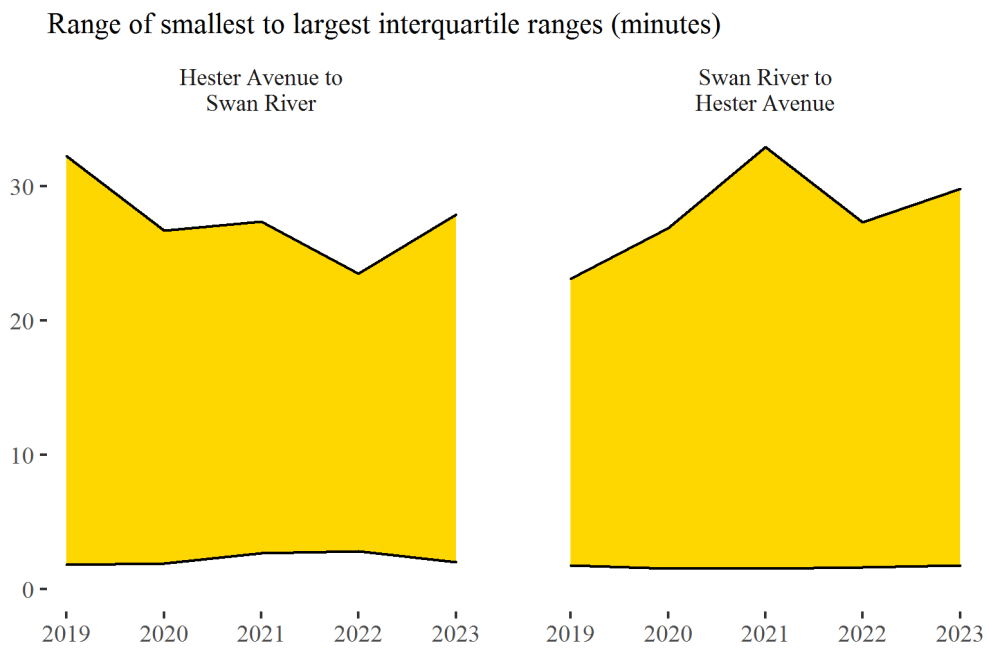
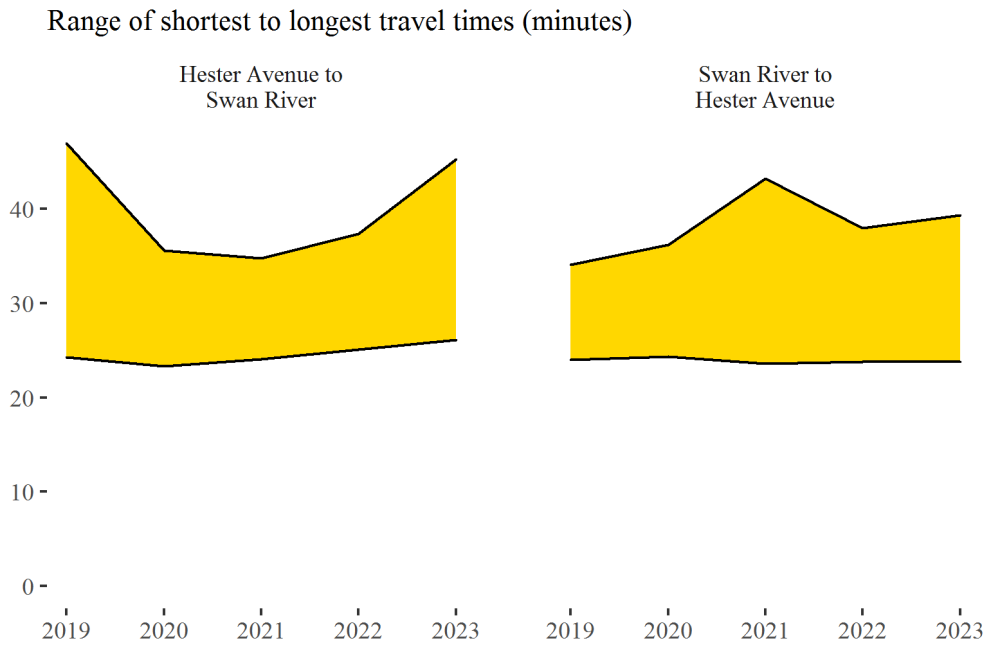
The best median travel times and lowest uncertainty for journeys from Swan River to Hester Avenue were at 2am, with a median travel time of 24 minutes and an interquartile range of 2 minutes. The longest median travel times and greatest uncertainty were at 5pm, with a median of 39 minutes and an interquartile range of 30 minutes.

**Figure A.191 Route 2 (Mitchell) route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.192 Route 2 (Mitchell) Performance over time

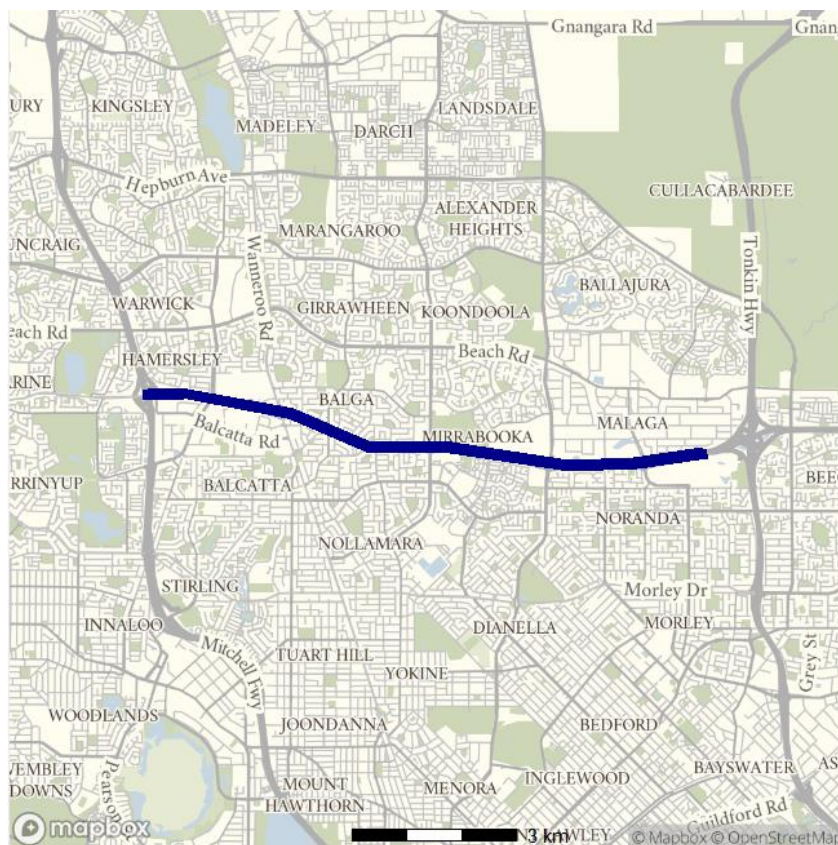


Source: BITRE estimates.

## Route 3 (Reid Highway) - Mitchell Freeway to Tonkin Freeway / Tonkin Freeway to Mitchell Freeway

This route follows the Reid Highway between its connection with the Mitchell Freeway (Route 2) north of Perth's CBD, and its interchange with the Tonkin Freeway (Route 4) at Malaga, in Perth's near northern suburbs. It passes the Perth suburbs of Westminster, Mirrabooka and Noranda.

Figure A.193 Route 3 (Reid Highway) route map



Source: BITRE estimates.

Table A.65 Route 3 (Reid Highway) route travel times and congestion measures, 2023

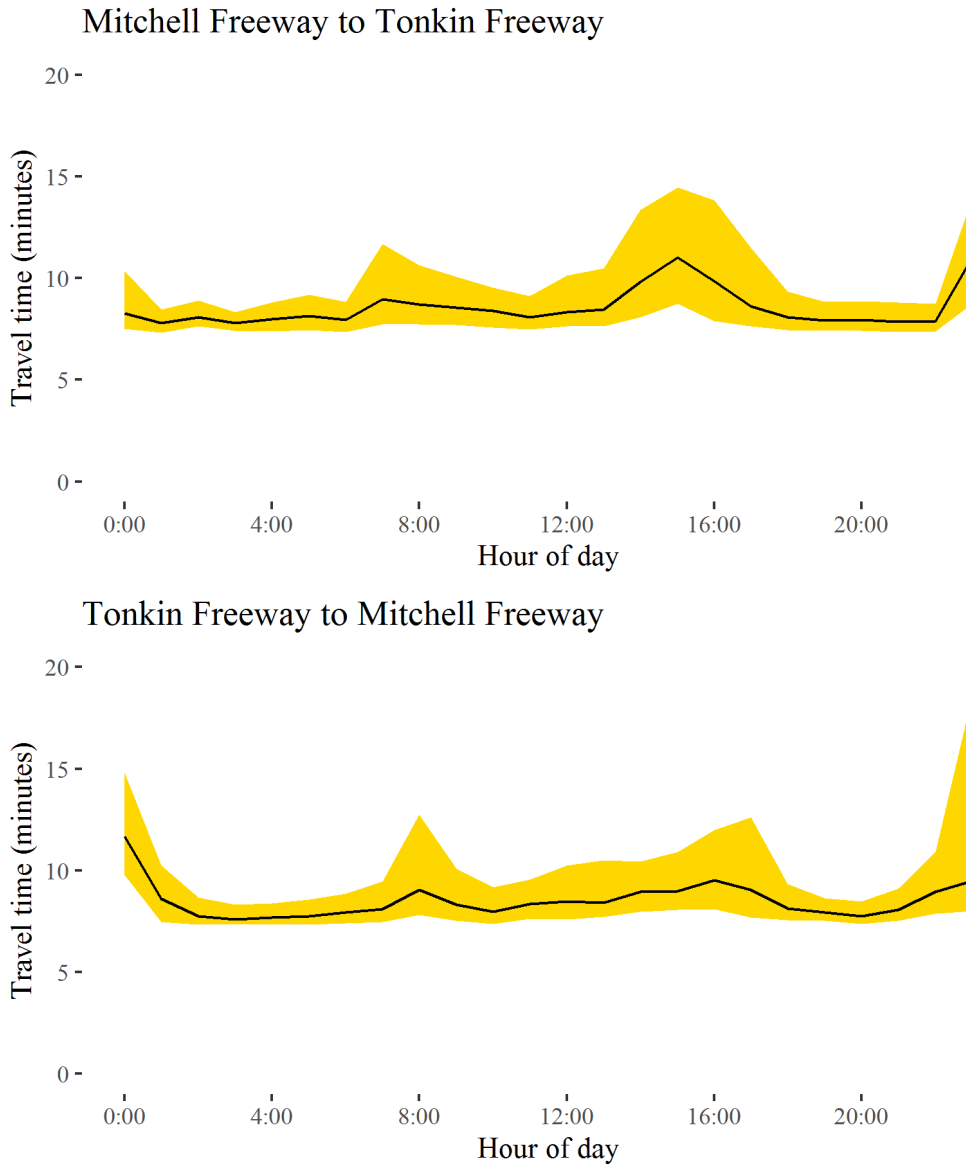
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Mitchell Freeway to Tonkin Freeway	00:07:47	00:11:01	1.099	00:00:55	00:05:56	2.820	10.3
Tonkin Freeway to Mitchell Freeway	00:07:35	00:11:40	1.123	00:00:59	00:10:34	2.806	10.5

Source: BITRE estimates.

The best median travel time for journeys from Mitchell Freeway to Tonkin Freeway was 8 minutes at 3am and the lowest uncertainty was at 3am with an interquartile range of just under 1 minute. The longest median travel time was at 3pm with a median of 11 minutes and the greatest uncertainty at 4pm with an interquartile range of 6 minutes.

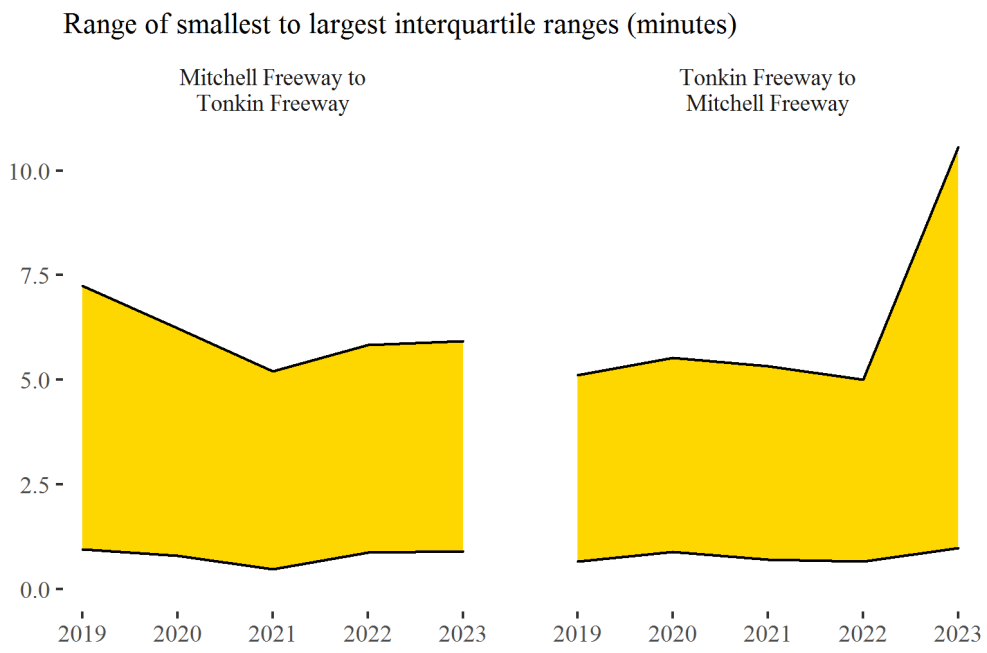
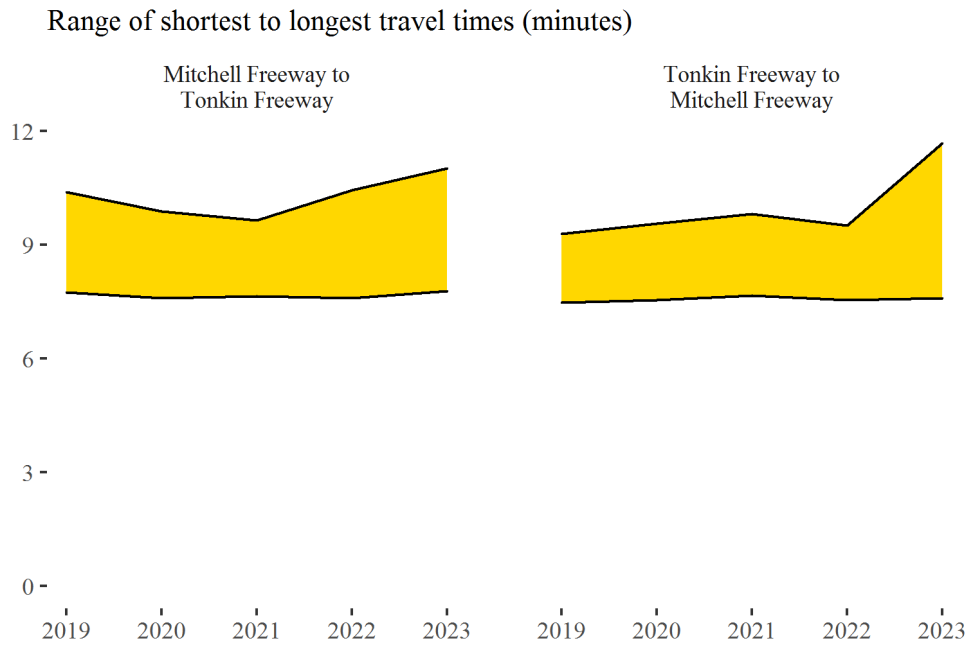
The best median travel time for journeys from Tonkin Freeway to Mitchell Freeway was 8 minutes at 3am and the lowest uncertainty was also at 3am with an interquartile range of just under 1 minute. The longest median travel time was 12 minutes at midnight and the greatest uncertainty was at 11pm with an interquartile range of 11 minutes.

**Figure A.194 Route 3 (Reid Highway) route median and interquartile range travel times**



Source: BITRE estimates.

**Figure A.195 Route 3 (Reid Highway) Performance over time**

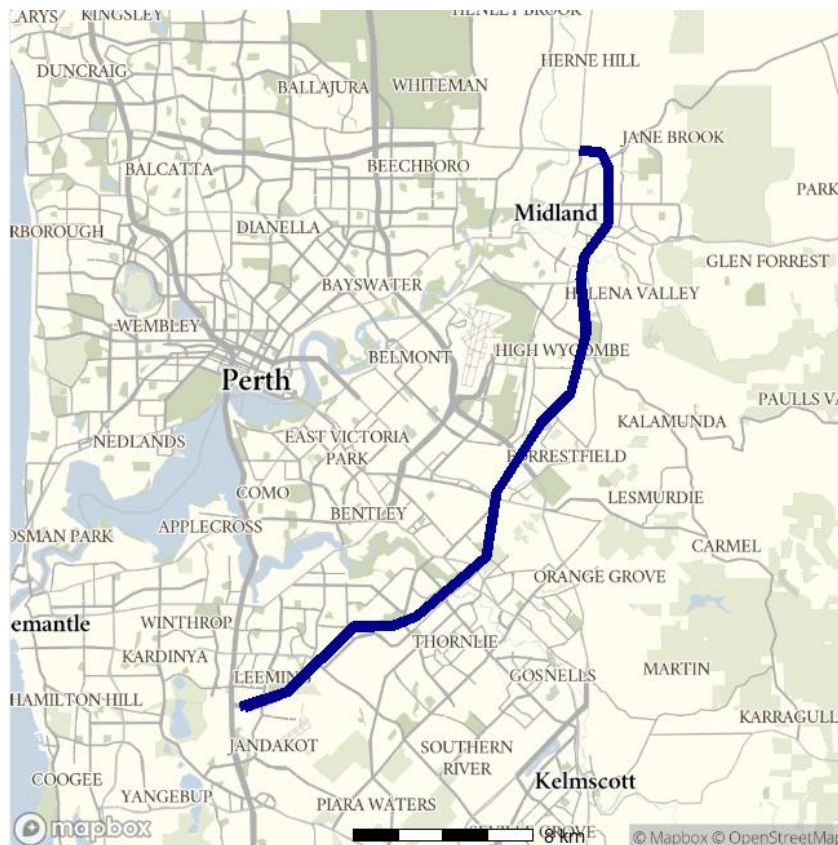


Source: BITRE estimates.

## Route 3 (Roe Highway) - Great Northern Highway to Kwinana Freeway / Kwinana Freeway to Great Northern Highway

This route follows the Roe Highway between its junction with the Great Northern Highway (Route 1) in the north and its connection with the Kwinana Freeway (Route 2) at Leeming in Perth's south.

**Figure A.196 Route 3 (Roe Highway) route map**



Source: BITRE estimates.

**Table A.66 Route 3 (Roe Highway) route travel times and congestion measures, 2023**

Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Great Northern Highway to Kwinana Freeway	00:24:42	00:30:33	1.093	00:03:48	00:15:28	2.264	34.1
Kwinana Freeway to Great Northern Highway	00:24:00	00:31:44	1.087	00:03:08	00:20:23	2.820	34.2

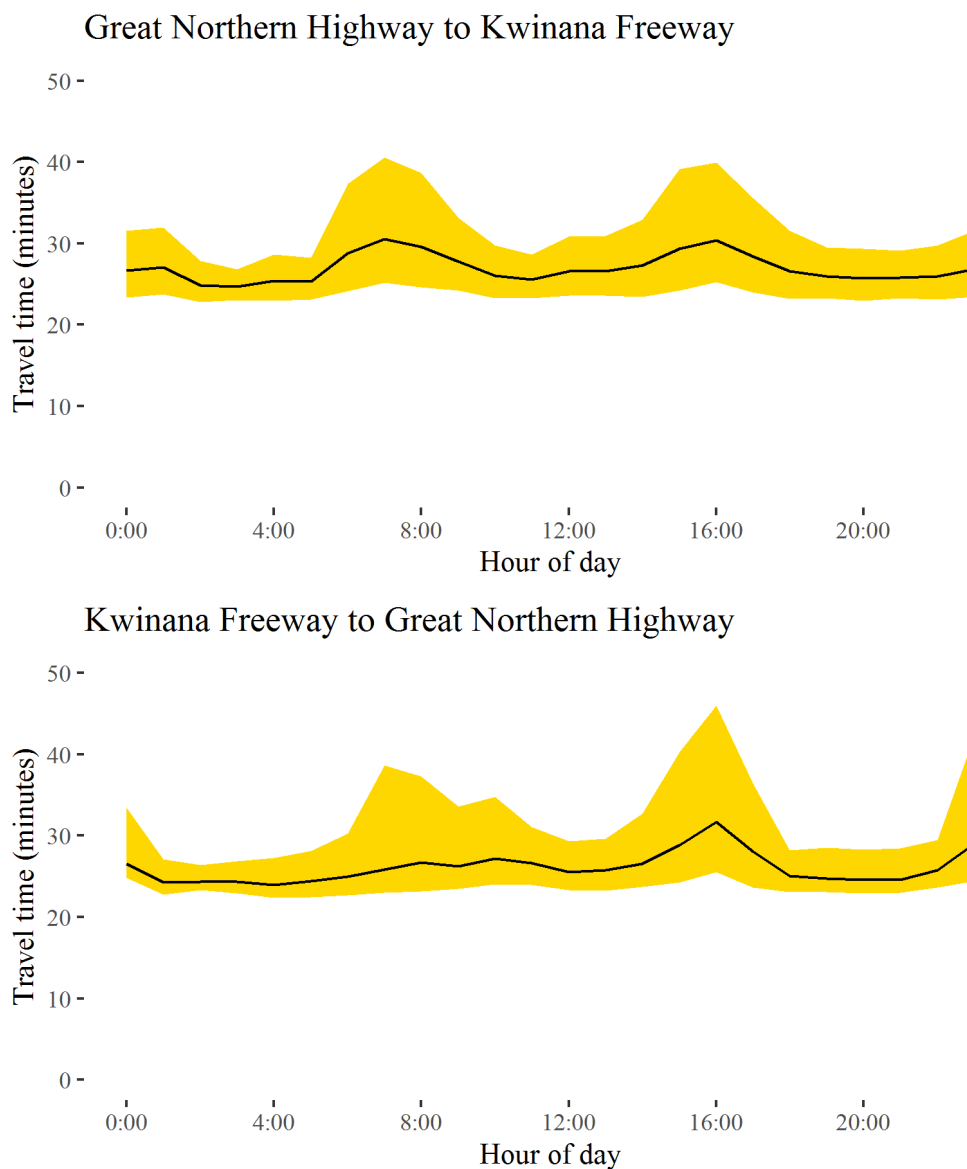
Source: BITRE estimates.



The best median travel times and least uncertainty for journeys from the Great Northern Highway to Kwinana Freeway were at 3am, with a median travel time of 25 minutes and an interquartile range of 4 minutes. The longest median travel times and greatest uncertainty were at 7am, with a median of 31 minutes and an interquartile range of 15 minutes.

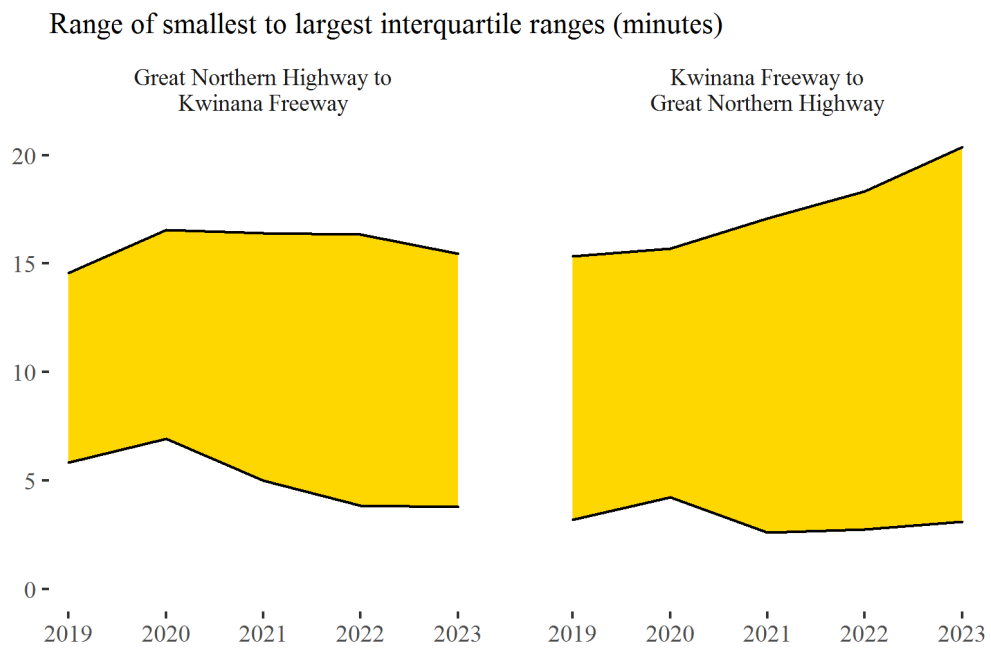
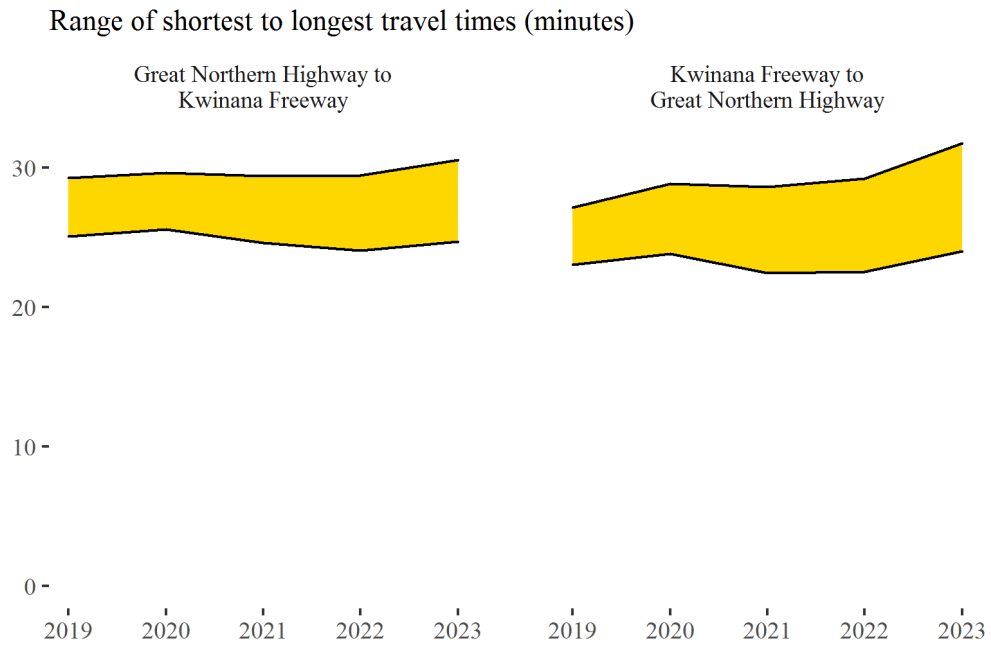
The best median travel times and least uncertainty for journeys from the Kwinana Freeway to Great Northern Highway were at 4am, with a median travel time of 24 minutes and an interquartile range of 3 minutes. The longest median travel times and greatest uncertainty were at 4pm, with a median of 32 minutes and an interquartile range of 20 minutes.

**Figure A.197 Route 3 (Roe Highway) route median and interquartile range travel times**



Source: BITRE estimates.

**Figure A.198 Route 3 (Roe Highway) Performance over time**

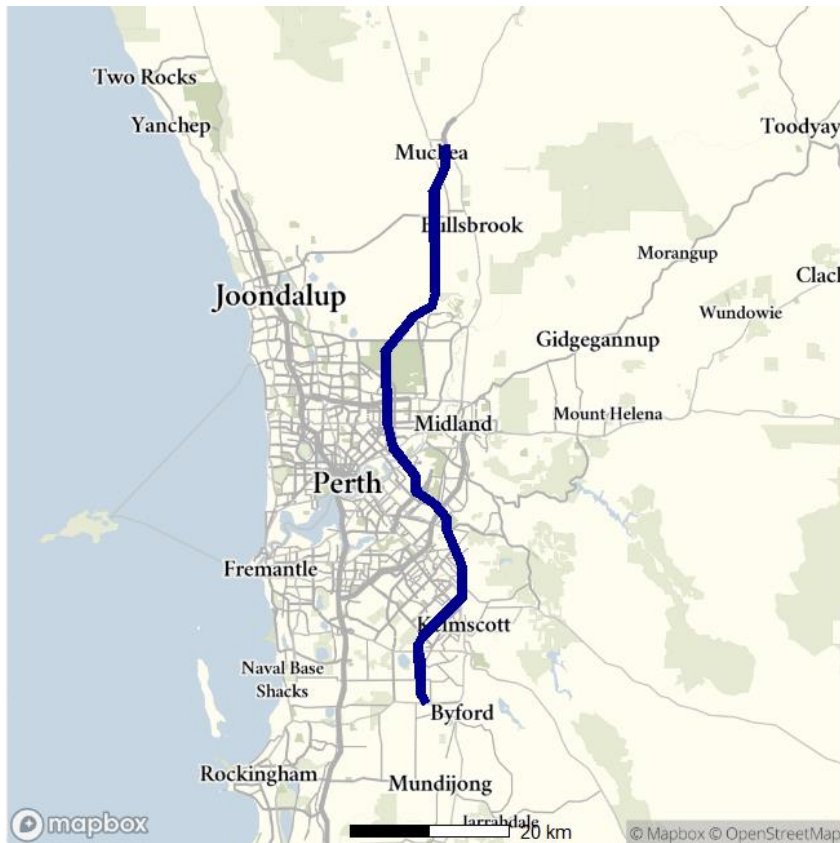


Source: BITRE estimates.

## Route 4 - Great Northern Highway to Thomas Road / Thomas Road to Great Northern Highway

This route follows the Tonkin Highway (Route 4) between its junction with the Great Northern Highway, at Muchea north of Perth, and its terminus at Thomas Road on Perth's southern outskirts. It crosses the Reid Highway (Route 3) north of Morley and the Swan River near Redcliffe, and runs past Perth airport.

Figure A.199 Route 4 route map



Source: BITRE estimates.

Table A.67 Route 4 route travel times and congestion measures, 2023

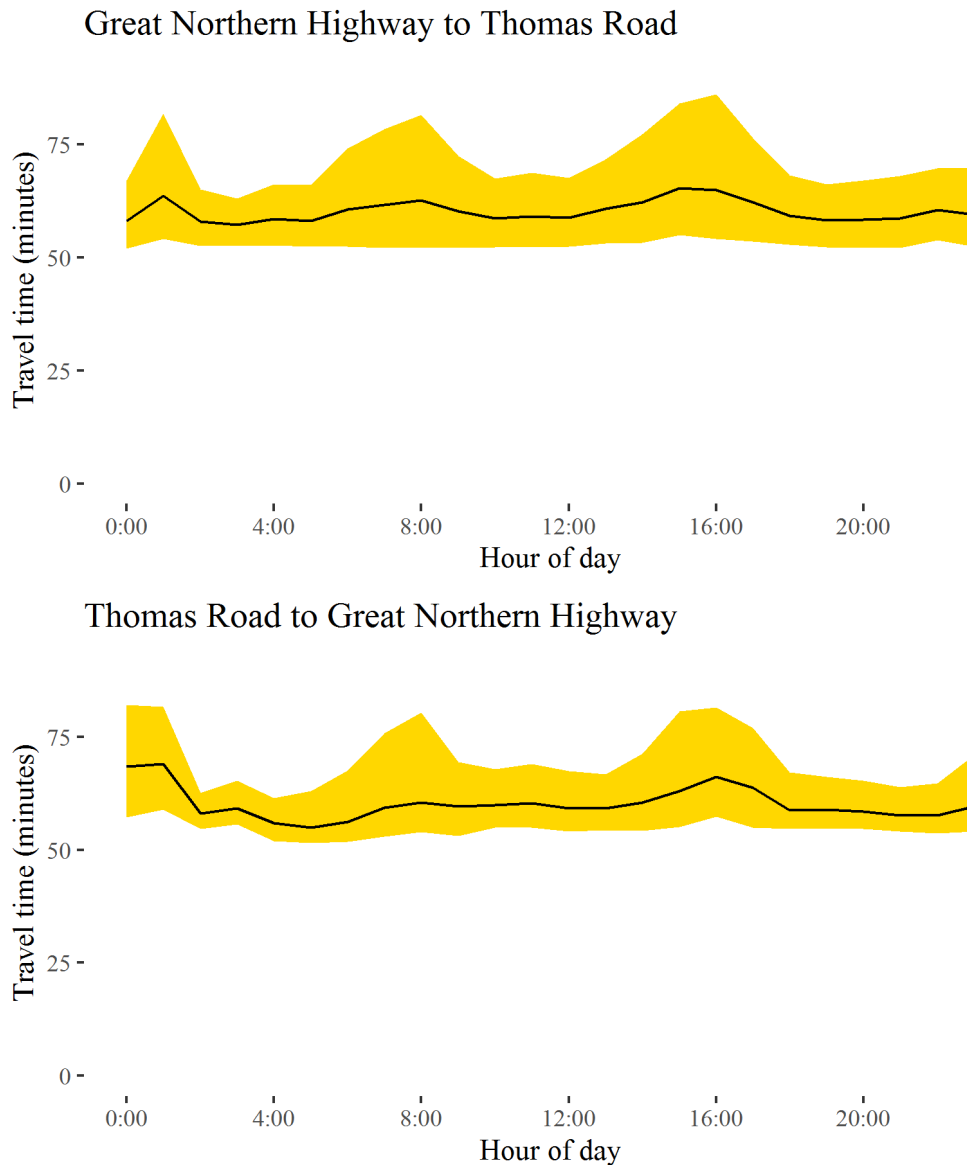
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Great Northern Highway to Thomas Road	00:57:15	01:05:23	1.052	00:10:29	00:32:05	1.820	79.9
Thomas Road to Great Northern Highway	00:54:55	01:08:59	1.096	00:08:01	00:26:27	1.986	79.9

Source: BITRE estimates.

The best median travel times and least uncertainty for journeys from the Great Northern Highway to Thomas Road were at 3am, with a median travel time of 1 hour and an interquartile range of 10 minutes. The longest median travel time was at 3pm with a median of 1 hour 5 minutes and the greatest uncertainty at 4pm with an interquartile range of 32 minutes.

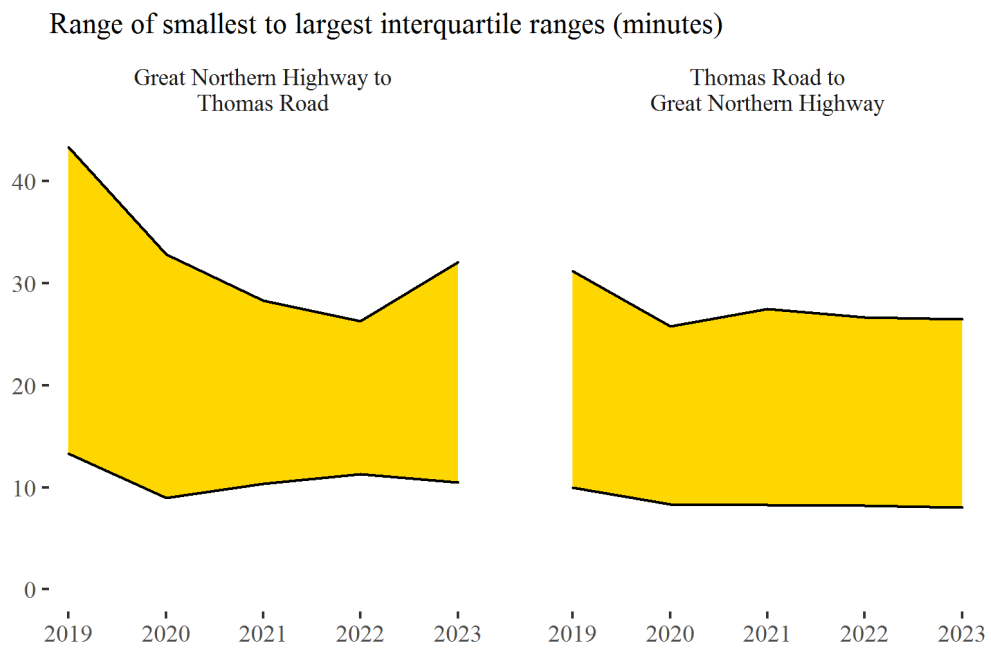
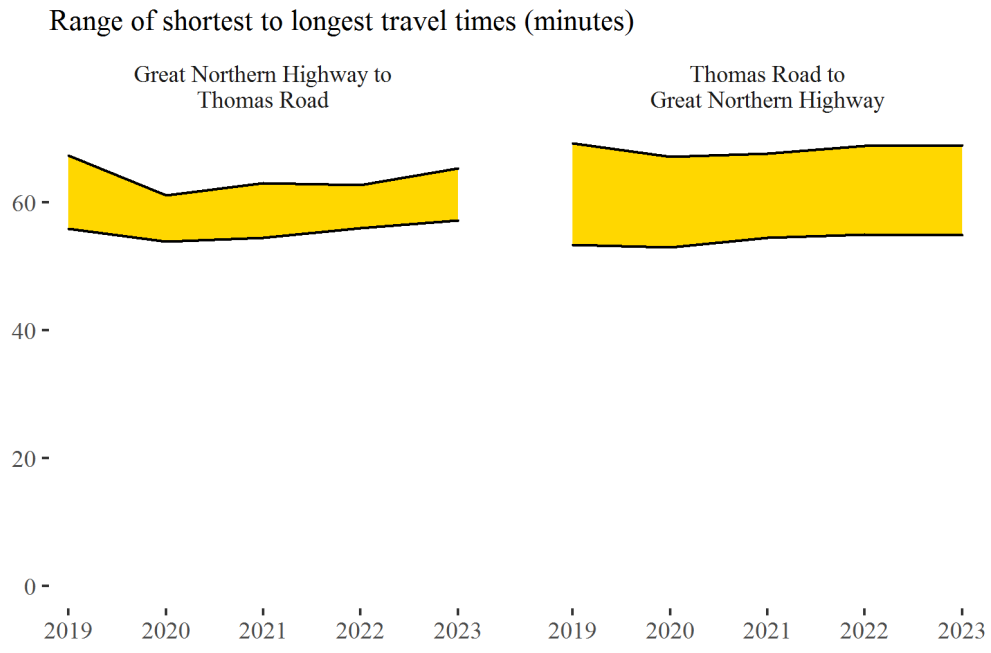
The best travel times and lowest uncertainty travelling from Thomas Road to Great Northern Highway were at 5am and 2am, respectively, with a median travel time of 55 minutes and an interquartile range of 8 minutes. The longest median travel time was 1 hour 9 minutes at 1am and the greatest uncertainty was at 8am with an interquartile range of 26 minutes.

**Figure A.200** Route 4 route median and interquartile range travel times



Source: BITRE estimates.

Figure A.201 Route 4 Performance over time

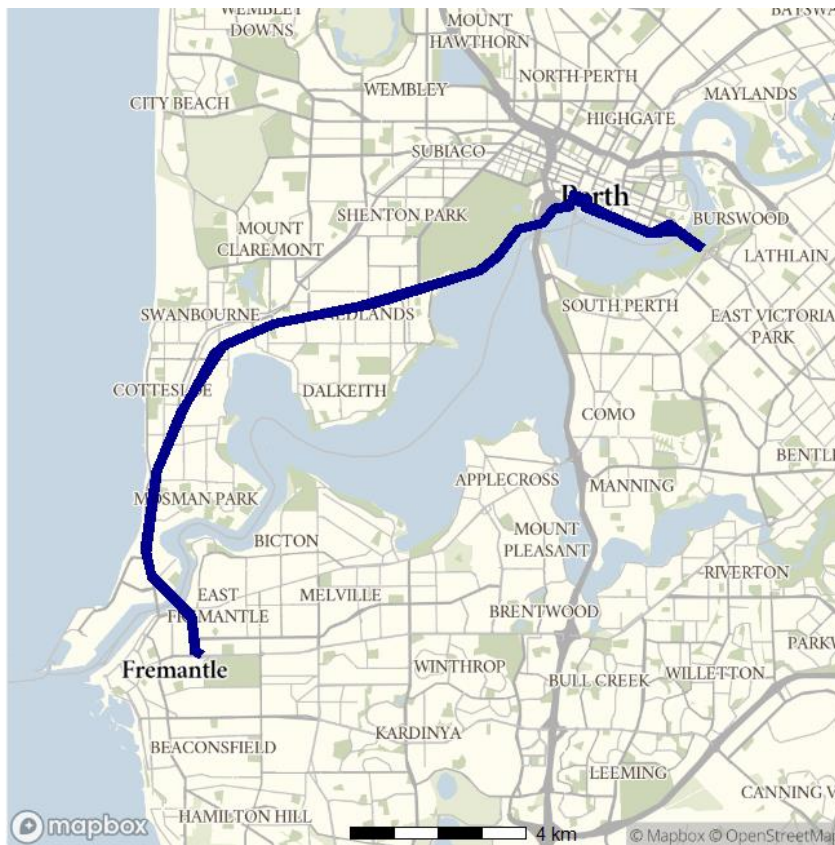


Source: BITRE estimates.

## Route 5 - Great Eastern Highway to Stirling Highway, High Street / Stirling Highway, High St to Great Eastern Highway

This route runs between High Street (Route 7) in Fremantle, via the northern side of the Swan River, to the junction of Albany Highway, Great Eastern Highway (GEH) and Canning Highway near Burswood, southwest of the CBD. It traverses Stirling Highway, Mounts Bay Road, Riverside Drive and the Causeway.

Figure A.202 Route 5 route map



Source: BITRE estimates.

Table A.68 Route 5 route travel times and congestion measures, 2023

Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Great Eastern Highway to Stirling Highway, High Street	00:21:03	00:29:52	1.197	00:02:07	00:20:49	5.367	20.4
Stirling Highway, High St to Great Eastern Highway	00:21:50	00:32:27	1.218	00:04:09	00:27:18	3.141	20.7

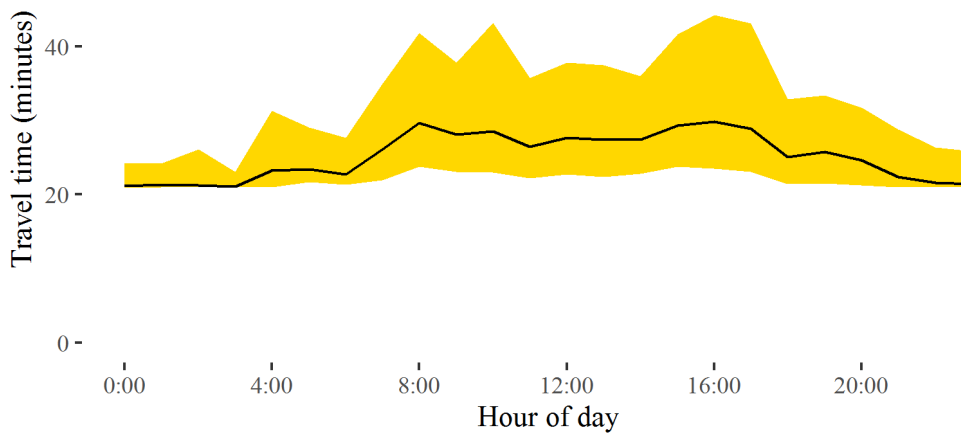
Source: BITRE estimates.

The best median travel times and lowest uncertainty for journeys from Great Eastern Highway to Stirling Highway, High Street were at 3am, with a median travel time of 21 minutes and an interquartile range of 2 minutes. The longest median travel times and greatest uncertainty were at 4pm, with a median of 30 minutes and an interquartile range of 21 minutes.

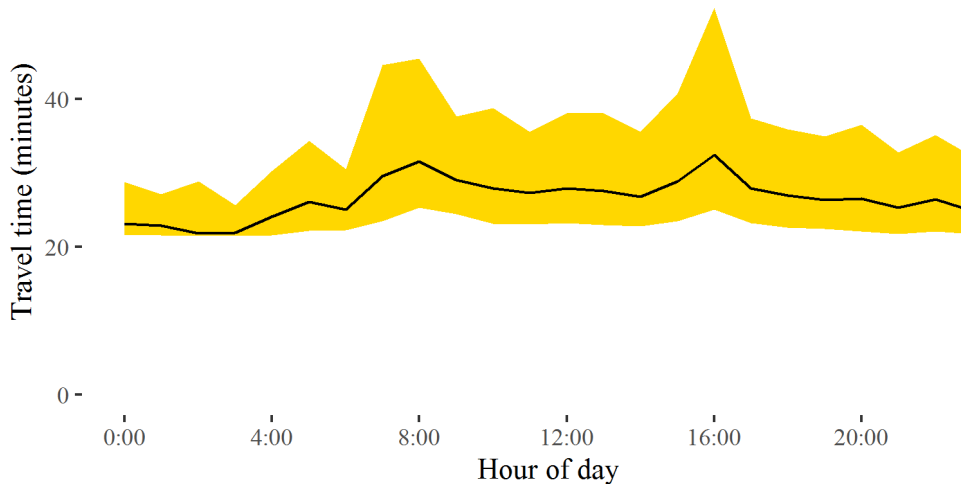
The best travel times and lowest uncertainty travelling from Stirling Highway, High St to Great Eastern Highway were at 2am and 3am, respectively, with a median travel time of 22 minutes and an interquartile range of 4 minutes. The longest median travel times and greatest uncertainty were at 4pm, with a median of 32 minutes and an interquartile range of 27 minutes.

**Figure A.203 Route 5 route median and interquartile range travel times**

Great Eastern Highway to Stirling Highway, High Street

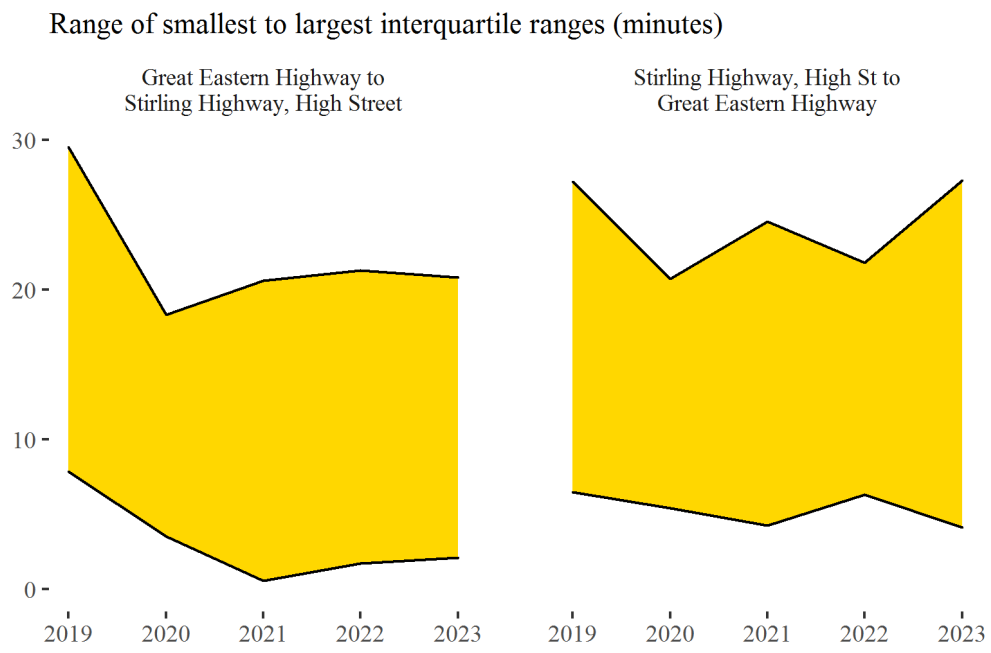
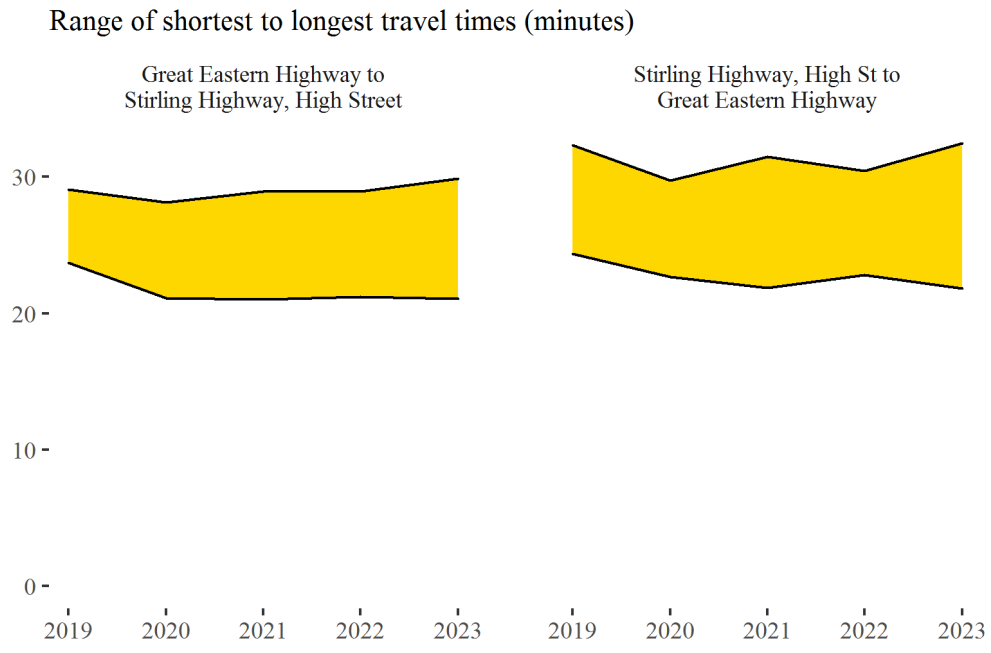


Stirling Highway, High St to Great Eastern Highway



Source: BITRE estimates.

Figure A.204 Route 5 Performance over time



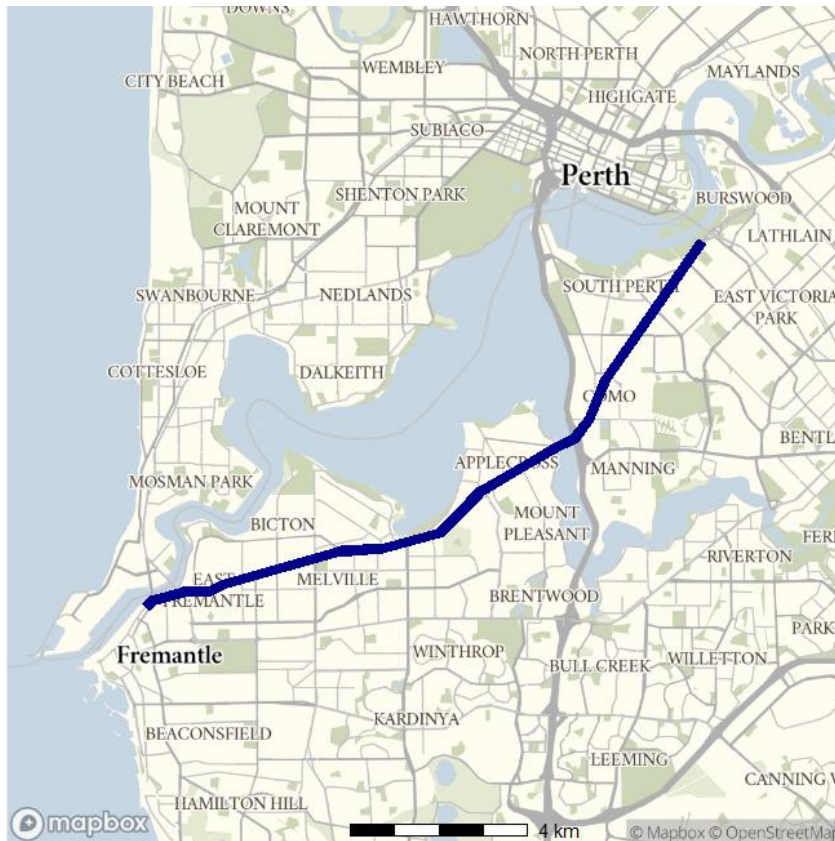
Source: BITRE estimates.



## Route 6 - Fremantle to Great Eastern Highway / Great Eastern Highway to Fremantle

This surface route follows the Canning Highway between Fremantle and the Great Eastern Highway, to the east of the Perth CBD—like Route 5 but south of the Swan River.

Figure A.205 Route 6 route map



Source: BITRE estimates.

Table A.69 Route 6 route travel times and congestion measures, 2023

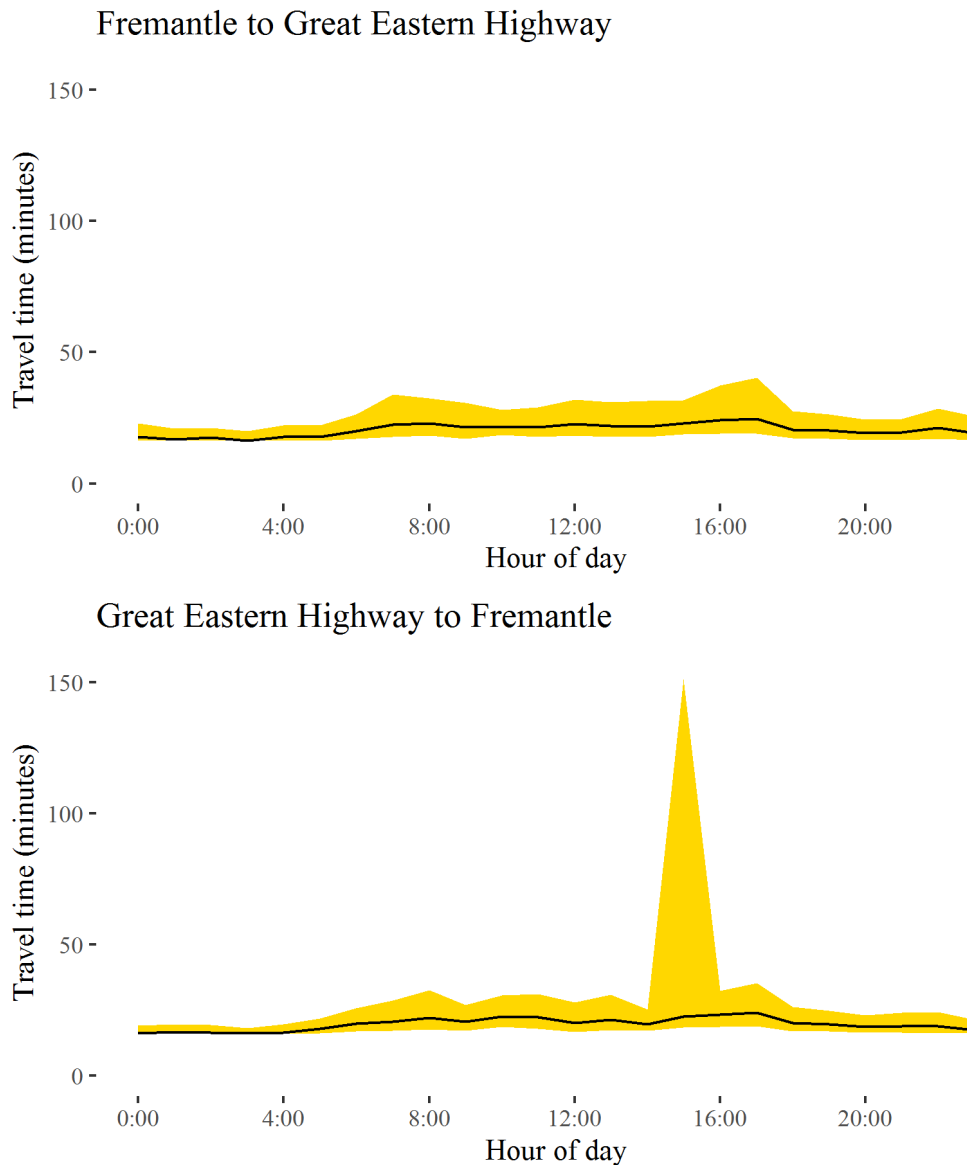
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Fremantle to Great Eastern Highway	00:16:16	00:24:34	1.260	00:03:36	00:21:24	2.958	16.0
Great Eastern Highway to Fremantle	00:16:08	00:23:57	1.222	00:02:03	02:12:45	6.731	15.8

Source: BITRE estimates.

The best median travel time for journeys from Fremantle to the Great Eastern Highway was 16 minutes at 3am and the lowest uncertainty was also at 3am with an interquartile range of 4 minutes. The longest median travel times and greatest uncertainty were at 5pm, with a median of 25 minutes and an interquartile range of 21 minutes.

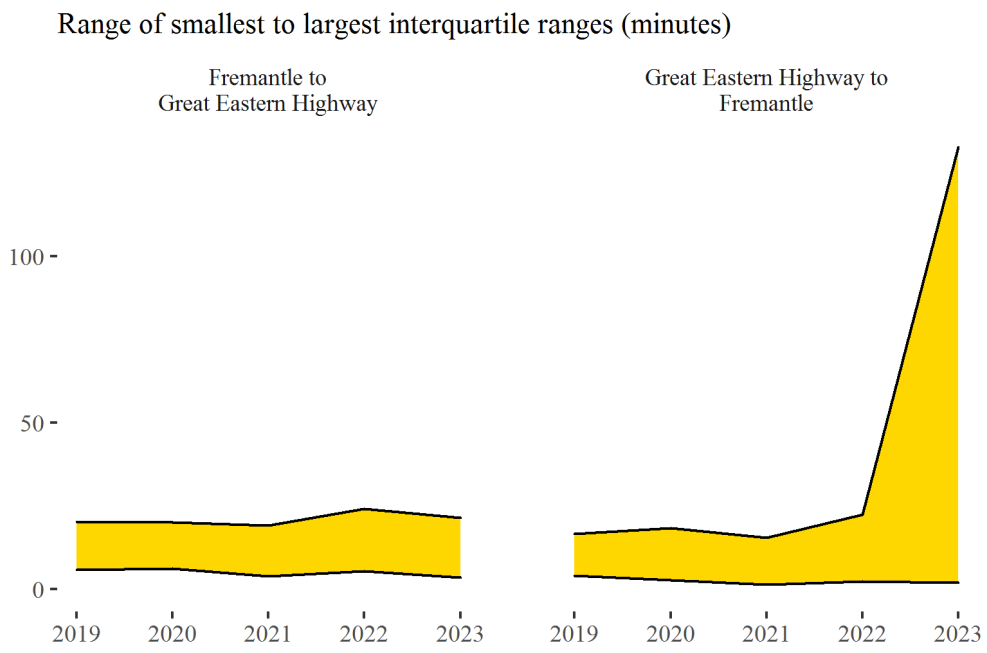
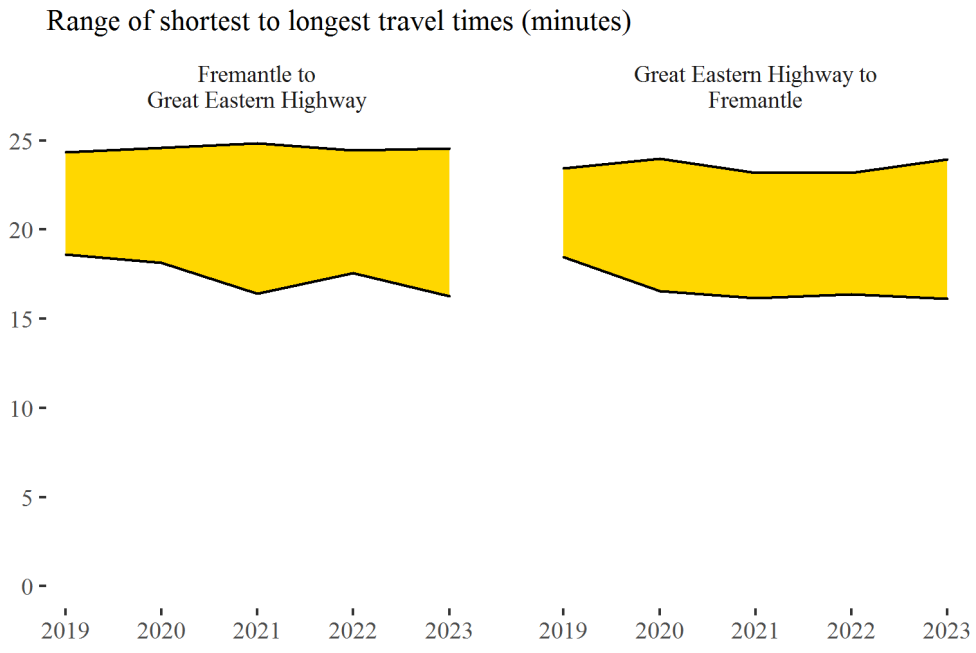
The best median travel times and lowest uncertainty for journeys from the Great Eastern Highway to Fremantle were at 3am, with a median travel time of 16 minutes and an interquartile range of 2 minutes. The longest median travel time was at 5pm with a median of 24 minutes and the greatest uncertainty at 3pm with an interquartile range of 2 hour 13 minutes.

**Figure A.206 Route 6 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.207 Route 6 Performance over time

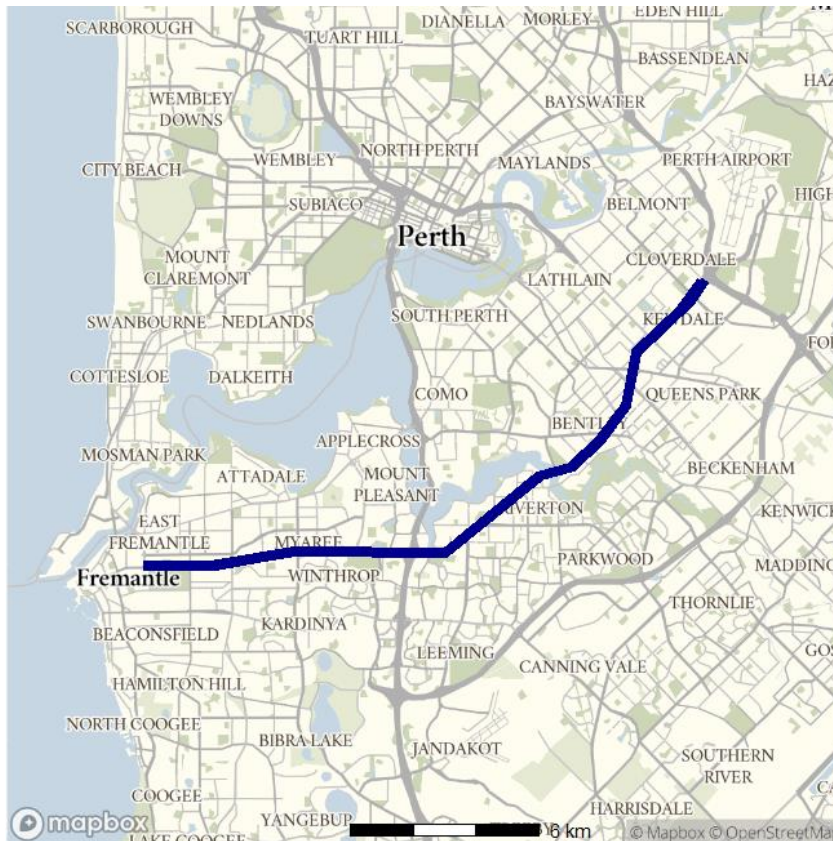


Source: BITRE estimates.

## Route 7 - Stirling Highway to Tonkin Freeway / Tonkin Freeway to Stirling Highway

This route follows the Leach Highway (Route 7) between the Stirling Highway (Route 6), at Fremantle, to the interchange with the Tonkin Freeway (Route 4) near Perth Airport.

**Figure A.208 Route 7 route map**



Source: BITRE estimates.

**Table A.70 Route 7 route travel times and congestion measures, 2023**

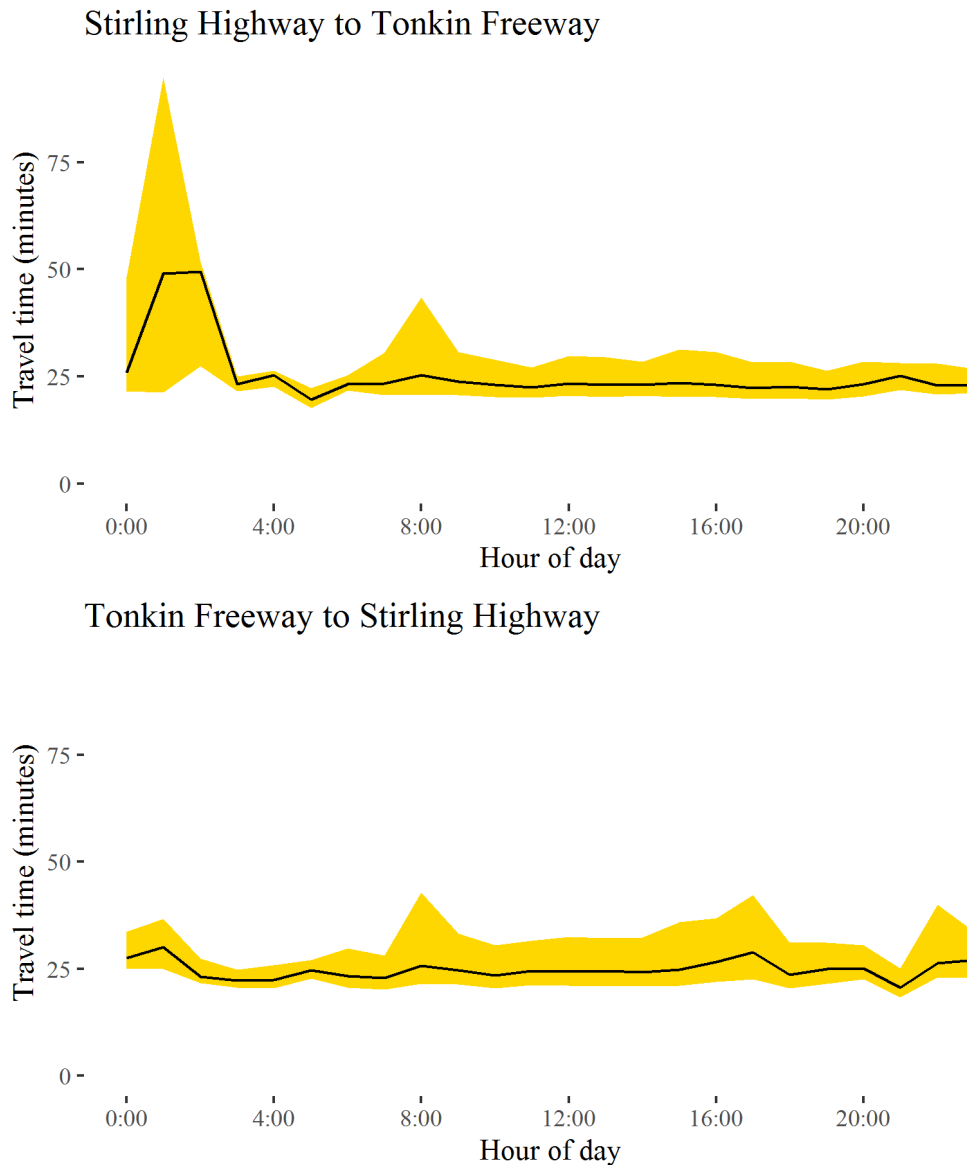
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Stirling Highway to Tonkin Freeway	00:19:35	00:49:30	1.299	00:03:24	01:13:31	3.651	21.9
Tonkin Freeway to Stirling Highway	00:20:33	00:30:03	1.208	00:04:16	00:21:14	2.508	22.2

Source: BITRE estimates.

The best median travel times and lowest uncertainty for journeys from Stirling Highway to the Tonkin Freeway were at 5am, with a median travel time of 20 minutes and an interquartile range of 3 minutes. The longest median travel time was at 2am with a median of 50 minutes and the greatest uncertainty at 1am with an interquartile range of 1 hour 14 minutes.

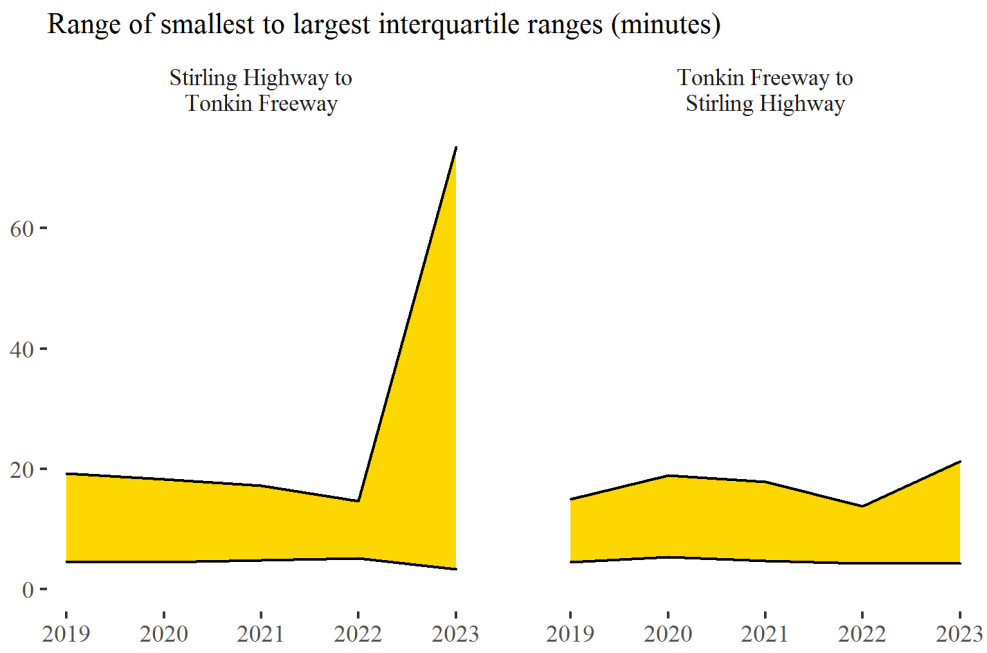
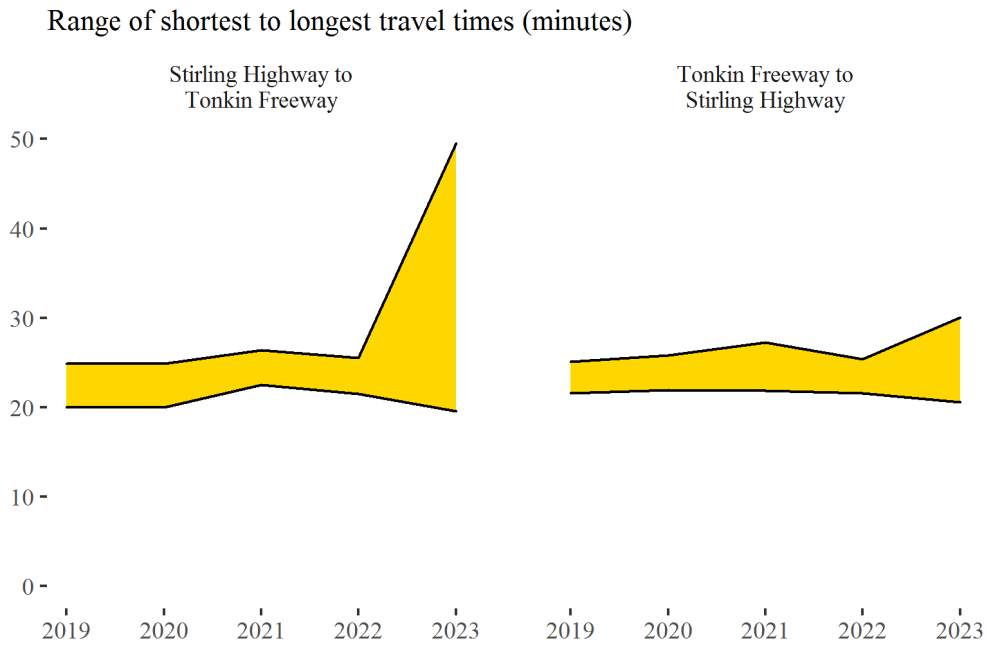
The best travel times and lowest uncertainty travelling from Tonkin Freeway to Stirling Highway were at 9pm and 3am, respectively, with a median travel time of 21 minutes and an interquartile range of 4 minutes. The longest median travel time was 30 minutes at 1am and the greatest uncertainty was at 8am with an interquartile range of 21 minutes.

**Figure A.209** Route 7 route median and interquartile range travel times



Source: BITRE estimates.

Figure A.210 Route 7 Performance over time

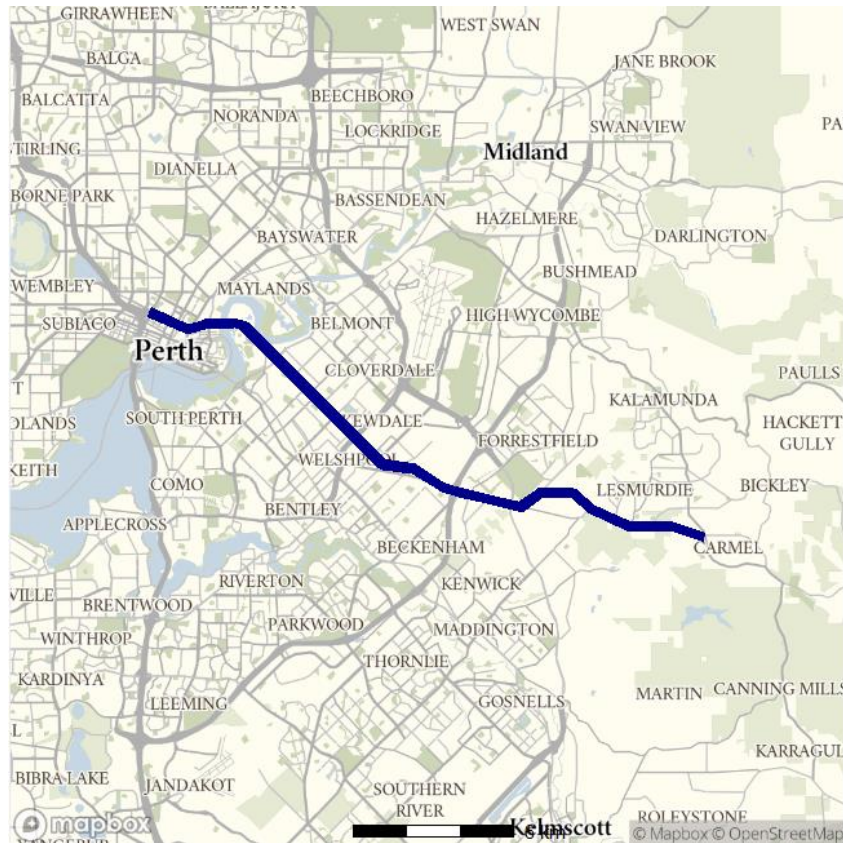


Source: BITRE estimates.

## Route 8 - Canning Road to Mitchell Freeway / Mitchell Freeway to Canning Road

This route runs from Canning Road on Perth's eastern fringe, through Perth's eastern suburbs, to the Mitchell Freeway (Route 2) just west of the CBD. The route follows the Graham Farmer Freeway, Orrong Road and Welshpool Road.

**Figure A.211** Route 8 route map



Source: BITRE estimates.

**Table A.71** Route 8 route travel times and congestion measures, 2023

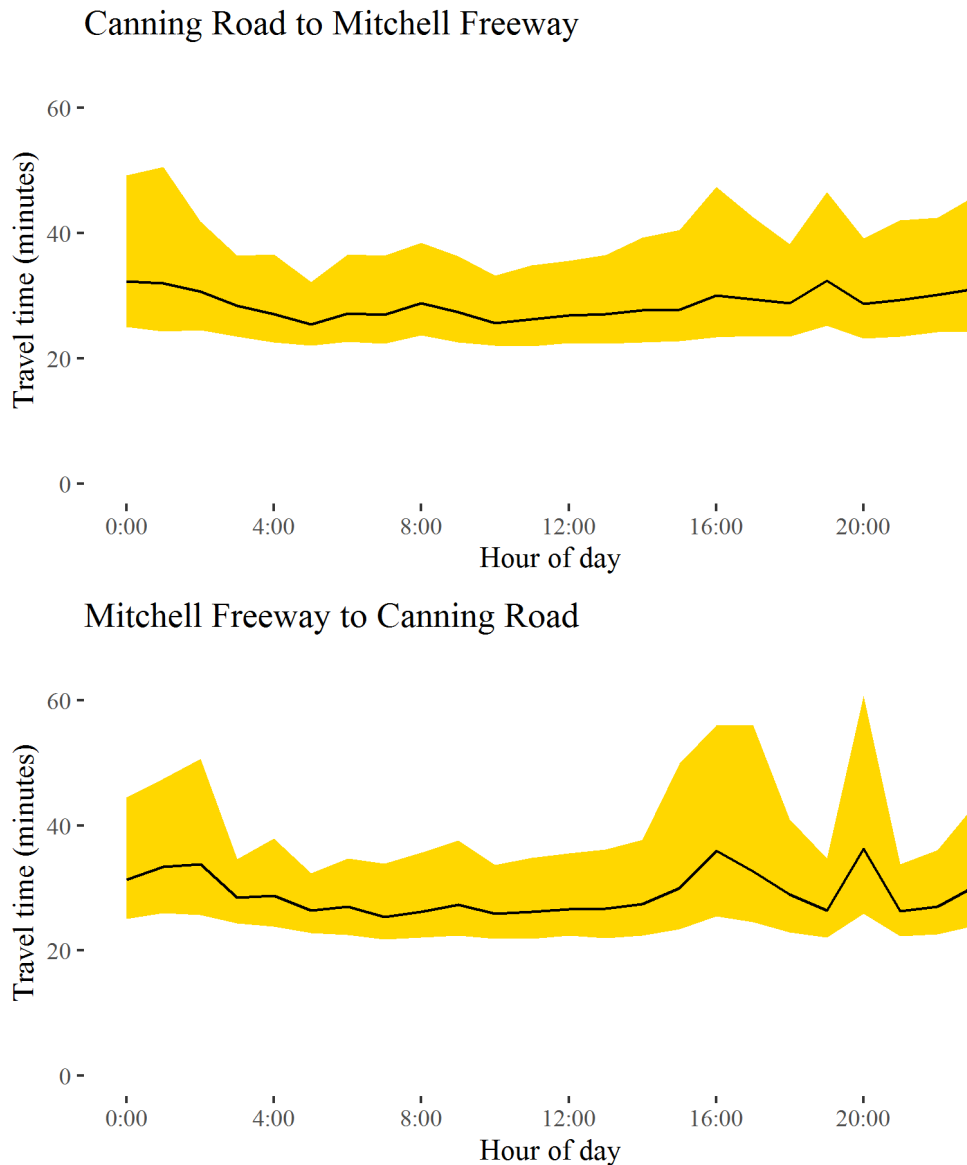
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Canning Road to Mitchell Freeway	00:25:28	00:32:21	1.125	00:10:15	00:26:16	1.631	24.1
Mitchell Freeway to Canning Road	00:25:23	00:36:14	1.141	00:09:29	00:34:52	1.838	24.1

Source: BITRE estimates.

The best median travel time for journeys from Canning Road to the Mitchell Freeway was 25 minutes at 5am and the lowest uncertainty was also at 5am with an interquartile range of 10 minutes. The longest median travel time was 32 minutes at 7pm and the greatest uncertainty was at 1am with an interquartile range of 26 minutes.

The best median travel times and lowest uncertainty for journeys from the Mitchell Freeway to Canning Road were at 7am, with a median travel time of 25 minutes and an interquartile range of 9.5 minutes. The longest median travel times and greatest uncertainty were at 8pm, with a median of 36 minutes and an interquartile range of 35 minutes.

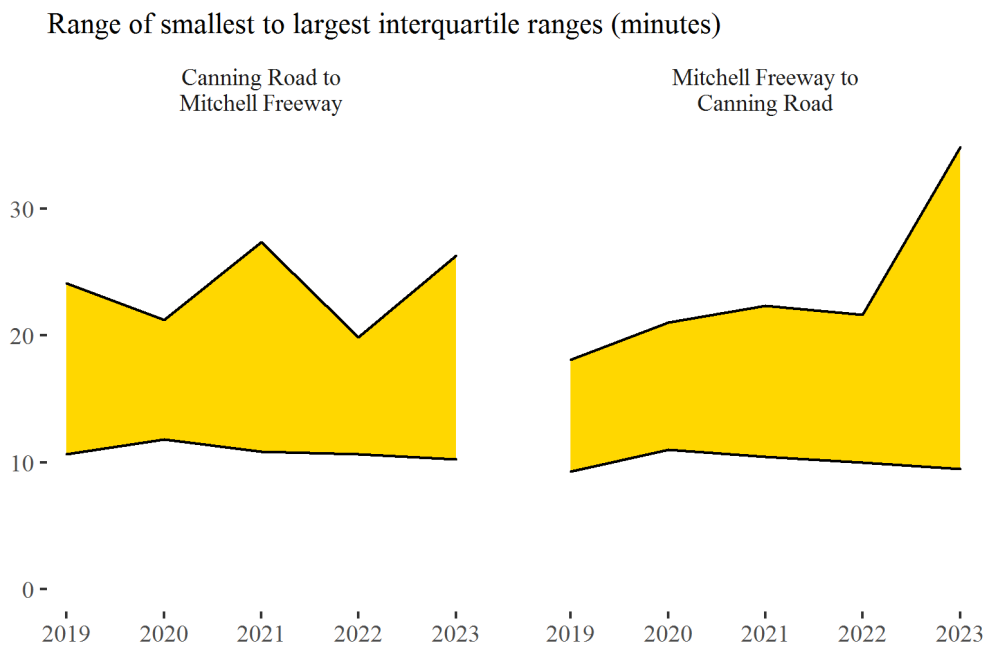
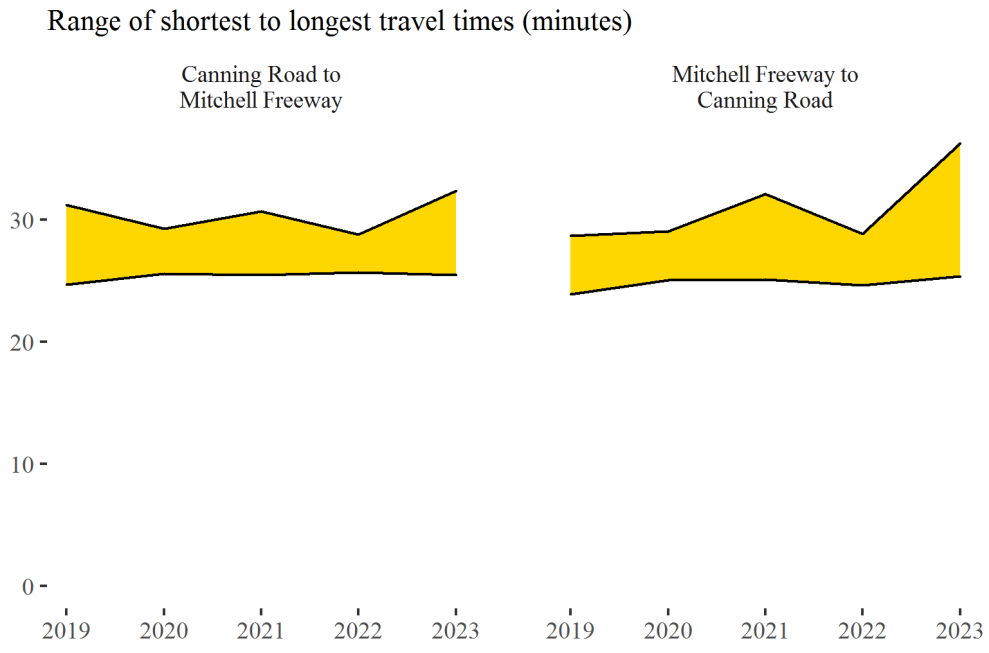
**Figure A.212** Route 8 route median and interquartile range travel times



Source: BITRE estimates.



**Figure A.213 Route 8 Performance over time**



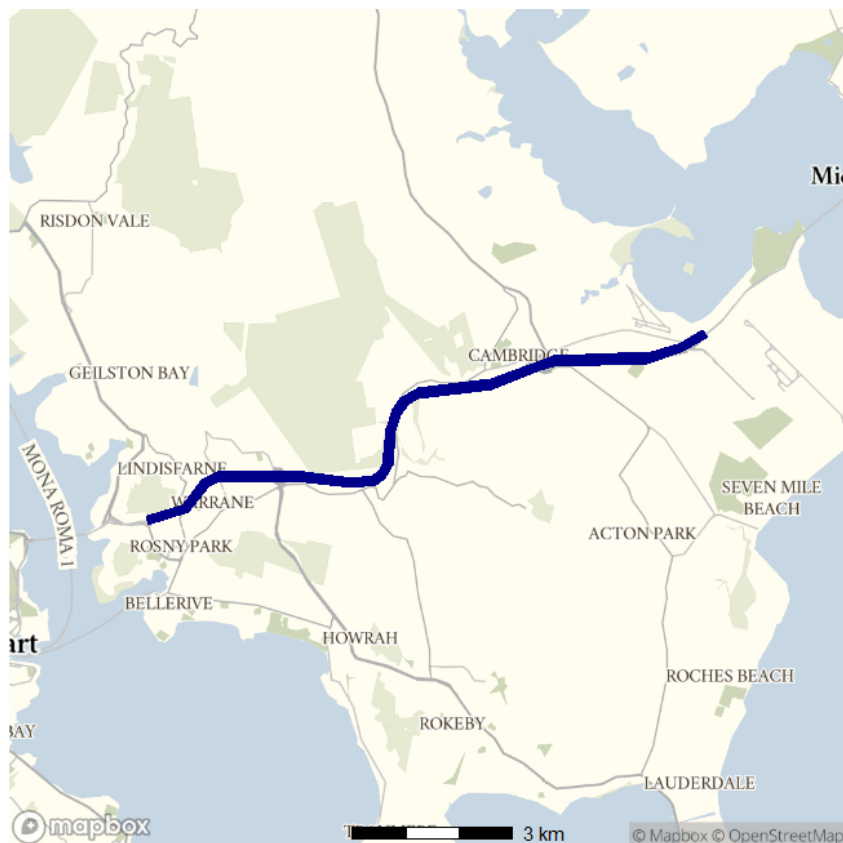
Source: BITRE estimates.

## Hobart routes

### A3 - Airport to River Derwent / River Derwent to Airport

This motorway route, also known as the Tasman Highway, runs between Hobart Airport and the River Derwent at Montagu Bay

Figure A.214 A3 route map



Source: BITRE estimates.

Table A.72 A3 route travel times and congestion measures, 2023

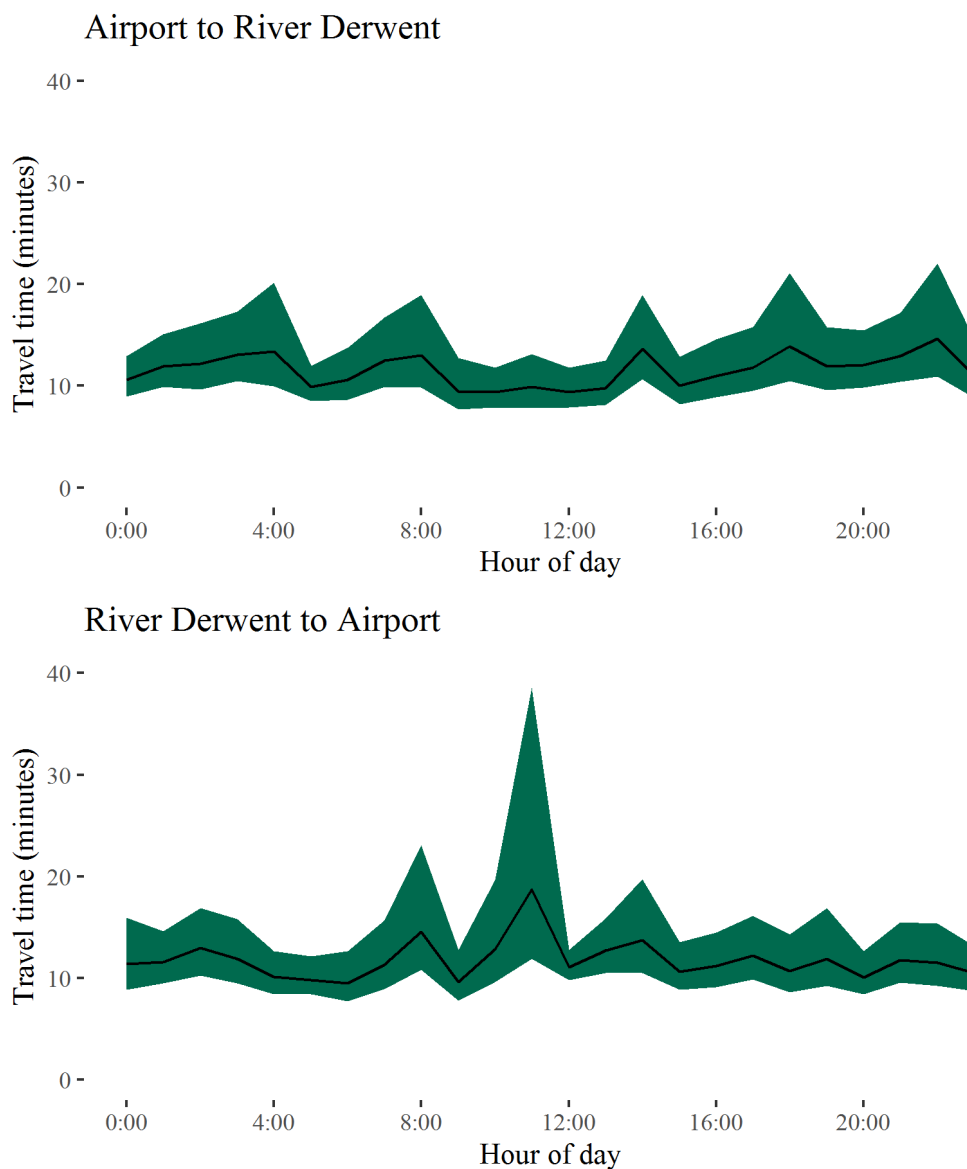
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Airport to River Derwent	00:09:22	00:14:37	1.236	00:03:31	00:11:06	1.789	12.1
River Derwent to Airport	00:09:29	00:18:42	1.240	00:03:01	00:26:41	2.301	12.1

Source: BITRE estimates.

The best travel times and lowest uncertainty travelling from Airport to River Derwent were at 12am and 5am, respectively, with a median travel time of 9 minutes and an interquartile range of 3.5 minutes. The longest median travel times and greatest uncertainty were at 10pm, with a median of 15 minutes and an interquartile range of 11 minutes.

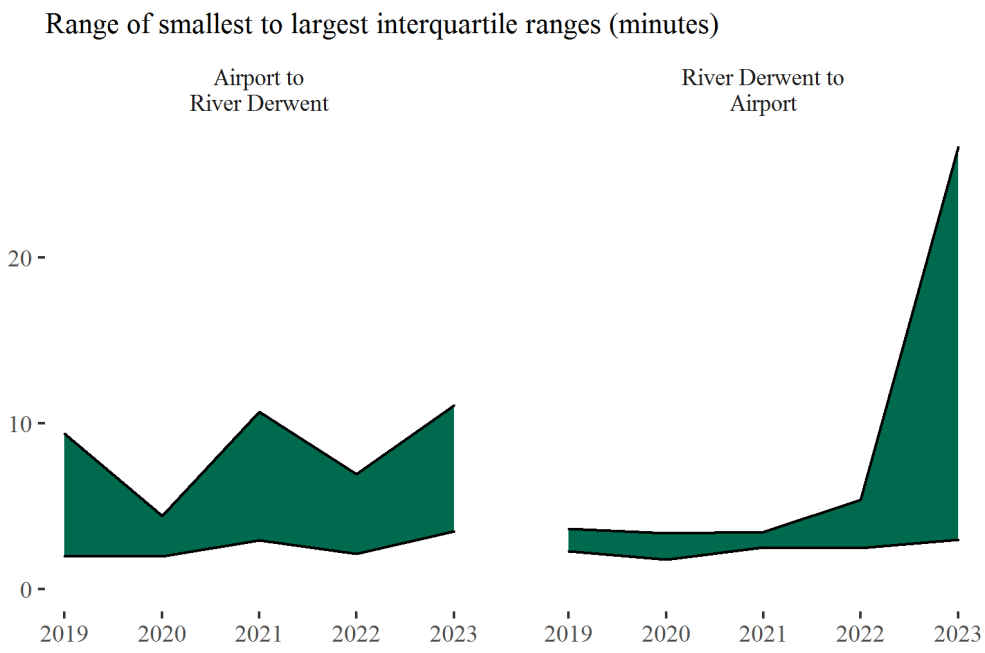
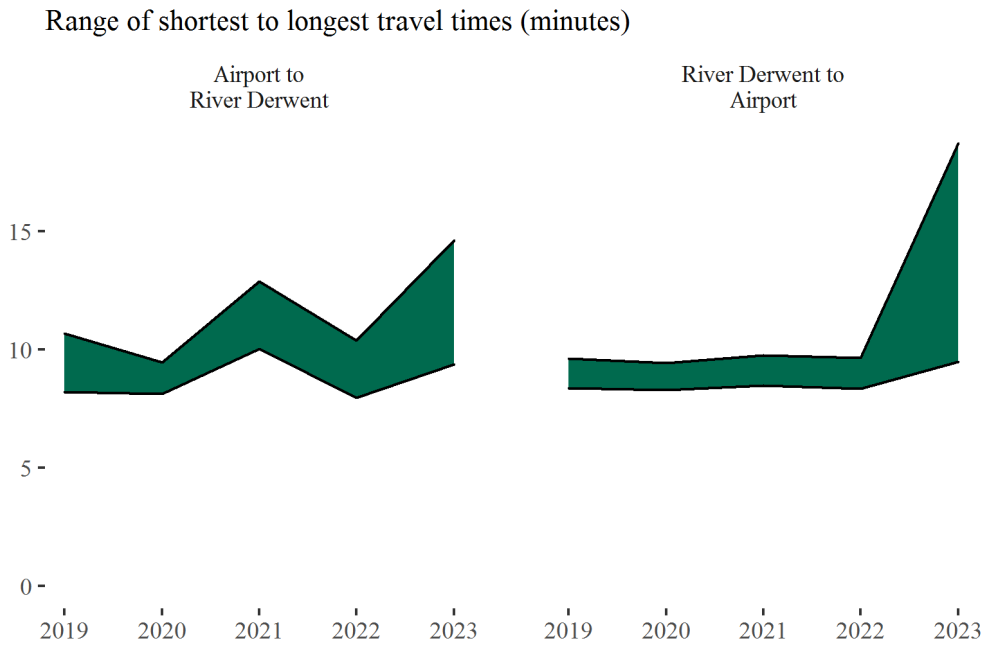
The best travel times and lowest uncertainty travelling from River Derwent to Airport were at 6am and 12am, respectively, with a median travel time of 9.5 minutes and an interquartile range of 3 minutes. The longest median travel times and greatest uncertainty were at 11am, with a median of 19 minutes and an interquartile range of 27 minutes.

**Figure A.215 A3 route median and interquartile range travel times**



Source: BITRE estimates.

Figure A.216 A3 Performance over time

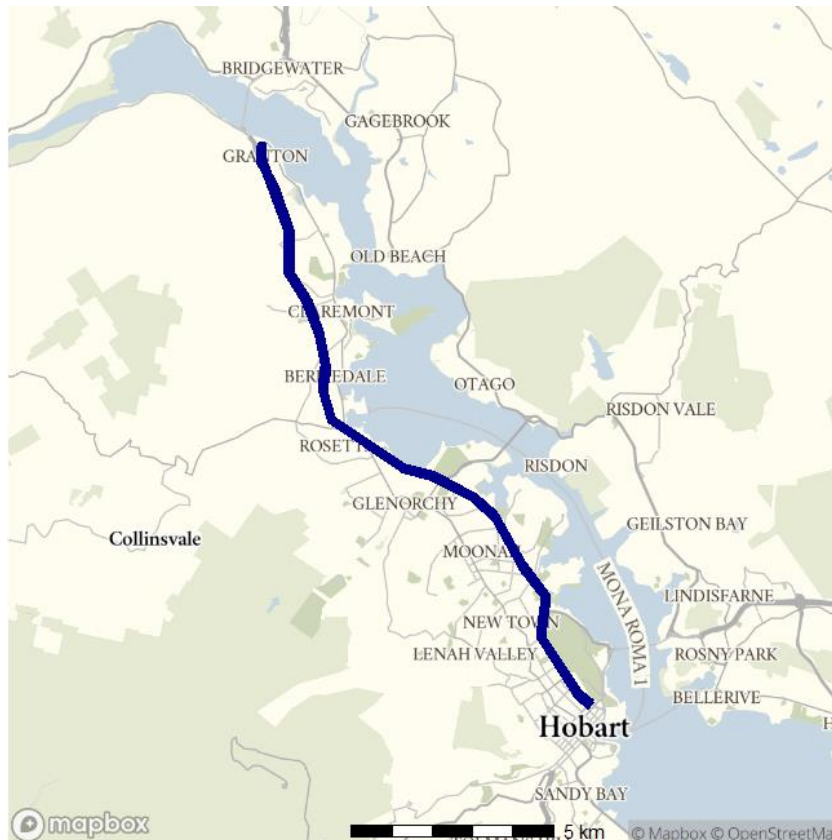


Source: BITRE estimates.

## Route 1 - Bridgewater Bridge to City / City to Bridgewater Bridge

This route, also known as the Brooker Highway, connects the City to the Midland Highway after it crosses the River Derwent at Granton. It connects Hobart to the north of Tasmania and surface links to other Australian states.

Figure A.217 Route 1 route map



Source: BITRE estimates.

Table A.73 Route 1 route travel times and congestion measures, 2023

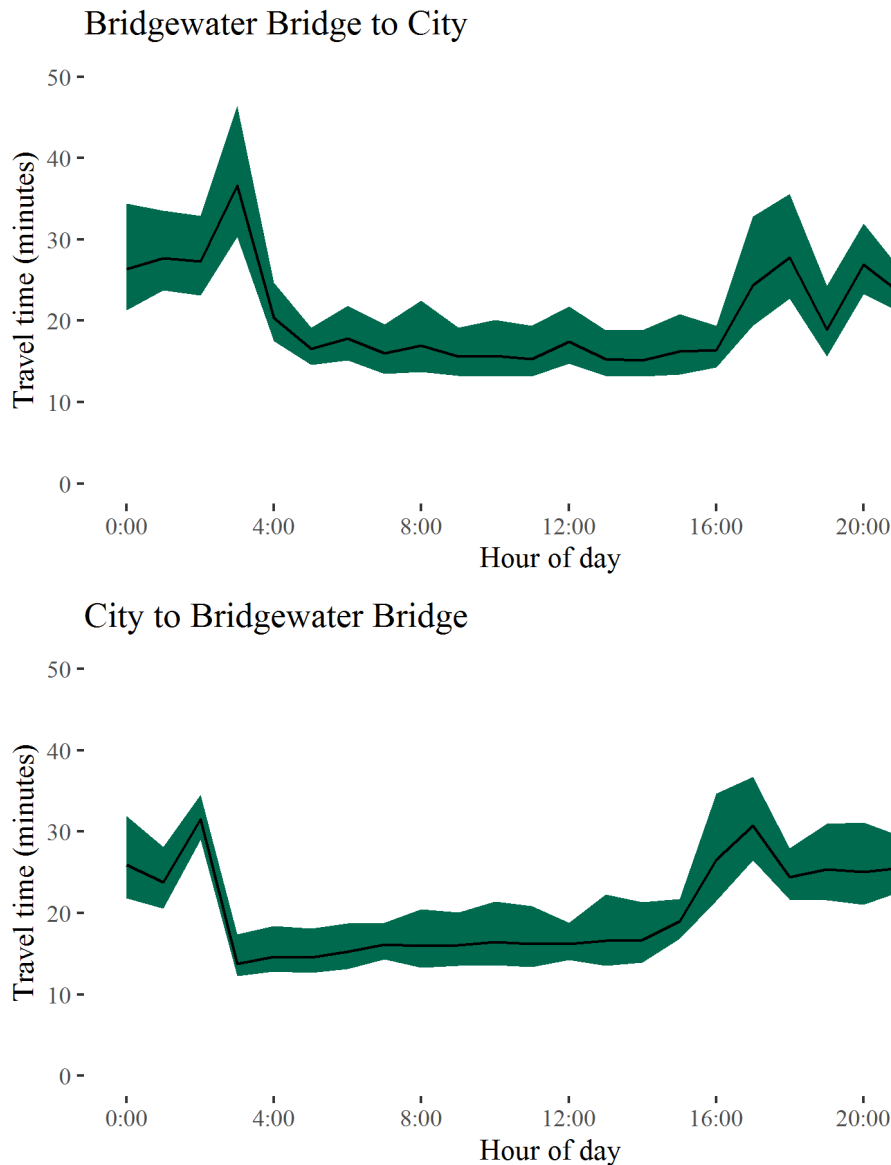
Direction	Shortest median travel time	Longest median travel time	METR	Shortest uncertainty range	Longest uncertainty range	MEUR	Route distance
Bridgewater Bridge to City	00:15:06	00:36:38	1.373	00:04:38	00:16:06	1.774	17.9
City to Bridgewater Bridge	00:13:45	00:32:00	1.542	00:04:31	00:13:14	1.609	17.3

Source: BITRE estimates.

The best median travel times and lowest uncertainty for journeys from Bridgewater Bridge to the City were at 2pm, with a median travel time of 15 minutes and an interquartile range of 5 minutes. The longest median travel times and greatest uncertainty were at 3am, with a median of 37 minutes and an interquartile range of 16 minutes.

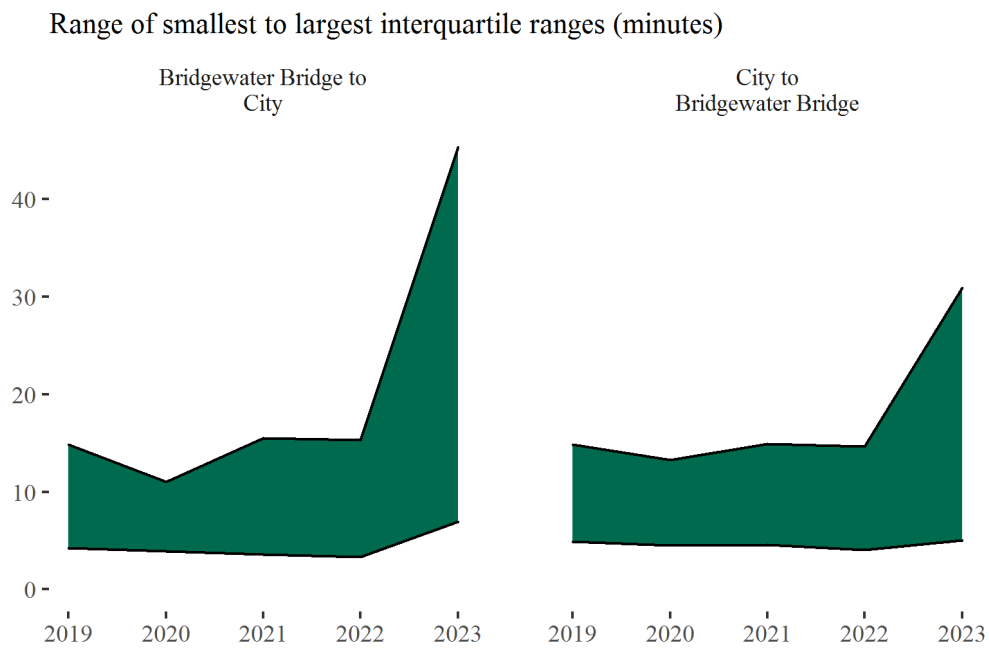
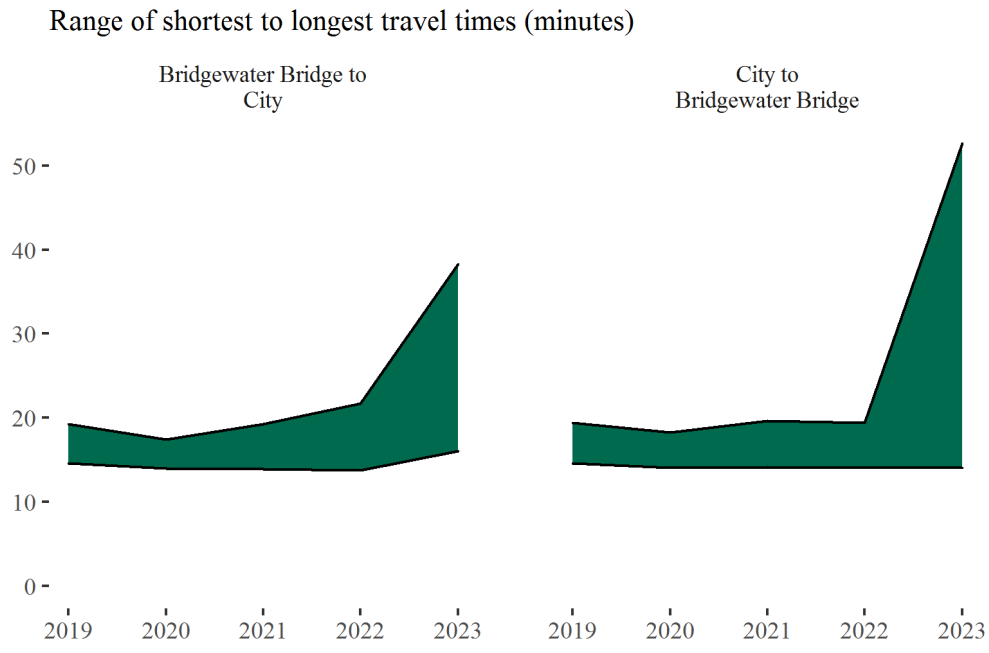
The best travel times and lowest uncertainty travelling from the City to Bridgewater Bridge were at 3am and 7am, respectively, with a median travel time of 14 minutes and an interquartile range of 4.5 minutes. The longest median travel time was at 11pm with a median of 32 minutes and the greatest uncertainty at 4pm with an interquartile range of 13 minutes.

**Figure A.218** Route 1 route median and interquartile range travel times



Source: BITRE estimates.

Figure A.219 Route 1 Performance over time



Source: BITRE estimates.

## **Appendix B – Brief summary of methods and measures**

For this paper, BITRE used freight telematics to collate speeds experienced by freight vehicles on individual road segments ranging in length from a few to several hundred metres. BITRE defined routes and identified the segments that make up those routes. Median travel times were determined by calculating the time taken if a vehicle experienced the median travel speeds across all segments on the route, and the same method was applied for the interquartile range with speeds at the 1st and 3rd quartiles.

The Mean Excess Time Ratio (METR) is calculated as the mean hourly ratio of median travel times to the best observed median travel time. The Mean Excess Uncertainty Ratio (MEUR) is calculated as the mean hourly ratio of interquartile range to the smallest observed interquartile range.

The aggregate measures for each city are calculated as the mean of these two measures for a city, weighted by the distance and volumes of traffic observed on each route. This ensures congested, but relatively short and unimportant routes for freight, such as the M1 in Sydney, do not overly affect results.

Some data sparse segments required Bayesian estimation. Bayesian estimation was implemented via the Stan modelling language for Bayesian analysis (Stan Development Team 2020), implemented through the 'rethinking' package for R (McElreath 2020).

The segments making up routes were identified with a lightly modified version of the OSRM routing engine (Luxen and Vetter 2011).

Summary data for all routes and segments on this report will be available at [data.gov.au](https://data.gov.au).

## **Appendix C – About the BITRE freight telematics program**

This paper uses data from the BITRE telematics project. This project transforms GPS traces from freight vehicles of private road freight operators into data about Australia's road freight industry and road freight network, to help inform industry, government and other interested parties. This data can help inform planning and investment in the road network and rest areas, inform industry and government on economic activity and assist trip planning among other potential uses. The project uses BITRE's independently developed *Yulo* framework (Green and Mitchell, 2018, BITRE 2021b). By tracking the entirety of vehicles' journeys it can generate data on more parts of the road network than is practical using conventional road data collection means, such as fixed cameras or pneumatic tubes. This report is based on over 350 million observations from over 7736 road segments whilst the database contains over 5 billion observations on over 1 million road segments.

Previous publications using this data include an analysis of the effect of COVID 19 lockdowns on freight route performance in 2021, 2020 and 2019 (BITRE 2021a, 2021d, 2022 & 2023) and a display of the freight catchments served by Australian ports (BITRE 2021c).

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