Australian Government
Commonwealth Grants Commission

2025 Methodology Review

Roads consultation paper

October 2023

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Overview of category

1 The roads assessment covers state and territory (state) spending on the maintenance of roads, bridges and tunnels, and other related services.

2 State spending on this function comprises expenses for:

- road maintenance
- bridges and tunnels maintenance and rehabilitation
- road rehabilitation
- other road related expenses, such as road safety, traffic management and other transport activities (including driver license administration, motor vehicle registration, heavy vehicle regulation and road transport planning administration).

3 State recurrent roads expenses and investment in roads infrastructure are assessed separately, with roads investment being assessed in the investment category.

Current assessment method – 2020 Review

4 The 2020 Review assessment method separately assesses state expenses on rural roads, urban roads, and bridges and tunnels. Higher costs are attributed to:

- longer road networks, as states with large numbers of dispersed localities need longer road networks, and hence need to spend more on maintenance and repairs than other states
- greater traffic volumes, as states require greater spending on traffic control and safety measures (such as signage and traffic lights)
- greater heavy vehicle use, which causes greater pavement wear and tear that increases maintenance to restore the pavement to acceptable service standards
- longer bridge and tunnel lengths, as states with greater lengths need to spend more on maintenance and repairs than other states.

5 The roads assessment also recognises the differences between states in wage costs, and, for bridges, tunnels and rural roads, the higher costs of providing services in more remote locations.

Data used in the assessment

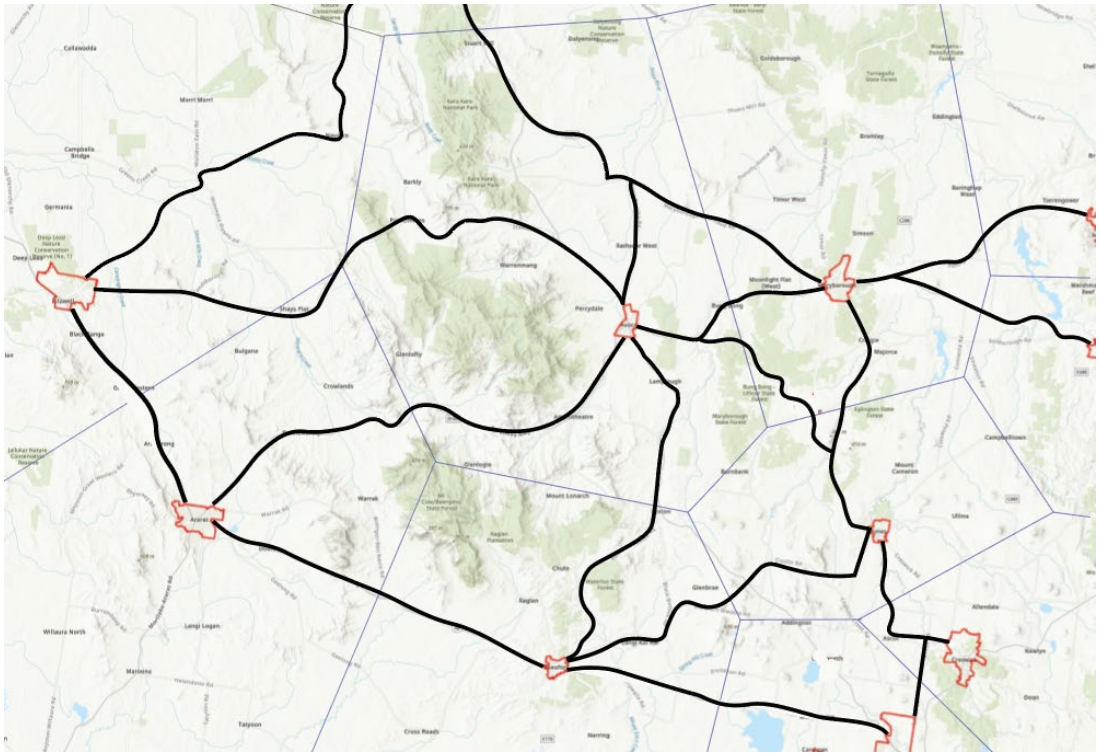
6 The roads assessment uses the following data.

- The assessed road network in urban areas is calculated using ABS data on population estimates for towns of over 40,000 people and an assumption that all urban centres of over 40,000 people need the same length of state roads per capita.
- Rural road length is calculated as the shortest route between all neighbouring towns of over 1,000 people (Figure 1), plus additional routes to smaller towns, major mines, gas wells, ports and national parks, creating a synthetic rural road network. It uses Pitney Bowes routing data on Australia's complete road network,

ABS data on urban centre locations and state data on the location of other potential destinations for roads.

- In the 2020 Review, heavy vehicle and total road use data was informed by the ABS Survey of Motor Vehicle Use. With the ABS discontinuing this survey, since 2021–22 this information has been solely sourced from data modelled by the Bureau of Infrastructure and Transport Research Economics and the National Transport Commission.
- States provide data on bridge and tunnel lengths.
- Both National Transport Commission and state data are used to determine the relative importance of the subcomponents in budgets of state road authorities. These data estimate the importance of each subcomponent for recurrent road expenses (maintenance and operations) and investment.

Figure 1 Shortest route between neighbouring towns of 1,000 people



Source: Commission calculation.

Category and component expenses

7 State gross expenses on roads were about $9 billion in 2021–22, representing 3.1% of total state expenditure (Table 1). Road user charges are assessed equal per capita in the other revenue category.

Table 1 Total roads expenses, 2021–22

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Total expenses ($m)	3,749	1,555	1,695	1,333	233	125	146	140	8,975
Proportion of total expenditure (%)	4.4	2.3	2.8	3.5	1.2	1.9	2.6	2.3	3.1

Source: Commission calculation, 2023 Update.

8 Roads expenses and investment have both grown over the 4 years to 2021–22, although with some fluctuations between years (Table 2).

Table 2 Total roads expenditure, 2018–19 to 2021–22

	2018–19	2019–20	2020–21	2021–22
	$m	$m	$m	$m
Expenditure				
Roads expenses	7,535	6,903	8,549	8,975
Roads investment	12,811	13,434	12,602	15,058
	%	%	%	%
Proportion of total expenditure				
Roads expenses	3.2	3.0	3.4	3.1
Roads investment	5.4	5.9	5.0	5.2

Source: Commission calculation, 2023 Update.

9 Table 3 shows the roads assessment structure and drivers of state needs.

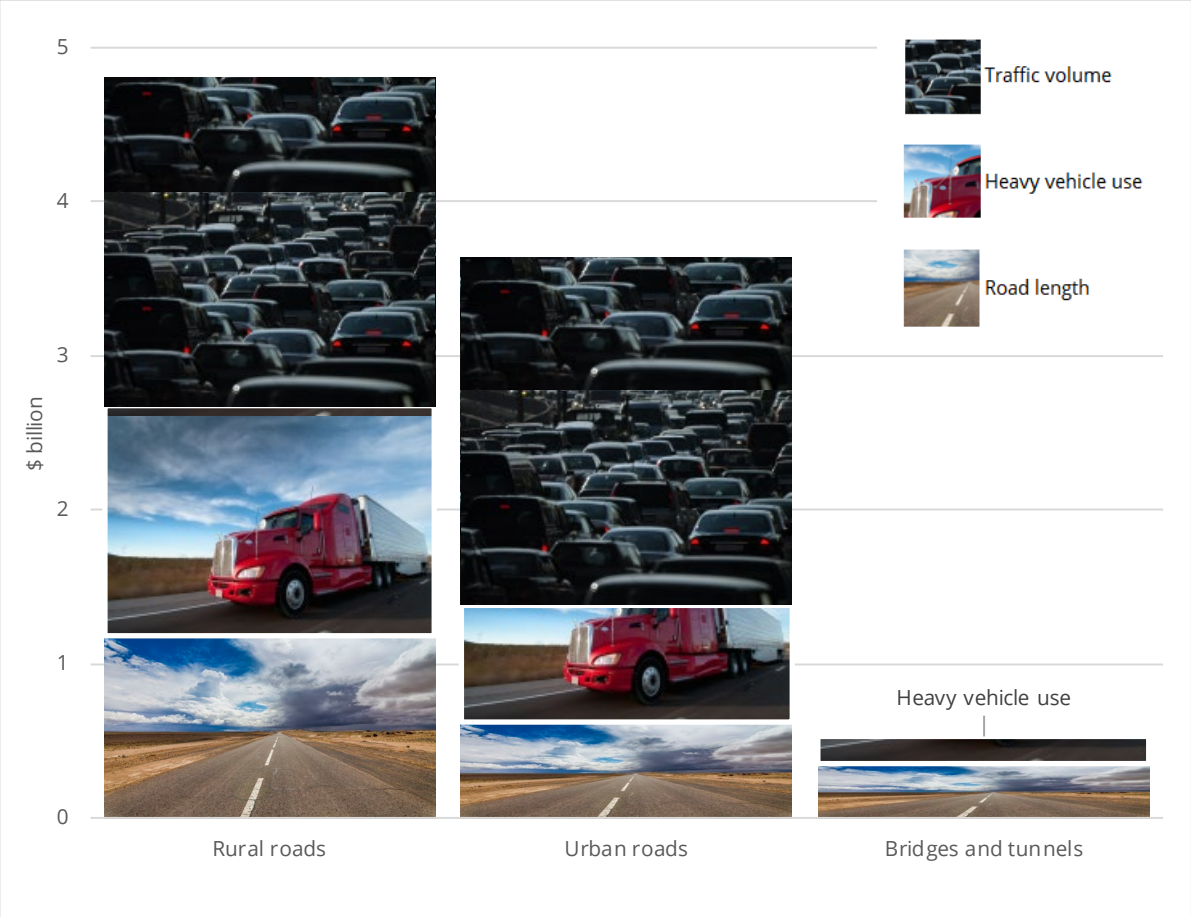
Table 3 Structure of the roads assessment, 2021–22

Component	Expenses	Driver	Influence measured by driver
Rural roads	4,805	Length	Recognises that the length of the rural road network influences costs.
		Traffic	Recognises that traffic volume influences costs.
		Heavy vehicles	Recognises that heavy vehicles damage roads.
		Regional costs	Recognises the differences in the cost of providing services to different areas within a state (applied to road length only).
		Wage costs	Recognises the differences in wage costs between states.
Urban roads	3,639	Length	Recognises that the length of the urban road network influences costs.
		Traffic	Recognises that traffic volume influences costs.
		Heavy vehicles	Recognises that heavy vehicles damage roads.
		Wage costs	Recognises the differences in wage costs between states.
Bridges and tunnels	531	Length	Recognises that the length of bridges and tunnels influences cost.
		Heavy vehicles	Recognises that heavy vehicles damage bridges and tunnels.
		Regional costs	Recognises the differences in the cost of providing services to different areas within a state.
		Wage costs	Recognises the differences in wage costs between states.

Source: Commission calculation, 2023 Update.

10 While light vehicles are responsible for a very small proportion of pavement damage, spending on road fixtures such as steel covers, lane markers, light poles, signposts, crash barriers and traffic management mean that traffic volume drives more spending than road length or heavy vehicle use in both urban and rural roads (Figure 2).

Figure 2 Drivers of national spending on roads, 2021–22



Note: Traffic volume expenses for bridges and tunnels are unavailable, so the only drivers applied to bridges and tunnels spending are heavy vehicle use and road length.

Source: Commission calculation, 2023 Update.

GST distribution in the 2023 Update

11 Table 4 shows the GST impact of the assessment in the 2023 Update. The roads assessment distributed $704 million ($27 per capita) away from an equal per capita distribution. The associated investment components had a considerably larger effect.

Table 4 GST impact of the roads assessment, 2023–24

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total effect
	$m	$m	$m	$m	$m	$m	$m	$m	$m
Roads									
Rural roads	-182	-378	105	224	167	21	-96	140	656
Urban roads	-38	16	75	25	-58	-17	7	-12	124
Bridges and tunnels	1	-31	41	-7	-10	4	-2	5	50
Total ($m)	**-219**	**-393**	**221**	**243**	**99**	**8**	**-91**	**133**	**704**
Total ($pc)	**-27**	**-58**	**41**	**85**	**54**	**13**	**-193**	**510**	**27**
Associated investment									
Investment in rural roads	-524	-927	461	560	103	-4	-106	437	1,561
Investment in urban roads	13	-318	277	149	-100	-45	33	-11	473
Total ($m)	**-757**	**-1,697**	**1,000**	**1,038**	**156**	**-28**	**-356**	**1,068**	**3,050**
Total ($pc)	**-91**	**-250**	**184**	**365**	**84**	**-48**	**-757**	**4,111**	**115**

Note: Investment in bridges and tunnels is included in investment in rural and urban roads as data are unavailable to further disaggregate the investment components.

Source: Commission calculation, 2023 Update.

12 Further detail on service provision arrangements, the range of services included within this category and the underlying conceptual cases for the assessment methods are explained in volume 2, chapter 20, Report on GST Revenue Sharing Relativities, 2020 Review.

What has changed since the 2020 Review?

The ABS Survey of Motor Vehicle Use has been discontinued

13 The ABS Survey of Motor Vehicle Use was a major source for traffic data, but has been discontinued by the ABS. It collected data on odometer readings, fuel use, vehicle use and vehicle type. The survey was last completed for the 2019–20 financial year and was released at the end of December 2020. It was used in the 2020 Review but has not been used since 2021–22.

14 The Bureau of Infrastructure and Transport Research Economics and the National Transport Commission both incorporated data from the Survey of Motor Vehicle Use in their traffic and trend data provided to the Commission. They also use smoothing techniques and additional data sources including fuel sales, motor vehicle registrations and fleet fuel efficiency to model motor vehicle use annually. This will likely remain the best data source for this information.

15 The Bureau of Infrastructure and Transport Research Economics is continuing to investigate possible replacements for the Survey of Motor Vehicle Use.

There are new national roads data

16 Since the last review, progress has been made on the National Service Level Standards for Roads and Geoscience Australia has published a national roads map.

17 In 2018, state and Commonwealth ministers agreed to develop the National Service Level Standards for Roads, providing consistency across states including national road categories and secondary attributes.[1]

18 The dataset under the National Service Level Standards for Roads is being collated by the Commonwealth Department of Infrastructure, Transport, Regional Development, Communications and the Arts. These data are not expected to be available until late 2024, which will be too late for use in the 2025 Review. During subsequent reviews, it may become a better data source for assessing road length given its nationally consistent categorisation of roads based on social and economic functions. However, its initial iteration will not include information on whether a road is owned and operated by a state government or a local government and therefore will require some adjustment prior to being used in the roads assessment.

19 In July 2023, Geoscience Australia released the Digital Atlas of Australia.[2] It includes the National Roads dataset, an optimised aggregated national view of road geometry primarily sourced from state and local government data.

20 The National Roads map includes a harmonised road classification system that is comparable but not identical to the classification under the National Service Level Standards for Roads.[3] It also does not include information on whether a road is owned and operated by a state government or a local government. The Commission investigated using this dataset to assess rural and urban road lengths, but its preliminary view is that the 2020 Review method remains the most policy neutral indicator of state needs.

Population distribution has changed

21 Data from the 2021 Census on the population of urban centres have been released by the ABS. The urban population for the urban roads assessment will be updated for the 2024 Update.

22 The rural roads assessment is based on roads between neighbouring urban centres with populations of at least 1,000 people. The population in some towns has increased to meet this threshold while other towns have fallen below this threshold. This changes which towns the Commission's synthetic rural road network would

[1] The Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA), National Service Level Standards for Roads: 7 Primary Road Categories, DITRDCA, 2021, accessed 15 August 2023.

[2] Geoscience Australia, National Roads, Digital Atlas website, 2023, accessed 15 Aug 2023.

[3] Mark Dunford, Geoscience Australia, personal communication, 19 June 2023.

connect. The Commission decided not to update this network for the 2024 Update due to the complexity of updating the assessment, the marginal nature of the change and because the new population data only affected one update cycle.

Heavier passenger vehicles are on the roads

23 Electric vehicles are generally heavier than equivalent petrol models, contributing to increased road maintenance and construction costs. While electric vehicles comprised just 0.23% of light vehicles in 2021, they represented 8.4% of new car sales in Australia in 2023, indicating a growing trend.[4]

24 With the increasing popularity of electric vehicles and sports utility vehicles, as well as an increased weight of other passenger vehicles, the average weight of the passenger fleet has increased, from around 1.4 tonnes per vehicle in 2013 to around 1.5 tonnes in 2021. Despite this increase, the Commission estimates that passenger vehicles cause less than 0.5% of vehicle-induced road damage.

Implications for assessment

25 The Commission has identified 3 issues for consideration:

- measurement of urban road length
- measurement of rural road length
- measurement of traffic volume.

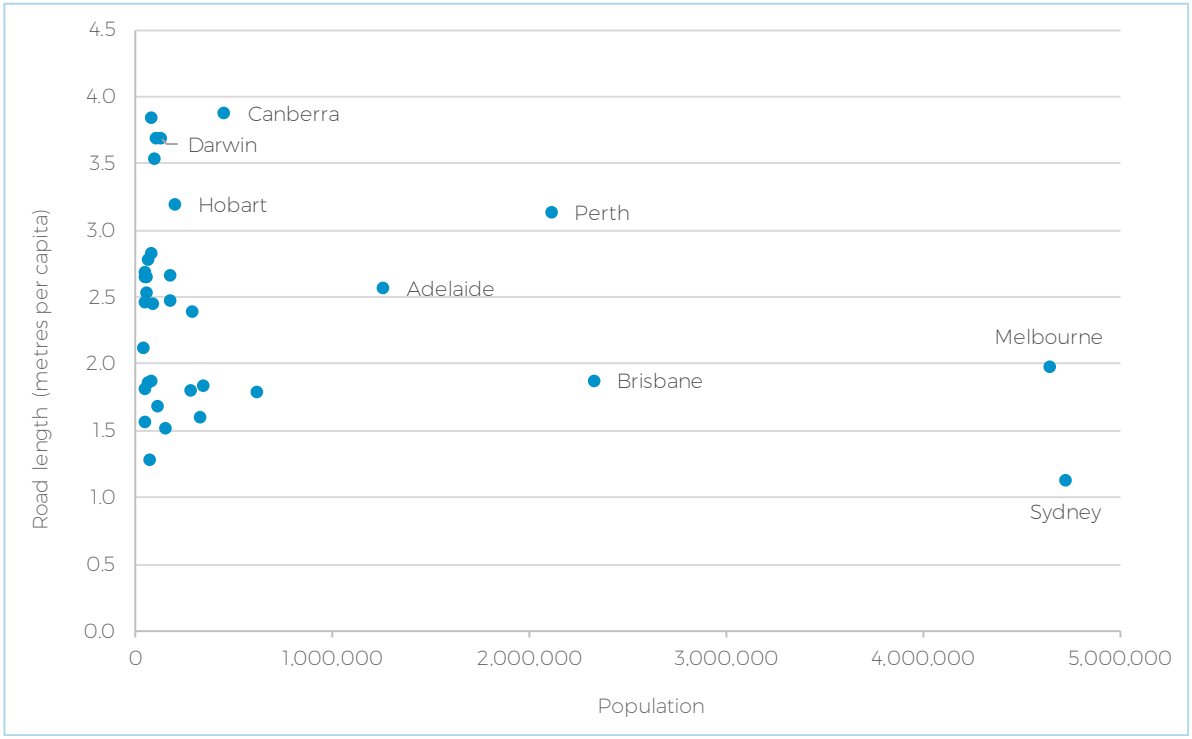
What drives urban road length?

26 In the 2020 Review, in the absence of nationally comparable state road length data, the Commission's assessment assumed all urban centres required the same length of state roads per capita. Geoscience's national roads dataset can now test that assumption. The nationally consistent road data cannot classify whether a road is a state or local road. However, the Commission has used highways, busways, arterial and sub-arterial roads to proxy state roads. These roads are shown for sections of each capital city in Attachment A.

27 Analysis of this newly available data by the Commission found no strong relationships between state road length and population size or density among towns of over 40,000 people (Figure 3).

[4] National Transport Commission (NTC), Carbon Dioxide Emissions Intensity for New Australian Light Vehicles 2021, NTC, 2022, p 2; Electric Vehicle Council (EVC), State of Electric Vehicles July 2023, EVC, 2023, p 62.

Figure 3 Urban road length per capita and population in large towns, 2021



Note: Each data point is an urban centre of over 40,000 people.
Source: Commission calculation.

28 The current assessment treats all large urban centres as having the same per capita needs for urban roads. Figure 3 shows these towns have state road networks ranging from 1 to 4 metres per capita. Although road lengths per capita decline with increasing population size for the capital cities, this relationship is not evident among the other towns.

29 The Commission's preliminary view is to retain the current assessment of urban roads, using population alone as the driver. This is equivalent to assigning every large town the average state road length of 2.02 metres per capita.

Consultation question

Q1. Do states support retaining the 2020 Review method of assessing urban road length, using population as the driver for large towns?

Should rural road lengths be updated?

30 In the 2020 Review, the Commission engaged a consultant to measure a synthetic road network as a proxy for the roads that are typically state roads. These included:

- the shortest road distance between all adjacent towns of at least 1,000 people
- up to two roads between towns of 200 to 999 people to the nearest two towns
- roads from national parks, major mines, gas wells and ports to the network.

31 Since the 2020 Review, some towns have grown above the 1,000 population threshold, or fallen below it, and some mines, gas wells, ports and national parks have closed while others have opened. As such, if the Commission were to recalculate the synthetic road network, it would differ from that measured in the 2020 Review. These changes are expected to drive only a very small effect on the network.

32 The Commission's preliminary view is that a repeat of the 2020 Review process of calculating a synthetic road network is not warranted. It may be possible to manually estimate the changes to the network, requiring a data request to states for the locations of any destination (mines and so on) that have closed or opened since the 2020 Review data request. Given the small effect this is likely to have, and resources required, the Commission's preliminary view is that a manual update is not warranted.

Consultation question

Q2. Do states agree that the 2020 Review synthetic rural road network should not be updated?

Are there better ways of measuring traffic volume?

33 The Commission currently sources traffic volume data from both the Bureau of Infrastructure and Transport Research Economics and the National Transport Commission. Both these datasets merge information from the now-discontinued ABS Survey of Motor Vehicle Use with other data on petrol sales, motor vehicle registrations and fleet fuel efficiency.

34 Both the Bureau of Infrastructure and Transport Research Economics and the National Transport Commission have noted that the loss of the ABS Survey of Motor Vehicle Use may decrease the reliability of traffic volume data in the future.

35 The Commission considered using the following alternative sources, but neither were considered reliable.

- Mass GPS probe data, sourced from mobile phones and a third-party private provider. This would be inflated by the data provider using Estimated Resident Population to adjust for missing data. It's uncertain how complete coverage would be in remote areas, and providers were unable to disaggregate the data by heavy vehicle use.
- State traffic count data, used as an inflator against 2018–19 ABS Survey of Motor Vehicle Use data (the last year of the ABS data prior to COVID lockdowns). This would provide disaggregated light/heavy vehicle data, but not end-to-end trip information. Furthermore, the number and location of traffic counters differs widely between states.

36 Due to the issues with the alternative data sources, the Commission's preliminary view is that the Bureau of Infrastructure and Transport Research Economics and the National Transport Commission continue to be the best data sources for traffic volume information.

Consultation question

Q3. Do states agree that traffic volume should continue to be assessed using data from the Bureau of Infrastructure and Transport Research Economics and the National Transport Commission?

Proposed assessment

Differences from the 2020 Review approach

37 Subject to receiving state comments, the Commission proposes to retain the 2020 Review approach for all components. Data for traffic volume and heavy vehicle use are affected by the cessation of the ABS Survey of Motor Vehicle Use, but no further changes are proposed.

Proposed assessment structure

38 Table 5 shows the proposed structure of the roads assessment for the 2025 Review.

Table 5 Proposed roads assessment structure, 2025 Review

Component	Driver	Influence measured by driver	Change since 2020 Review?
Rural roads	Length	Recognises that the length of the rural road network influences costs.	No
	Traffic	Recognises that traffic volume influences costs.	No (a)
	Heavy vehicles	Recognises that heavy vehicles damage roads.	No (a)
	Regional costs	Recognises the differences in the cost of providing services to different areas within a State (applied to road length only).	No
	Wage costs	Recognises the differences in wage costs between states.	No
Urban roads	Length	Recognises that the length of the urban road network influences costs.	No
	Traffic	Recognises that traffic volume influences costs.	No (a)
	Heavy vehicles	Recognises that heavy vehicles damage roads.	No (a)
	Wage costs	Recognises the differences in wage costs between states.	No
Bridges and tunnels	Length	Recognises that the length of bridges and tunnels influences cost.	No
	Heavy vehicles	Recognises heavy vehicles damage bridges and tunnels.	No (a)
	Regional costs	Recognises the differences in the cost of providing services to different areas within a State.	No
	Wage costs	Recognises the differences in wage costs between states.	No

(a) In the 2023 Update, the Commission changed this assessment due to the cessation of the ABS Survey of Motor Vehicle Use. No further change is proposed.

Source: Commission calculation.

New data requirements

39 Data on bridge and tunnel lengths will be requested from the states. For the associated investment in urban and rural roads assessment, data on the urban/rural split of gross roads capital expenditure will also be requested.

40 If the Commission updates the synthetic rural road network, states will be asked to provide data on the location of operational mines, national parks and other key landmarks.

Consultation

41 The Commission welcomes state views on the consultation questions identified in this paper (outlined below) and the proposed assessment. State submissions should accord with the 2025 Review framework. States are welcome to raise other relevant issues with the Commission.

Q1. Do states support retaining the 2020 Review method of assessing urban road length, using population as the driver for large towns?

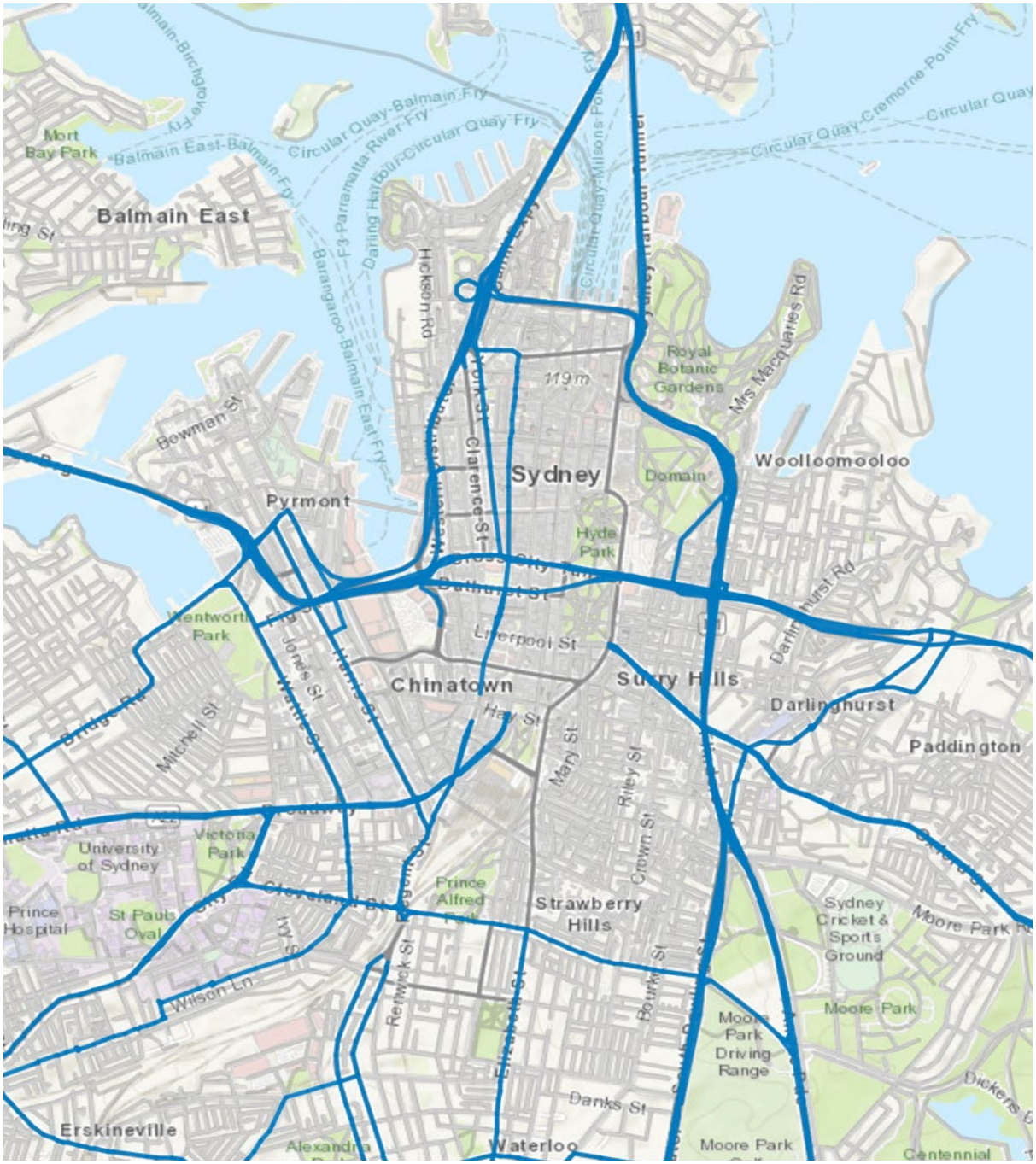
Q2. Do states agree that the 2020 Review synthetic rural road network should not be updated?

Q3. Do states agree that traffic volume should continue to be assessed using data from the Bureau of Infrastructure and Transport Research Economics and the National Transport Commission?

Attachment A – State-type roads

Sydney

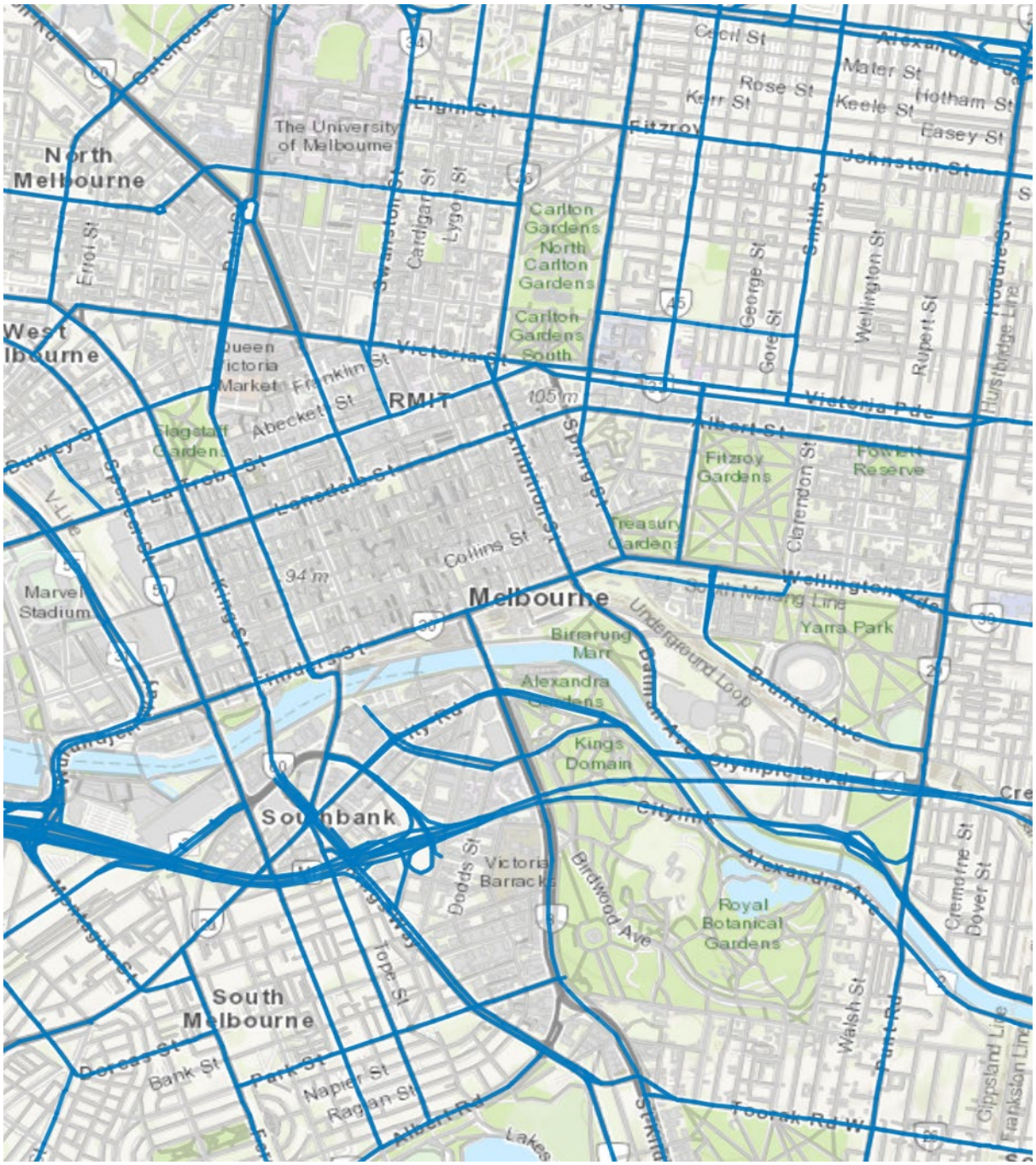
Figure A-1 State-type roads, Sydney



Source: Geoscience Australia, National Roads, Digital Atlas website, 2023, accessed 28 Aug 2023.

Melbourne

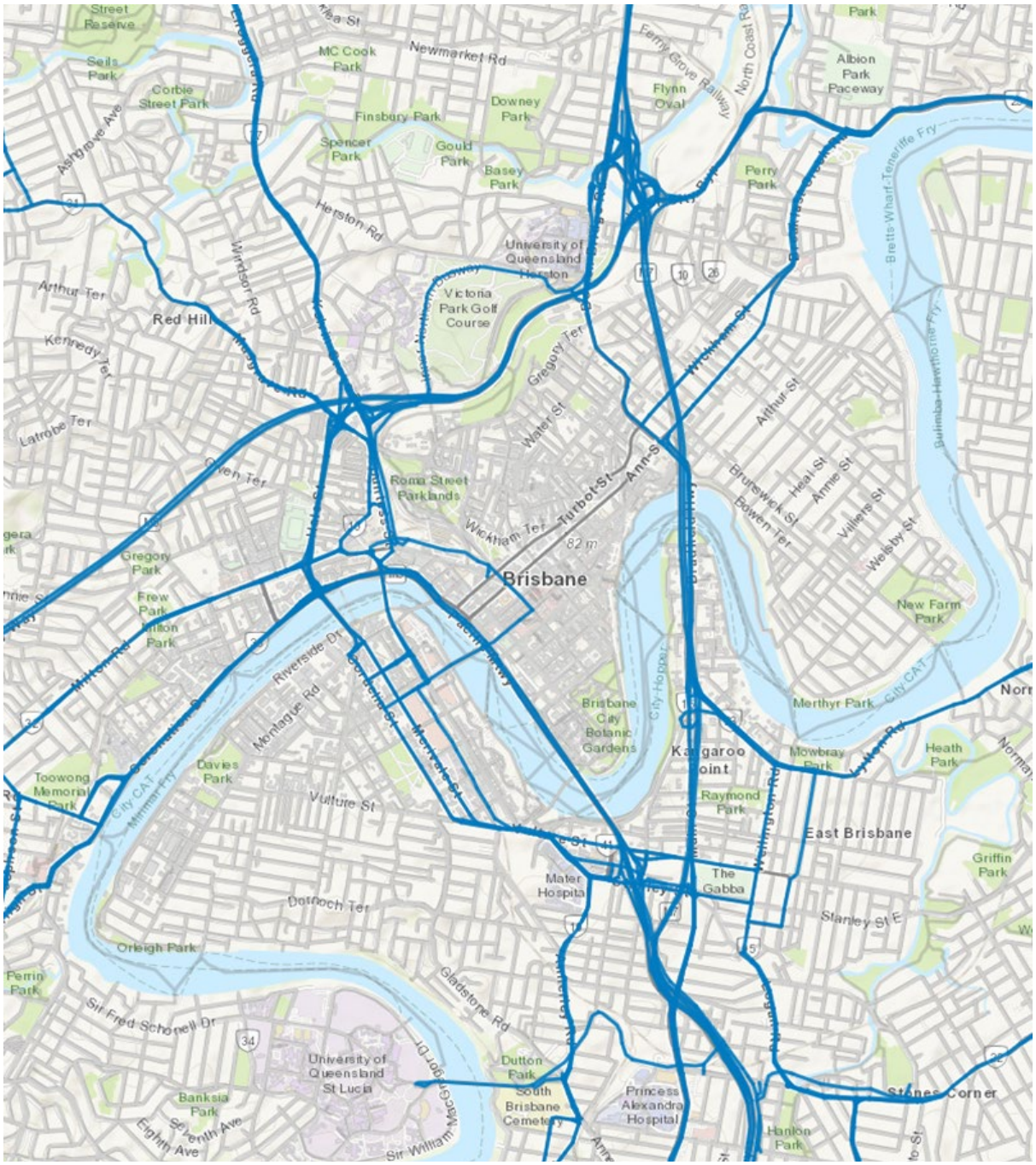
Figure A-2 State-type roads, Melbourne



Source: Geoscience Australia, National Roads, Digital Atlas website, 2023, accessed 28 Aug 2023.

Brisbane

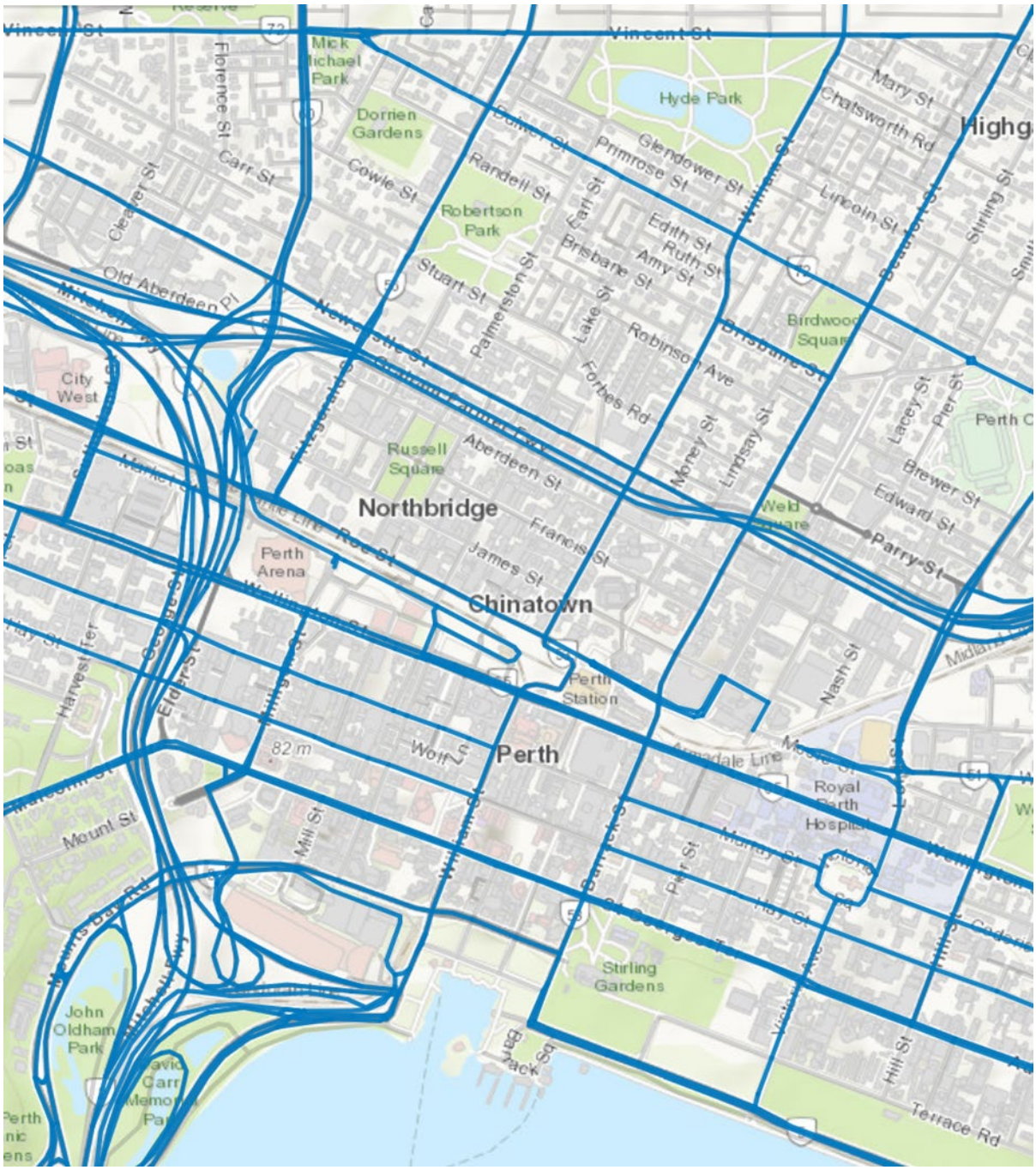
Figure A-3 State-type roads, Brisbane



Source: Geoscience Australia, National Roads, Digital Atlas website, 2023, accessed 28 Aug 2023.

Perth

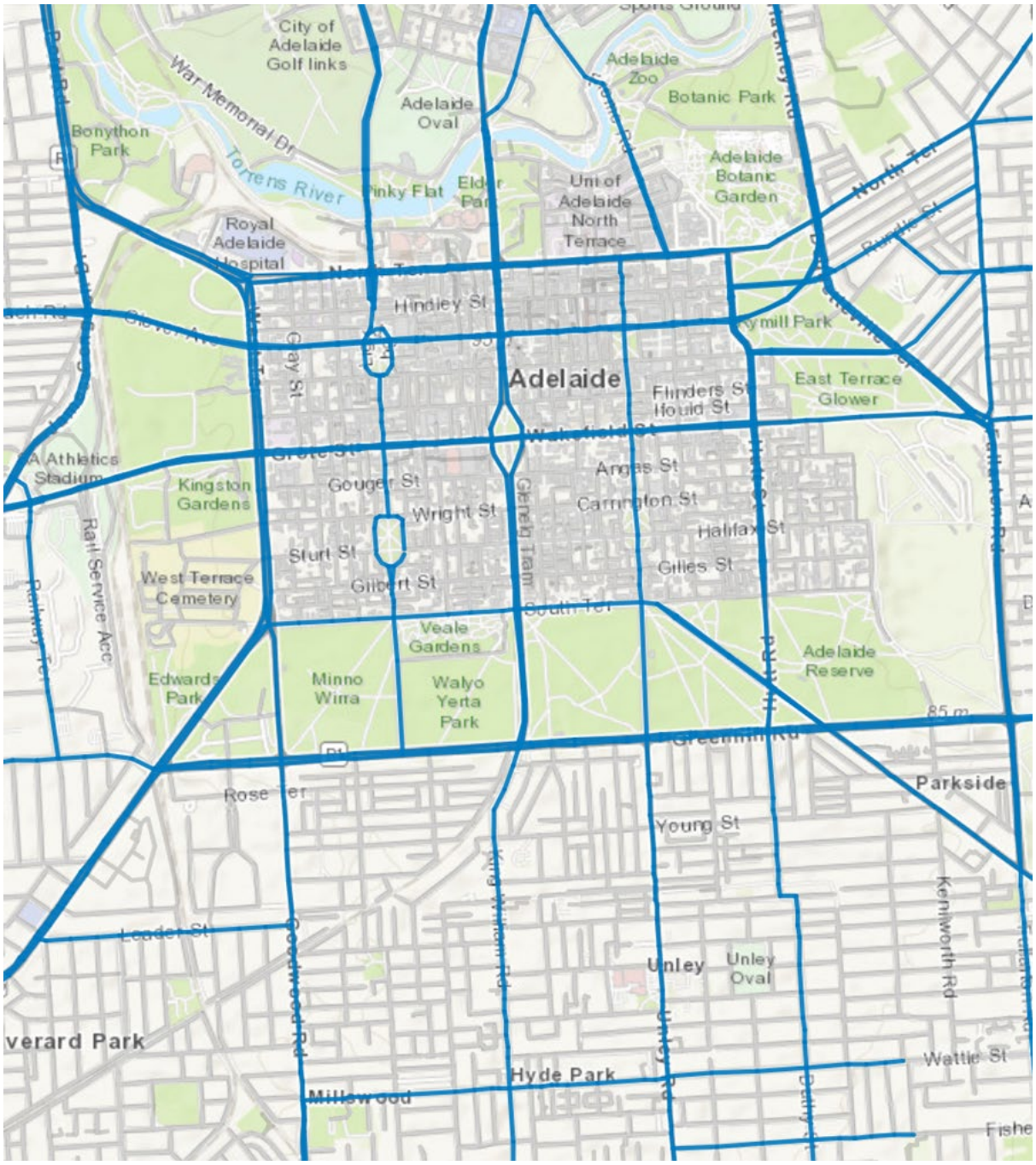
Figure A-4 State-type roads, Perth



Source: Geoscience Australia, National Roads, Digital Atlas website, 2023, accessed 28 Aug 2023.

Adelaide

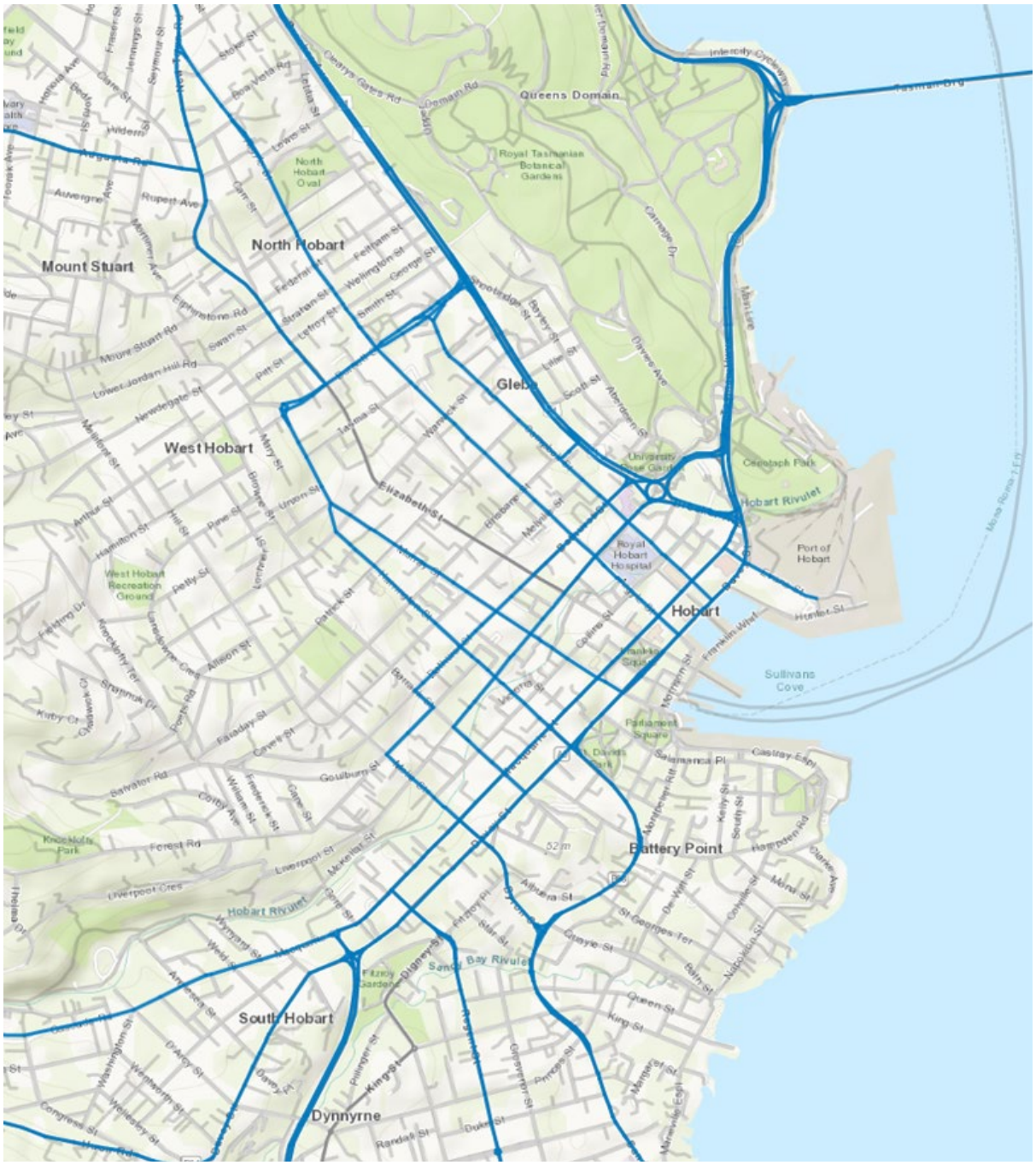
Figure A-5 State-type roads, Adelaide



Source: Geoscience Australia, National Roads, Digital Atlas website, 2023, accessed 28 Aug 2023.

Hobart

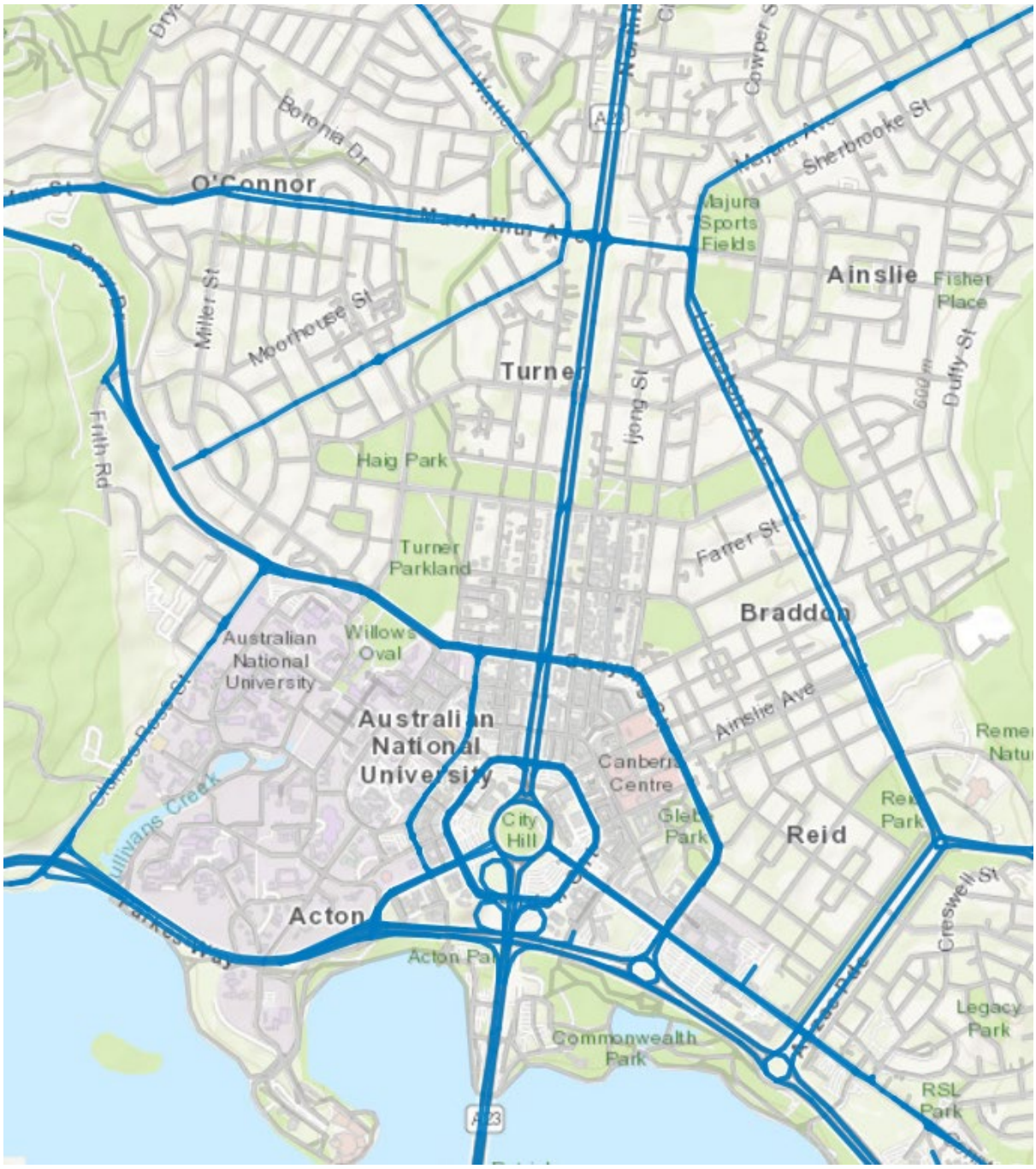
Figure A-6 State-type roads, Hobart



Source: Geoscience Australia, National Roads, Digital Atlas website, 2023, accessed 28 Aug 2023.

Canberra

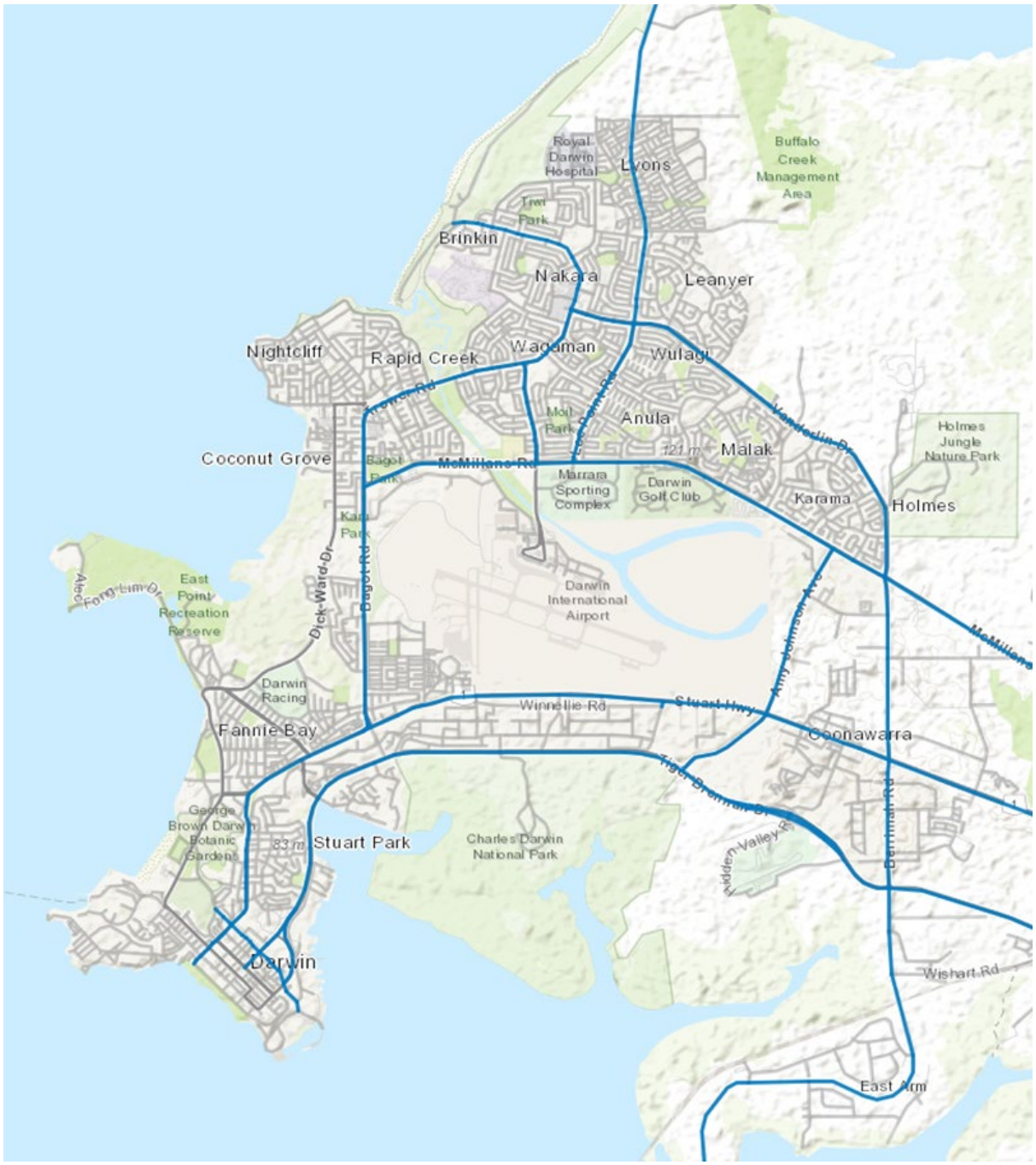
Figure A-7 State-type roads, Canberra



Source: Geoscience Australia, National Roads, Digital Atlas website, 2023, accessed 28 Aug 2023.

Darwin

Figure A-8 State-type roads, Darwin



Source: Geoscience Australia, National Roads, Digital Atlas website, 2023, accessed 28 Aug 2023.