

Roads

Overview

- 1 The roads assessment covers state and territory (state) recurrent spending on the maintenance of roads, bridges, tunnels and other related services. It has the following components:
 - rural roads
 - urban roads
 - bridges and tunnels.
- 2 The assessment recognises that roads expense needs are influenced by the following.
 - Longer road networks — states with longer roads will have higher spending needs.
 - Greater traffic volumes — states with more traffic will face higher spending on traffic control and safety measures, such as signage and traffic lights.
 - Greater heavy vehicle use — states with greater heavy vehicle use need to spend more as this increases pavement wear and tear, requiring maintenance to restore the pavement.
 - Longer bridge and tunnel lengths — states with more bridges and tunnels need to spend more on maintenance and repairs as these structures are more expensive to build and maintain than regular roads.
 - Remoteness of the rural road network — states with a higher proportion of the rural road network in more remote areas will have higher spending needs.
 - Wage costs — states facing greater wage cost pressures have higher spending needs.

Actual state expenses

- 3 The first step in calculating assessed expenses is identifying actual state expenses.¹ States collectively spent 3.7% of their total recurrent expenses on roads in 2022-23 (Table 1). Table 1 shows expenses broken down by component and Table 2 outlines actual expenses by state in 2022–23.²
- 4 Recurrent expenses include state spending on roads funded through the maintenance portion of the Infrastructure Investment Program for roads (around 3% of payments under this program, or \$350 million in 2022–23). The remaining payments are assessed in the investment category, with 50% of national network

¹ Adjusted budget calculations use ABS Government Financial Statistics data to determine actual state expenses. For further details see the adjusted budget chapter of the *Commission's Assessment Methodology*.

² Tables in this chapter, unless otherwise stated, use 2022–23 data.

payments and their related expenditure removed from the adjusted budget and 50% assessed by applying state needs for roads investment.³

Table 1 Roads expenses by component, 2022–23

	2022-23	
	\$pc	\$m
Rural roads	206	5,409
Urban roads	199	5,247
Bridges and tunnels	28	735
Total	433	11,391
Proportion of total expenses (%)		3.7

Table 2 Roads expenses by state, 2022–23

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Roads (\$m)	5,273	2,832	1,477	1,242	201	170	96	100	11,391
Roads (\$pc)	639	422	274	438	109	296	208	400	433
Proportion of total expenses (%)	5.3	3.6	2.5	3.7	1.1	2.4	1.5	1.7	3.7

Structure of assessment

5 Table 3 outlines the drivers that influence expenses in each component.

Table 3 Structure of the roads assessment

Component	Driver	Influence measured by driver
Rural roads	Length	The length of the road network influences costs.
	Traffic	Traffic volume influences costs.
	Heavy vehicles	Heavy vehicles damage roads and affects costs.
	Regional costs (a)	The cost of providing services increases as the level of remoteness increases.
	Wage costs	Differences in wages between states affect costs.
Urban roads	Length	Large cities require more roads.
	Traffic	Traffic volume influences costs.
	Heavy vehicles	Heavy vehicles damage roads and affects costs.
	Wage costs	Differences in wages between states affect costs.
Bridges and tunnels	Length	The length of bridges and tunnels influences costs.
	Heavy vehicles	Heavy vehicles damage bridges and tunnels and affect costs.
	Regional costs (a)	The cost of providing services increases as the level of remoteness increases.
	Wage costs	Differences in wages between states affect costs.

(a) Applied to rural road lengths and bridge and tunnel lengths only.

³ Commonwealth payments for National Network Roads are assessed 50% as not having an impact on GST because roads and transport infrastructure projects can have national objectives related to the efficient movement of people and goods, which the Commission's assessments do not capture.

Data

6 The data used in the assessment are outlined in Table 4.

Table 4 Data used in the roads assessment

Source	Data	Updated	Component
States	Bridge and tunnel lengths	5-yearly during methodology reviews	Bridges and tunnels
National Transport Commission	Expenses by state	Annually	All components; weights each component
	Heavy vehicle cost allocation	5-yearly during methodology reviews ^(a)	All components; distributes expenses between sub-components
	Traffic trend data	Last updated with 2019–20 data ^(b)	Splits urban/rural traffic and heavy vehicle use
Bureau of Infrastructure, Transport and Regional Economics	Road use data	Annually	All components; traffic and heavy vehicle use
ABS	Urban population	Annually	Urban road length
Pitney Bowes	Synthetic rural road network	Last updated during the 2020 Review	Rural road length

(a) The National Transport Commission reviewed its heavy vehicle cost allocation structure in 2021–22 but did not change it, therefore the allocation proportions used in the 2025 Review are the same as per the 2020 Review.

(b) Traffic trend data was based on the ABS' *Survey of Motor Vehicle Use*, which was discontinued after 2019–20. See paragraphs 19 to 21 for more detail.

Note: Data for the wage costs adjustment are also included in this assessment.

The adjusted budget data sources are outlined in the adjusted budget chapter of the *Commission's Assessment Methodology*.

Assessment method

Allocating expenses by component and driver

- 7 National Transport Commission data are used to apportion total roads expenses between components (rural roads, urban roads and bridges and tunnels); and between the drivers of cost (road length, traffic volume and heavy vehicle use).
- 8 Urban roads refer to the state road network within urban centres of 40,000 or more people, based on the National Transport Commission definition. Rural roads are other state roads.
- 9 Table 5 shows the National Transport Commission reported expenses and attribution. These data are used to allocate state spending to the 3 components (rural roads, urban roads and bridges and tunnels) and across the 3 drivers for each of these components.

Table 5 National Transport Commission state expenses by purpose, 2022–23

NTC expense categories	Total spend, 2022–23				Allocation to driver		
	Rural \$m	Urban \$m	Bridges and tunnels \$m	Total \$m	Road length %	Road traffic volume %	Road heavy vehicle use %
A: Servicing and operating	912	586	0	1,498	0	100	0
B: Road pavement and shoulder construction							
B1: Routine maintenance	536	353	0	889	24	38	38
B2: Periodic surface maintenance	606	417	0	1,023	30	10	60
C: Bridge maintenance/rehabilitation (a)	0	0	537	537	67	0	33
D: Road rehabilitation	855	1,178	0	2,034	55	0	45
E: Low-cost safety/traffic	775	1,027	0	1,802	0	100	0
G: Other miscellaneous activities							
G1: Corporate services	507	490	72	1,069	(b)	(b)	(b)
G2: Enforcement of heavy vehicle regulatory costs	79	76	0	154	0	0	100
G3: Vehicle registration	195	188	28	410	(b)	(b)	(b)
G4: Driver licensing	126	122	18	266	(b)	(b)	(b)
H: Other road-related payments							
H3: Spending on local access roads in unincorporated areas	25	24	0	50	(b)	(b)	(b)
H4: Direct spending on council managed local access roads	575	555	0	1,130	(b)	(b)	(b)
H5: Any other direct state spending on local access roads	79	76	0	155	(b)	(b)	(b)
Total	5,271	5,091	655	11,017			

(a) Spending on tunnels also falls under this category.

(b) Spending on most miscellaneous services and local roads are allocated between drivers in the same proportion as the total for other National Transport Commission expense categories.

Source: National Transport Commission (NTC), *State roads expenditure data 2022–23* [unpublished data set], NTC, 2023.

10 The allocated drivers for each National Transport Commission expense category are summed to estimate a total spend across 9 subcomponents (Table 6). These shares of spending are applied to total spending on roads.

Table 6 Shares of spending by component and driver, 2022–23

	Length	Traffic volume	Heavy vehicle use	Total
	%	%	%	%
Rural roads	9.9	24.8	13.1	47.8
Urban roads	10.9	22.7	12.6	46.2
Bridges and tunnels	4.0	0.0	2.0	5.9
Total	24.8	47.5	27.6	100.0

Source: NTC, *State roads expenditure data 2022–23*.

Rural roads

- 11 The assessment of rural roads recognises the influence of road length, traffic volume, and heavy vehicle use of state spending needs.

Rural road length

- 12 To achieve a policy neutral estimate of the length of the state road network outside urban centres of 40,000 or more, the Commission developed an assessed (or synthetic) rural state road network. This used an algorithm that measured rural roads by connecting all ABS Urban Centres and Localities, and connecting mines and gas wells to their nearest port, and connecting ports and national parks to their nearest locality.
- 13 The algorithm was run using 2018 data across the Pitney Bowes routable 'RouteFinder Links' dataset using its RouteFinder software to select the appropriate roads for inclusion. This dataset includes all accessible roads regardless of whether states classify them as state or local roads.⁴
- 14 All areas in Australia were allocated to the nearest urban centre. The centres with over 1,000 people were connected to all adjacent centres of over 1,000 people using the fastest driving route.⁵ All localities of between 200 and 1,000 people were connected to the nearest 2 urban centres of over 1,000 people by the fastest route. These small centres were connected to 2 larger centres because on average, state road data indicated that small urban centres had 1.8 connections to other centres.
- 15 Roads on the synthetic road network were assumed to have 2 lanes, unless state data indicated they had more, in which case actual lane numbers were used.
- 16 Table 7 shows the measures of rural road lane-kilometres for the 2025 Review.

Table 7 Estimated rural road lane-kilometres, 2025 Review

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
	km	km	km	km	km	km	km	km	km
Roads between towns	68,110	38,665	64,478	46,283	27,294	7,567	183	27,346	279,926
To ports	13	44	240	517	224	71	0	116	1,224
To mines	668	382	3,424	4,110	1,191	0	0	677	10,452
To national parks	6,985	1,496	13,913	3,894	2,597	1,035	162	1,177	31,260
Additional lanes	1,627	555	527	532	512	192	21	188	4,155
Total	77,402	41,142	82,582	55,336	31,819	8,865	366	29,505	327,017

Note: The rural road network assumes 2 lanes per road. The length of additional lanes was added using state-provided data. Source: Pitney Bowes, *Routefinder Networks Australia 2018.05* [unpublished data set], Pitney Bowes, 2018; and state data.

⁴ Four-wheel drive roads, restricted access roads and access roads to private property were not considered to be broadly accessible and were excluded.

⁵ The fastest route was found by attributing a speed limit of 80 kilometres per hour to connector and local roads. Highways and motorways were assigned their actual speed limits.

Traffic volume

- 17 The National Transport Commission recognises that traffic volume has an impact on the cost of maintaining roads. Roads with expected high traffic volumes are usually built to higher standards and cost more to maintain. Roads with high traffic volumes also have a higher level of traffic control and safety measures (such as signage, traffic lights and worker protection requirements during maintenance work).
- 18 Estimates of the share of vehicle kilometres travelled on arterial roads that are in urban and rural areas are derived from National Transport Commission data for each state. These shares are applied to the Bureau of Infrastructure, Transport and Regional Economics estimates of total vehicle kilometres travelled in each state to estimate urban and rural vehicle kilometres travelled in each state.
- 19 These traffic volume data were based on the ABS' Survey of Motor Vehicle Use. This survey was a major source for traffic data but has been discontinued by the ABS. The survey was last completed for 2019–20.
- 20 Due to the discontinuation of the survey, the National Transport Commission no longer provides traffic data split by rural and urban traffic. The road assessment uses the trend rural/urban traffic split calculated from the time series of surveys of motor vehicle use over the 7 years to 2019–20. Traffic data by vehicle type from the Bureau of Infrastructure and Transport Research Economics will continue to be updated annually. This will be based on historical Survey of Motor Vehicle Use data, smoothing techniques and additional data sources including fuel sales, motor vehicle registrations and fleet fuel efficiency.
- 21 The Bureau of Infrastructure and Transport Research Economics is investigating possible replacements for the Survey of Motor Vehicle Use. If the Commission finds these data fit for purpose in consultation with states, it may use them as the most reliable estimates of urban and rural traffic.
- 22 Rural traffic volume by state is shown in Table 8.

Table 8 Traffic volume in rural areas by state, 2022-23

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Rural traffic volume ('000 vehicle kilometres travelled)	12,135	9,180	8,631	4,966	3,910	1,097	0	570	40,488
State share of traffic (%)	30.0	22.7	21.3	12.3	9.7	2.7	0.0	1.4	100.0

Source: Bureau of Infrastructure, Transport and Regional Economics (BITRE), *Vehicle Kilometres Travelled 2023 estimates* [unpublished data set], BITRE, 2023; and National Transport Commission (NTC), *State roads trend data, 2020–21* [unpublished data set], NTC, 2021.

Heavy vehicle use

- 23 The National Transport Commission recognises in its cost allocation matrix that heavy vehicles cause more wear and tear to roads than cars, although average weights of passenger vehicles have been trending upwards over time. There are also regulatory costs associated with heavy vehicle use.

- 24 Total tonne-kilometres are estimated by applying National Transport Commission average gross mass values of articulated trucks and other heavy vehicles to the kilometres travelled by that class of vehicle in each state. As with the traffic volume measure, the heavy vehicle travel data have been adjusted to remove travel on local roads and to split the data between urban and rural roads. The heavy vehicle use in rural areas is shown in Table 9.

Table 9 Heavy vehicle use in rural areas by state, 2022–23

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Rural heavy vehicle use (million tonne km)	52,341	34,650	38,195	28,108	20,388	4,250	0	2,832	180,763
Share of heavy vehicle use (%)	29.0	19.2	21.1	15.5	11.3	2.4	0.0	1.6	100.0

Source: BITRE, *Vehicle Kilometres Travelled 2023 estimates*; and NTC, *State roads trend data, 2020–21*.

Applying regional costs

- 25 The Rawlinsons construction cost gradient is used to reflect the different cost of maintenance in different remoteness areas. Due to generalising from general construction costs to road maintenance, a 25% discount is applied to the Rawlinsons regional cost gradient, and the gradient is only applied to rural road length. As there are no comprehensive data on the distribution of rural traffic volumes and heavy vehicle use across remoteness areas, these elements do not have a regional cost weight applied to them.

Applying wage costs

- 26 Wages costs are a significant share of the total cost of maintaining roads. Differences in wage costs between states have a differential effect on the cost of rural road maintenance. The roads assessment uses the Commission’s general method for measuring the influence of wage costs. Details on how this is calculated are in the wage costs chapter of the *Commission’s Assessment Methodology*.

Urban roads

- 27 Like rural roads, the assessment of urban roads recognises the cost of road length, traffic volume, and heavy vehicle use. The relative importance of these drivers is shown in Table 6.

Urban road length

- 28 State populations within urban centres of 40,000 or more people are used as a proxy for urban road lengths. This geography matches the geography used by the Bureau of Infrastructure, Transport and Regional Economics and the National Transport Commission. Table 10 shows the state shares of urban population.

Table 10 Population in urban centres of 40,000 people or more, December 2022

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Urban population ('000)	6,763	5,723	4,482	2,369	1,397	365	460	130	21,690
Total population ('000)	8,246	6,717	5,385	2,832	1,836	572	461	251	26,300
Urban proportion of state (%)	82.0	85.2	83.2	83.7	76.1	63.8	99.7	52.0	82.5

Source: Australian Bureau of Statistics, *Estimated resident population December 2022*, ABS, 2024, accessed 1 August 2024.

Traffic volume

29 Traffic volume data are sourced from the Bureau of Infrastructure, Transport and Regional Economics using the same methods as for rural roads. Table 11 shows urban traffic volume by state.

Table 11 Traffic volume in urban areas by state, 2022–23

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Urban traffic volume ('000 vehicle kilometres travelled)	36,065	32,857	27,406	14,103	6,837	2,222	2,568	824	122,882
State share of traffic (%)	29.3	26.7	22.3	11.5	5.6	1.8	2.1	0.7	100.0

Source: BITRE, *Vehicle Kilometres Travelled 2023 estimates*; and NTC, *State roads trend data, 2020–21*.

Heavy vehicle use

30 Urban heavy vehicle use by state is calculated using the same methods as for rural heavy vehicle use. The results are shown in Table 12.

Table 12 Heavy vehicle use in urban areas by state, 2022–23

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Urban heavy vehicle use (million tonne kilometres)	84,727	65,183	58,777	24,519	12,844	4,430	1,629	1,523	253,632
Share of heavy vehicle use (%)	33.4	25.7	23.2	9.7	5.1	1.7	0.6	0.6	100.0

Source: BITRE, *Vehicle Kilometres Travelled 2023 estimates*; and NTC, *State roads trend data, 2020–21*.

Applying regional costs

31 The Commission does not apply a separate regional costs factor to urban roads expenses because there is no clear conceptual case that the location of major urban centres with more than 40,000 people would affect the cost of road maintenance.

Applying wage costs

32 Wages costs are a significant share of the total cost of maintaining roads. Differences in wage costs between states have a differential effect on the cost of urban road maintenance. The roads assessment uses the Commission's general method for measuring the influence of wage costs. Details on how this is calculated are in the wage costs chapter of the *Commission's Assessment Methodology*.

Bridges and tunnels

- 33 Bridges and tunnels cost significantly more to build and maintain than roads. They are required because of topological features such as waterways and changes in elevation. States also respond to safety issues and the complexity of their road and rail networks by building bridges and tunnels over or under other sections of the networks to avoid intersections. The total length of these structures is a primary driver of bridge and tunnel expenses.
- 34 Other influences on bridge and tunnel maintenance expenses and investment are the size of a state's road network, which increases the likelihood of bridges and tunnels, and traffic volume (including heavy vehicle use), which influences the type and size of bridges and tunnels and the maintenance costs.

Bridge and tunnel lengths

- 35 Bridge and tunnel lengths are measured by using actual lengths of bridges and tunnels managed by states, using state-provided data. Only structures of at least 4 metres in length are included to ensure comparability across datasets. These lengths are shown in Table 13.

Table 13 Bridge and tunnel lengths by state, 2024

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
	km	km	km	km	km	km	km	km	km
Bridges	221,673	136,892	196,549	55,296	31,618	23,518	12,047	13,663	691,257
Tunnels	578	21	549	1,660	1,040	0	190	0	4,037
Total	222,251	136,913	197,098	56,956	32,658	23,518	12,237	13,663	695,294
Shares (%)	32.0	19.7	28.3	8.2	4.7	3.4	1.8	2.0	100.0

Source: State data.

- 36 The assessment does not account for differences in bridge and tunnel size and complexity. Given the variability in structure descriptions at this level of detail, it is not clear how such differences could be reliably measured.

Heavy vehicle use

- 37 The assessment of heavy vehicle use rates for bridges and tunnels uses total tonne-kilometre data for both urban and rural roads. These data are shown in Table 14.

Table 14 Estimated total heavy vehicle use by state, 2022–23

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Total heavy vehicle use (million tonne kilometres)	137,068	99,833	96,971	52,626	33,232	8,680	1,629	4,354	434,394
Share of heavy vehicle use (%)	31.6	23.0	22.3	12.1	7.7	2.0	0.4	1.0	100.0

Source: BITRE, *Vehicle Kilometres Travelled 2023 estimates*.

Applying regional costs

- 38 As with the rural roads component, the Commission applies the Rawlinsons regional cost gradient, with a 25% discount, to bridge and tunnel length expenses based on the length of bridges and tunnels by remoteness regions.

Applying wage costs

- 39 Wages costs are a significant share of the total cost of maintaining roads, bridges and tunnels. Differences in wage costs between states have a differential effect on the cost of bridge and tunnel maintenance. The roads assessment uses the Commission's general method for measuring the influence of wage costs. Details on how this is calculated are in the wage costs chapter of the *Commission's Assessment Methodology*.

Discounting the assessment

- 40 The Commission considers there is a conceptual case for the drivers in the road assessment, although given data limitation, there are uncertainties with some aspects of the assessment. The Commission is concerned with the reliability of:
- the synthetic rural road network as a reflection of state rural road length needs
 - heavy and light vehicle traffic volume data
 - the relative importance of road length, heavy and light vehicle traffic as drivers of expense needs
 - the comprehensiveness of major drivers of differences in spending need.
- 41 Given the range of uncertainties, the Commission considers a discount of the assessment is warranted. Using a discount moves the assessment closer to equal per capita. The level of discount applied requires judgement, and across the Commission's assessments range from 12.5% to 25% depending on the level of uncertainty (discussed in the fiscal equalisation, supporting principles and assessment guidelines chapter of *Review Outcomes*). In relation to the roads assessment, the level of uncertainty is relatively low and the Commission considers a discount of 12.5% is appropriate. This discount is in addition to the 25% discount already applied to the Rawlinsons regional cost gradient, used in the assessment of rural road length and bridges and tunnels length.

GST distribution in the 2025 Review

42 Table 15 shows the GST impact of the assessment in the 2025 Review.

Table 11 GST impact of the roads assessment, 2025–26

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total effect
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Rural roads	-198	-373	109	226	168	20	-96	144	667
Urban roads	-30	39	82	10	-68	-20	1	-15	132
Bridges and tunnels	1	-40	48	-8	-11	6	-4	8	62
Total (\$m)	-227	-374	240	229	90	5	-99	137	700
Total (\$pc)	-26	-52	42	75	47	9	-205	532	25

Note: Magnitude and direction of GST impact can change from year to year.