

## CHAPTER 17

### ROADS

#### WHAT IS INCLUDED IN THE ROADS CATEGORY?

- 1 The Roads category comprises expenses on the maintenance and rehabilitation of roads, bridges and tunnels, as well as recurrent expenses on road safety, traffic management and other transport activities (such as driver licensing, motor vehicle registration, heavy vehicle regulation and road transport planning administration). Roads depreciation expenses are assessed in the Depreciation category. Road construction expenses are assessed in the Investment category.
- 2 Roads category expenses totalled \$5.9 billion in 2008-09 (Table 17-1).

**Table 17-1 Roads category expenses, 2008-09**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Category expense (\$m)	2 061.3	1 495.2	1 210.8	602.4	217.6	115.0	48.3	126.0	5 876.6
Total (\$pc)	292.74	278.70	278.38	273.31	135.00	229.96	138.92	568.34	271.54
Proportion of State operating expense (%)	4.1	3.8	3.3	3.2	1.6	2.6	1.4	3.1	3.4

Source: Commission calculation using State data.

- 3 Table 17-2 shows that, on average, the Roads category represented around 3.3 per cent of State expenses between 2005-06 and 2008-09.

**Table 17-2 Roads expenses as a proportion of total expenses**

	2005-06	2006-07	2007-08	2008-09
Total for category (\$m)	4 134.0	4 532.7	5 281.1	5 876.6
Total operating expenses (\$m)	134 969.0	146 359.0	157 538.0	171 074.5
Proportion of total operating expenses (%)	3.1	3.1	3.4	3.4

Source: Commission calculation using ABS GFS and State data.

### **The average service delivery policy**

- 4 States build and maintain roads for the purpose of moving people and goods within and between States. The primary drivers of road expenses are the length and use of the roads.
- 5 Differences between States in the length of their road networks reflect their different geography and settlement patterns. For example, the ACT's network comprises mostly roads within the Canberra urban area with a small length of roads connecting Canberra to New South Wales. By contrast, Queensland has a large road network. It has a large network of urban roads because of its many urban population centres. Since these centres are scattered across a large land area, it also has a large network of rural roads connecting them.
- 6 State policy choices on the number of alternate routes between urban centres and the degree to which States give responsibility for roads to local government may also affect the length of State roads. However, a policy neutral measure of road length would reflect the application of a common set of these policies to all States.
- 7 State road expenses are also influenced by the use of their road networks. The impact of heavy vehicle use on road expenses has been well documented. The National Transport Commission (NTC) conducts regular inquiries into the cost of heavy vehicle use.
- 8 Population density also affects the cost of roads. Roads in densely populated urban areas carry large volumes of traffic, much of which is moving within the urban area itself. Hence, the cost of maintaining urban roads is likely to differ from that of maintaining rural roads — the latter may span large distances but carry relatively smaller traffic volumes.

### **What is the role of the Commonwealth Government?**

- 9 All three levels of government are involved in road funding. States own and are responsible for managing major roads (including highways), which connect localities within the State and connect the State to other States. Roads of lesser significance in both urban and rural areas are typically the responsibility of local governments. However, States decide which roads are State roads and which are local roads and those decisions differ between States. In some areas (usually sparsely populated ones), States have no choice but to manage roads that would normally be classified as local roads. This is typically because a local government does not exist or because it does not have the financial capacity to support those roads.
- 10 The Commonwealth Government provides funding for some of these roads. Commonwealth funding and our treatment of it is shown in Table 17-3. The chapter on the Adjusted budget discusses the reasons for the treatment of this funding.

**Table 17-3 Commonwealth payments to States relevant to the Roads category and their treatment**

Payments affecting relativities	Payments not affecting relativities
Nation building program (formerly Auslink) maintenance: National network maintenance; Strategic regional program (State government roads payment); Black spots program (State government roads payments); Heavy vehicles program.	Nation building program (formerly Auslink): Roads to recovery (Local government payments); Roads to recovery (State payments for unincorporated areas); Strategic regional program (Local government payments); Black spots program (Local government payments); Innovation and research program. Identified local roads grants for local government Supplementary road funding to South Australia National Road Safety Council contribution
Other payments Interstate road transport (this payment is assessed as a motor tax)	

Note: Programs that have been replaced by other programs included in this table are treated the same way. The Report chapter on Infrastructure discusses the treatment of Commonwealth payments for Roads capital.

Source: Commonwealth of Australia, Budget Paper No. 2, Expense Measures, 2009-10; and Commonwealth of Australia Budget Paper No.3, 2009-10.

## ASSESSMENT APPROACH

### Overview

- 11 The roads assessment has been built using a process of identifying and measuring the specific factors that influence State spending on roads, such as road length and road use, and then combining them appropriately to ensure there is no double counting.
- 12 Our assessment also allows for: interstate and regional differences in the price of some inputs used in providing the services (such as employee wages and other inputs); differences in diseconomies of small scale in administrative tasks; expenses stemming from the Commonwealth's Native title and land rights legislation; and Canberra's role as the national capital. Separate chapters provide details of how these common factors are assessed.

### Factors affecting the size of the road maintenance task

#### Road length

- 13 The NTC and States advised that a certain amount of road deterioration occurs because of factors such as the impact of weather and sunlight on the road surface and substrate, even if roads were not used. The Commission concluded that a proportion of road maintenance and replacement costs is attributable solely to the total length of roads a State needs to maintain.

- 14 The Commission also concluded it is necessary to sub-divide road lengths according to whether they were in urban or rural areas. This is because information from the NTC and the ABS<sup>1</sup> indicated road functions, expenses and use differ between urban and rural areas.
- 15 While States accepted road length affected their expenses, they had different views on which types of road expenses arose solely because of road length.
- 16 *Measuring rural road length.* While it should be relatively easy to obtain measures of State road lengths, there are long-standing difficulties obtaining data that are reliable and comparable across States. The readily available data are prepared by each State's road authority which primarily prepares the data for its own purposes. The data from States are unsuitable for interstate comparisons because they are affected by differences between States in the way they classify roads, their policies on where roads will be built and their policies on the allocation of responsibility for roads between the State and local governments.
- 17 In the 2005 Update report the Commission raised concerns about the comparability of the road length data provided by States. The concerns were affirmed by the ABS when it reviewed data used by the Commission. Because of these concerns, the Commission froze the road length data at their 2004 Review levels. Since then, we have been unable to resolve difficulties with the State data and have investigated alternative ways of measuring road length. In December 2006 we engaged a consultant to develop a reliable and comparable measure of State managed roads.
- 18 The consultant developed a comparable measure of the length of State managed rural roads in each State using a mapping algorithm. This algorithm applied a uniform policy on where States build roads and the State-local government division of responsibility. Specifically, State managed roads were defined as existing roads connecting localities larger than 400 people by the fastest route. A State's rural road length was the sum of its mapped roads. This concept of State managed roads applied by the Commission was developed and refined in close consultation with States through the data working party and the roads working party. The algorithm adopted was progressively refined as a result of State comments on preliminary results.
- 19 Technically, the size of the road maintenance task is more accurately measured on the basis of lane-kilometres, because this measure includes the relative width of roads. However, the mapping approach was able to measure rural roads on the basis of road length only, which implicitly assumes the average road width is similar across the States. The Commission observed that, in the Austroads publication *Roadfacts 2005*, the average number of lanes on rural roads was similar for all States (the total rural lane kilometres divided by the total kilometres). We decided mapped length in kilometres was an appropriate broad indicator of the length of State managed rural roads. The measure of rural road lengths obtained using the

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<sup>1</sup> State expense data reported to the NTC show that in 2007-08, nearly 60 per cent of State roads spending was directed to urban roads even though their length is only about 20 per cent of rural roads. ABS data on road use shows that over 70 percent of the total vehicle kilometres travelled is in urban areas.

mapping approach was first used by the Commission in the 2008 Update. It was recalculated in January 2009 for the 2010 Review, using 2006 Census data, the most current roads dataset and rural boundaries based on the ABS *Survey of Motor Vehicle Use* (SMVU)<sup>2</sup>.

- 20 Most States supported the mapping approach, but a few did not. New South Wales was not convinced it worked. It preferred that the Commission use State reported lengths. It questioned whether the mapping approach could produce a reliable measure for rural roads given that it did not reliably measure urban roads. It said that, consistent with the Commission's guidelines for dealing with data, if the mapping approach was to be used, the resulting rural lengths should be discounted.
- 21 The Commission has decided to use the data on State managed rural roads produced by the mapping approach. We consider the mapped data are a reliable, policy neutral measure of the State road task which, unlike the State reported data, apply a common classification and policy framework to the road networks in each State. The outcome of applying the mapping approach to urban roads does not have implications for rural roads because the circumstances of urban and rural road networks are different, as are the algorithms that measure them.
- 22 *Dissecting rural roads into unsealed and sealed roads.* Rural roads may be sealed or unsealed. State policies appear to vary on when to seal a road. There is some relationship with traffic volume but other factors such as physical environment were said by some States to influence the decision (for example, some roads which are subject to high rainfall are more likely to be sealed).
- 23 The types of roads that are unsealed and the costs of maintaining them vary considerably from State to State. However, it was generally accepted that unsealed roads had lower maintenance costs than sealed roads and that allowing for those cost differences and interstate differences in the proportion of unsealed roads would have a material effect on the GST distribution.
- 24 The Commission, therefore, sought information from the States on the difference in maintenance costs for sealed and unsealed roads and which roads were unsealed. Queensland was concerned that State cost data might not be comparable. The weighted average cost per kilometre of unsealed roads for all States was 44 per cent of sealed roads. The State data are influenced by the impact of road use, which is separately assessed. Removing the effect of road use would increase the relative cost of unsealed roads because more of the cost of sealed roads relates to use<sup>3</sup>. We have exercised our judgment to set the cost of maintaining a kilometre of unsealed roads at half that of a sealed road.
- 25 The Commission also sought a comparable measure of unsealed rural road lengths, to which this weight would be applied. Tasmania proposed using State reported unsealed road lengths

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<sup>2</sup> Earlier measurements during the development of the mapping approach used different definitions of urban and rural boundaries. Because we use aspects of the SMVU in other parts of the assessment, we decided to use the SMVU boundaries in the rural measurement.

<sup>3</sup> Western Australia advised the relative cost of its unsealed roads would increase from 45 per cent to 55 per cent if it removed the impact of road use from its cost data for sealed and unsealed roads in remote areas.

because it thought the policy influences would be minor. By contrast, the Northern Territory thought the policy influences would be major. Victoria said traffic volume was the main determinant of when roads were sealed. It proposed classifying road lengths by traffic volumes and using the length of roads with low traffic volume as the measure of unsealed road lengths. This option could not be pursued because States cannot provide data on this basis. Consistent with its approach on all rural roads, the Commission declined to use State reported unsealed road lengths. We have decided to measure unsealed roads as the length of minor rural roads identified in the mapping approach — all other mapped State managed roads, which were classified as freeways, highways or main roads, were assumed to be sealed.

- 26 Table 17-4 shows the Commission's measure of unsealed roads and compares it with State reported unsealed road lengths. The Commission's measure implies Victoria and South Australia seal more rural roads than the average and Tasmania and the Northern Territory less.

**Table 17-4 Length of unsealed roads**

Road type	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Unsealed (km) (a)	1 454	1 364	4 711	3 578	1 399	39	0	2 215	14 761
State unsealed (km) (b)	1 520	362	5 840	3 473	468	169	0	3 639	15 471
Difference	-66	1 002	-1 129	105	931	-130	0	-1 424	-710

- (a) The length of mapped rural roads that were not freeways, highways or major roads contained in the rural road measurement carried out in a consultancy for the Commission in January 2009.
- (b) State advice on the length of mapped rural roads that were unsealed within the mapped rural network of November 2007.
- 27 *Developing an urban road length measure.* The Commission also considered that State provided data on the length of urban roads are not comparable across States due to differences among the States in road classifications, the allocation of responsibilities between State and local government and the definitions of an urban area.
- 28 The Commission attempted to derive a policy-neutral measure of State-type urban roads using a mapping approach, as we did for rural roads.
- 29 The Commission's attempts to map and measure the length of a consistently defined set of State managed urban roads did not produce acceptable results. The length of the mapped roads is inconsistent with other urban indicators, such as area and urban population, and the results for Sydney and Melbourne showed large and inexplicable differences in road density and lengths. Extensive amounts of extra information on traffic volumes for individual roads are required to ensure this approach produces comparable information.
- 30 In its place, the Commission has decided to use State urban populations as a proxy for urban road lengths because it is consistent with the principal purpose of urban roads, which is to transport people and goods around the urban centre. For this purpose, urban areas are defined

according to the definition used in the ABS SMVU, that is, localities of 40 000 or more<sup>4</sup> — the NTC also uses this definition.

- 31 While most States supported this measure, Victoria did not. It preferred the mapping approach. However, as noted above, we are not convinced that the mapping approach produced comparable measures of the length of State managed roads.

### *Road use*

- 32 Road use affects State expenses in two main ways.
- High traffic volumes require States to install and maintain traffic control and safety measures (such as signage and traffic lights). Failure to provide and support such ‘road furniture’ would have unacceptable consequences for road safety.
  - Road use, particularly by heavy vehicles, causes pavement wear and tear, which requires minor and major maintenance to restore the pavement to acceptable service standards. Road engineers consider that light vehicles cause little pavement damage.
- 33 *Measuring traffic volume.* There are several possible measures of traffic volume<sup>5</sup>.
- 34 Consistent with the emphasis on reliability and simplification in the terms of reference, the Commission has chosen total vehicle kilometres travelled (VKT), which measures the total distance travelled by all vehicles and treats a kilometre travelled by a car in the same way as a kilometre travelled by a heavy truck. We have decided to use VKT because it is the simplest of the measures used by the NTC in its analysis of road expenses. In addition, analysis we have undertaken indicated the choice of measure did not have a material effect on the GST distribution.
- 35 We have sourced our traffic volume data from unpublished traffic volume data derived by the Bureau of Infrastructure, Transport and Regional Economics (BITRE). These data are based on the SMVU<sup>6</sup>. BITRE adjusts the SMVU data<sup>7</sup> and smoothes it using averages from several survey years. We have chosen the BITRE data as our traffic volume measure because we consider it to be more reliable than the unadjusted SMVU data.
- 36 A further issue in measuring traffic volume was that the VKT data covered State managed roads and roads managed by local government. For the Commission’s purposes, those data need to be adjusted to remove the volume of traffic on local roads. This has been done by

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<sup>4</sup> Localities include capital city statistical divisions and statistical districts with a population of more than 40 000, as well as ‘clusters of collection districts and other urban areas with a population greater than 40 000’. See ABS, *Survey of Motor Vehicle Use, 2008, Cat. No. 9208.0*, pages 42 and 43.

<sup>5</sup> The measures include the two measures used by the NTC: total vehicle kilometres travelled (VKT); and passenger car equivalent kilometres (PCU-km). The latter adjusts the total distance travelled to allow for the effects of differences in the size of different vehicles using the roads. See NTC, *Third Heavy Vehicle Road Pricing Determination: Technical Report, 2005*.

<sup>6</sup> It uses the SMVU dataset ‘Total distance travelled by area of operation’. This ensures that the traffic data reflects all travel in a State, not just travel by vehicles registered in that State.

<sup>7</sup> BITRE adjusts the SMVU data using data such as fuel sales, off-road use, fleet fuel use modelling and traffic data from monitored networks in cities.

adjusting the VKT using data determined by the NTC on the Australian average proportion of travel on arterial roads by different types of vehicles — for example, the NTC estimated 63 per cent of travel by passenger vehicles and 90 per cent of travel by articulated heavy vehicles was on arterial roads.

- 37 The ACT was concerned that using national average factors did not adequately adjust for differences between States in local road use. It suggested the traffic volume factors should be discounted. We have decided not to discount because it would require judgment to set the level of discount and the error such a discount would produce in measuring State traffic volume differences may be no lower than that arising from the national average local use factors<sup>8</sup>.
- 38 Many States said, and the Commission has accepted, the urban and rural patterns of road use differ. It is desirable to split use into urban and rural. However, we have had concerns about whether we could obtain reliable data to support a split. We consider the reliability of the BITRE traffic volume data sufficient to allow it to be split into urban and rural. We have done so using SMVU data on urban-rural proportions<sup>9</sup>.
- 39 *Measuring heavy vehicle road use*. There are several measures of heavy vehicle road use but not all are available on a reliable basis at a State level.

#### **Measures of heavy vehicle use**

*Average gross mass-kilometres (AGM-km)*: gross tonne-kilometres for a group of vehicles based on NTC trend data on total mass of different heavy vehicle types and kilometres travelled.

*Equivalent standard axle-kilometres (ESA-km)*: converts average gross mass for different heavy vehicle types to equivalent standard axles using a statistical relationship derived for the NTC, which is combined with kilometres travelled.

*Heavy vehicle kilometres travelled (HV-VKT)*: distance travelled by heavy vehicles, in kilometres.

- 40 AGM-km and ESA-km are better than HV-VKT as measures of the effect on roads of heavy vehicle loads.
- 41 New South Wales said pavement wear was affected by the size and frequency of loads from heavy vehicles and ESA provided a better measure of that impact. Conceptually, this view has merit. However, States cannot provide road lengths classified by traffic volume. That data would be critical to developing an assessment that recognised the impact of frequency of application of loads over a length of road.

<sup>8</sup> Discounting would have the effect of bringing all States closer to the national average, thereby reducing recognition of differences in use disabilities.

<sup>9</sup> BITRE data are not disaggregated into urban and rural. The Commission has used six years of SMVU data on travel within urban and non-urban areas to derive the urban-rural proportions for each State.

- 42 Victoria preferred average gross mass-kilometres (AGM-km), while Western Australia said ESA was a better measure because it is specifically designed to measure the impact of heavy vehicles on roads.
- 43 We have chosen to use AGM-km, because it is simpler than ESA-km, requires less estimation and there is no material difference in the GST distribution when using it, compared to using ESA-km or using both ESA-km and AGM-km together.
- 44 The Commission estimates AGM-km for each State by applying Australian average AGMs for each BITRE vehicle class, derived from NTC trend data<sup>10</sup>, to the kilometres travelled by each class of heavy vehicle in each State. As with the traffic volume measure, VKT, we adjusted the heavy vehicle travel to remove travel on local roads. We also split heavy vehicle travel data into urban and rural. Western Australia said that using State AGMs (rather than Australian trend AGM) would produce a materially different outcome for the Northern Territory. The Commission would have preferred to use AGMs for each class of vehicle in each State (because there appear to be differences across States in vehicle loadings) but some of the disaggregated data needed to derive State-specific AGMs have high standard errors, bringing into question their reliability. The ABS and the NTC advised against using the data at that level of disaggregation.

#### *Local roads*

- 45 In areas of States where there is no local government (unincorporated areas) or where there is insufficient population to support road maintenance, State governments step in and manage roads that otherwise would be managed by a local government — local roads.
- 46 Between 2003-04 and 2008-09 an average of 5.5 per cent of annual State government expenses on roads were on State managed local roads<sup>11</sup>.
- 47 Since these expenses were mainly in unincorporated areas or areas where there was insufficient population for local government to support the roads, the Commission has decided they were mainly driven by State geography and population settlement patterns.
- 48 We have therefore decided to measure the local road task as the length of minor roads in remote, sparsely settled Census collection districts (CDs) — defined as remote and very remote CDs with a population density of less than 10 persons per 1000 square kilometres. This measure ensured:
- urban areas are excluded;
  - only areas with very low populations are selected; and
  - the Commission does not double count roads included in the rural road length measure.

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<sup>10</sup> The NTC has calculated trend data from the SMVUs for 2001 to 2007. We used the trend data to derive trend AGMs for the vehicle classes in the BITRE data.

<sup>11</sup> This is the average expense on local roads as a proportion of all recurrent expenses reported to the NTC by States.

*Bridges and tunnels*

- 49 Between 2003-04 and 2008-09, 4.5 per cent of annual road expenses were on bridge maintenance. New South Wales and Tasmania said the Commission should separately assess bridge expenses. Victoria said comparable bridge data were not available to support an assessment. The ACT said if a separate assessment could not be made, it would not be appropriate to include bridge expenses with other road expenses, because that would mean the wrong disabilities would be applied to them. It proposed assessing bridge expenses equal per capita.
- 50 The Commission considered a number of bridge related disability measures (including State bridge spending and State reported bridge stocks), but none of the measures agreed on the direction or magnitude of a bridges disability. We have decided to assess bridge maintenance expenses equal per capita, because we have not found reliable data to support a differential assessment. Because those States with significant tunnel expenses include them with bridge expenses, these will also be assessed equal per capita.

**Other disabilities raised by States***Urbanisation disability*

- 51 New South Wales argued for an urbanisation assessment to recognise the higher maintenance costs in very large cities that stem from factors other than the greater use of the roads. It said these costs arose from the need to minimise traffic disruption (after hours work, quick setting materials etc.).
- 52 New South Wales provided data showing maintenance costs were 17 per cent higher in Sydney than in Newcastle or Wollongong. However, it was not able to dissect the extra costs into those arising from higher use (which are reflected in the other allowances we assess for the higher traffic volume in more urbanised States) and other effects of urbanisation. In the absence of the extra data, we tested the materiality of an allowance based on a 17 per cent margin and found it was immaterial<sup>12</sup>.
- 53 These practical issues aside, a clear conceptual case for an urbanisation disability has not been established because annual whole of life costs per unit of traffic in urban areas appear to be lower than in rural areas. Moreover, we did not have evidence which demonstrated per capita costs in large urban areas were significantly higher than elsewhere for reasons other than the higher traffic volume.
- 54 Consequently, we have not assessed an urbanisation disability for Roads. The topic of urbanisation is also discussed in Chapter 5 of Volume 1, Major Assessment Issues.

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<sup>12</sup> Because we use urban population as a proxy for road length in urban areas, we used the New South Wales experience and assessed a cost weight of 1.17 for populations in cities with more than 1.75 million people — Sydney, Melbourne and Brisbane. An assessment using the weight is not material; the cost weight would need to be 1.40 for an assessment to be material.

*Physical environment disability*

- 55 Tasmania and the Northern Territory supported a physical environment assessment to recognise the differential effects of climate and soil type on State road expenses. However, they acknowledged that measuring these influences would be difficult.
- 56 Since each State would be able to point to unique features of its climate and geography, the Commission has not been convinced that there were material differences between the States in the overall effects of the physical environment on roads expenses. We have not been able to find a reliable way to measure such a disability. Consequently, we have not assessed a physical environment disability.

**Other factors affecting the cost of services**

- 57 The previous discussion considered factors that potentially had specific effects on the size and cost of the roads task. There are also some other factors that affect the cost of the roads task in much the same way as they affect other services. These common factors, which cover: the cost of establishing the minimum administrative structures; the effects of location on cost levels; expenses stemming from the Commonwealth's Native title and land rights legislation; and Canberra's role as the national capital are discussed below. Separate chapters provide details of how these common factors are assessed.

*Administrative scale*

- 58 All States are considered to require a basic administrative structure to manage their roads. The Commission recognises these costs through its administrative scale assessment. The amount assessed for roads is the same for all States.

*Location*

- 59 States face differences in the unit costs of providing services in different areas. These effects can arise from interstate differences in wage levels and non-wage costs and regional differences within States in wage-related and other costs.
- 60 The Commission recognises the effect of interstate wage and non-wage differences by applying an interstate location factor to Roads service expenses.
- 61 Several States advised that the cost of road maintenance is significantly higher in remote areas of their States, even allowing for the difference in road standard in those areas. The Commission recognises regional differences in wage and other costs by applying a regional location factor to services expenses related to rural road length only. The chapter on Location costs discusses how this factor is derived.

*Native title and land rights*

- 62 States report that some of their road expenses are affected by the operation of the Commonwealth's Native title and land rights legislation. These expenses are included in the assessment.

*National capital*

- 63 Canberra's role as the national capital results in additional expenses being incurred for road maintenance. This is because previous Commonwealth decisions meant some of the arterial roads inherited by the ACT at the time of self-government were wider than comparable roads in the States, which leads to extra maintenance costs. The Commission assessed an allowance for this influence and it has been included in the assessment.

**Combining disabilities**

- 64 Since there are differences between States in the per capita road length, road use, local road and bridge responsibilities and those differences are expected to result in a materially different assessment, the Commission has developed its Roads assessment to reflect five influences:
- road length;
  - traffic volume — the use of roads by all vehicles;
  - heavy vehicle use — the additional wear and tear caused by heavy vehicles;
  - local roads managed by States; and
  - bridges.
- 65 Road length, traffic volume and heavy vehicle use are measured separately for urban and rural roads.
- 66 States generally agreed that road length and road use were the main drivers of State expenses, but disagreed on how these drivers should be measured and combined.
- 67 Victoria and Western Australia suggested a different approach based on classifying roads by traffic volume. They proposed calculating weights for each class of road, with higher weights for the higher trafficked roads. The ACT also sought a higher weight for highly trafficked urban roads. The approach of classifying roads by use level was not progressed because our investigations revealed the detailed data required to support it were not available.
- 68 Once the effects of road length, use, local roads and bridges were measured, it has been necessary to combine them so that they are applied to the expenses they affect. This is done by weighting each influence by the proportion of roads expenses it affected. The weights were determined on the basis of technical analysis of factors affecting roads expenses by the NTC as part of its process for recommending heavy vehicle registration charges. The process for determining those weights, which is a critical and contentious aspect of the assessment, is discussed in a later section of this chapter.

**THE ASSESSMENT METHOD**

- 69 The roads assessment is in two components — service delivery expenses and other expenses. Table 17-5 shows the category structure and the disabilities assessed for each component for 2008-09.

**Table 17-5 Category structure, Roads, 2008-09**

Component	Component weight	Disability %	Influence measured by disability
Service expenses	99.36	Local roads	Recognises the differences between States in the cost of maintaining local roads managed by State governments.
		Urban roads	This is a composite factor. It recognises that the length of the urban road network, traffic volume and heavy vehicle use influence the cost of providing roads maintenance services in urban areas.
		Rural roads	This is a composite factor. It recognises that the length of the rural road network, traffic volume and heavy vehicle use influence the cost of providing roads maintenance services in rural areas. It also includes regional location influences.
		Bridges	Recognises that different drivers affect bridges expenses, but the Commission was not able to define them. This is an equal per capita assessment.
		Other services	Recognises other unmeasured factors that may influence the cost of providing roads maintenance services. This is an equal per capita assessment.
		Interstate location	Recognises the differences in the cost of providing labour and non-labour resources between States.
Other expenses	0.64	Administrative scale	Recognises the unavoidable costs each State incurs to provide the policy and administrative infrastructure necessary to provide the minimum unavoidable service, regardless of the size of the task.
		National capital	Recognises the costs to the ACT arising because of Canberra's status as the national capital and seat of government.
		Native title and Land rights	Recognises State costs of settling native title and land rights claims made under Australian Government legislation.

Source: Commission calculation.

### Service delivery expenses

- 70 Service delivery expenses make up 99.4 per cent of the average expenses for the category. The influences on States expenses considered by the Commission are local road requirements, road length, road use and bridges. We consider road length and road use separately for urban and rural roads. The expenses are also affected by differences in interstate wages and other input costs. Differences in regional location influences affect rural road length only.
- 71 The following paragraphs describe the calculation of factors for local roads, urban roads, rural roads and bridges.

#### Local roads factor

- 72 Table 17-6 shows the derivation of the Commission's local roads factor, measured using the length of minor roads in sparsely populated remote areas. Relatively, the Northern Territory is assessed to have the biggest local roads task, followed by Western Australia, South Australia and Queensland. Tasmania and the ACT are assessed to have no local road task.

**Table 17-6 Local roads factor, 2008-09**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Local road length (km)	9 841	1 416	35 192	38 077	14 745	0	0	10 999	110 271
Population ('000)	7 041	5 365	4 350	2 204	1 612	500	348	222	21 642
Length per '000 pop	1.4	0.3	8.1	17.3	9.1	0.0	0.0	49.6	5.1
Unweighted factor	0.27429	0.05181	1.58794	3.39059	1.79517	0.00000	0.00000	9.73747	1.00000
Local roads weight (%)									5.0
Weighted factor (a)	0.96400	0.95297	1.02916	1.11858	1.03944	0.95040	0.95040	1.43341	1.00000

(a) The unweighted factor is adjusted to apply to the proportion of relevant category expenses. The Tasmanian and ACT weighted factors are not zero, reflecting that most Roads expenses are not affected by this disability. The calculation of the local roads weight is shown in Appendix 17A.

Source: Length of non-major roads in Census collection districts of low population density in remote and very remote regions measured in a consultancy for the Commission in April 2009.

### Urban roads factor

- 73 This factor comprises factors for road length, traffic volume and heavy vehicle use.
- 74 Table 17-7 shows the derivation of the urban road length factor, measured using the proxy urban populations. The ACT is assessed to have the largest urban road network (in per capita terms), followed by Victoria. The Northern Territory is assessed to have the smallest urban road network.

**Table 17-7 Urban road length factor, 2008-09**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Urban population ('000)	5 581	4 469	3 438	1 744	1 172	395	346	102	17 247
Population ('000)	7 041	5 365	4 350	2 204	1 612	500	348	222	21 642
Urban road length factor	0.99451	1.04535	0.99171	0.99308	0.91236	0.99092	1.24650	0.57946	1.00000

Source: Estimated resident population as at June 2008 in localities of 40 000 or more, as defined by the ABS in its *Survey of Motor Vehicle Use*, based on 2006 Census populations. Special data collection provided by the ABS in 2009.

- 75 Table 17-8 shows the derivation of the urban traffic volume factor, measured using vehicle kilometres travelled. The ACT has the highest traffic volume in urban areas relative to its total population because all of the population is considered urban. Victoria, Queensland and Western Australia all have higher than average per capita urban traffic volume.
- 76 Table 17-9 shows the derivation of the urban heavy vehicle use factor, measured using average gross mass-kilometres. New South Wales and Queensland have higher than average per capita urban heavy vehicle use. The ACT has the lowest per capita urban heavy vehicle use.

**Table 17-8 Urban traffic volume factor, 2008-09**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Urban traffic volume (million km)	32 508	27 643	22 587	11 474	6 578	2 316	2 254	708	106 067
Population ('000)	7 041	5 365	4 350	2 204	1 612	500	348	222	21 642
Urban traffic volume per '000 population	4.6	5.2	5.2	5.2	4.1	4.6	6.5	3.2	4.9
Urban traffic volume factor	0.94197	1.05131	1.05955	1.06218	0.83265	0.94455	1.32211	0.65158	1.00000

Source: BITRE unpublished VKT estimates, 2009. NTC unpublished arterial road use factors, 2009. ABS unpublished disaggregated dataset of distance travelled by State of operation, *Survey of Motor Vehicle Use, 2002-2007*.

**Table 17-9 Urban heavy vehicle use factor, 2008-09**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Urban HV use (million AGM-km)	74 299	52 732	50 043	21 540	12 539	4 662	1 754	1 827	219 395
Population ('000)	7 041	5 365	4 350	2 204	1 612	500	348	222	21 642
Urban HV use per '000 population	10.6	9.8	11.5	9.8	7.8	9.3	5.0	8.2	10.1
Urban HV use factor	1.04085	0.96957	1.13491	0.96402	0.76727	0.91927	0.49727	0.81289	1.00000

Source: BITRE unpublished VKT estimates, 2009. NTC unpublished arterial road use factors and trend gross tonne-kilometres and vehicle kilometres travelled, 2009. ABS unpublished disaggregated dataset of distance travelled by State of operation, *Survey of Motor Vehicle Use, 2002-2007*.

77 Table 17-10 shows the composite urban roads factor, which combines the length, traffic volume and heavy vehicle use factors.

**Table 17-10 Combined urban roads factor, 2008-09**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Weight
Urban road length	0.99451	1.04535	0.99171	0.99308	0.91236	0.99092	1.24650	0.57946	12.8
Urban traffic volume	0.94197	1.05131	1.05955	1.06218	0.83265	0.94455	1.32211	0.65158	68.5
Urban heavy vehicle use	1.04085	0.96957	1.13491	0.96402	0.76727	0.91927	0.49727	0.81289	18.7
Combined factor	0.96720	1.03524	1.06499	1.03497	0.83059	0.94574	1.15796	0.67258	1.00000
Urban road weight (%)									30.6
Urban roads factor	0.98996	1.01079	1.01989	1.01070	0.94815	0.98339	1.04834	0.89980	1.00000

Note: The weights for the road length, traffic volume and heavy vehicle factors are those for urban from Appendix 17A, scaled to total 100 per cent.

Source: Table 17-7, Table 17-8 and Table 17-9.

### Rural roads factor

78 This factor comprises factors for road length, traffic volume and heavy vehicle use.

- 79 For the rural road length factor, road length is measured using mapped rural road lengths with unsealed roads weighted by 50 per cent relative to sealed roads, as shown in Table 17-11.

**Table 17-11 Length of rural roads**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
	km	km	km	km	km	km	km	km	km
Mapped lengths (a)	24 592	14 712	27 632	20 563	11 076	2 444	0	9 750	110 769
Unsealed length (b)	1 454	1 364	4 711	3 578	1 399	39	0	2 215	14 761
Weighted unsealed length (c)	727	682	2 356	1 789	700	19	0	1 108	7 380
Weighted sealed length (d)	23 138	13 348	22 921	16 985	9 677	2 405	0	7 535	96 008
Weighted rural length (e)	23 865	14 030	25 276	18 774	10 376	2 425	0	8 642	103 389

- (a) Rural road measurement carried out in a consultancy for the Commission in January 2009.  
 (b) The length of mapped rural roads that were not freeways, highways or major roads contained in the rural road measurement, from Table 17-4.  
 (c) Unsealed road length weighted by 0.5.  
 (d) Mapped lengths less unsealed length, weighted by 1.0.  
 (e) Weighted sealed length plus weighted unsealed length.

- 80 Table 17-12 shows the calculation of the rural road length factor. A regional location factor is applied to recognise the effect of regional differences in wages and other costs. The factor is multiplied by the raw rural road length factor. The Northern Territory is assessed to have the largest rural road network per capita, followed by Western Australia. The ACT is assessed to have no rural road network (because its entire area is defined as urban for the Roads assessment).

**Table 17-12 Rural road length factor, 2008-09**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Rural road length (kms)	23 865	14 030	25 276	18 774	10 376	2 425	0	8 642	103 389
Population ('000)	7 041	5 365	4 350	2 204	1 612	500	348	222	21 642
Raw length factor	0.70944	0.54742	1.21643	1.78300	1.34739	1.01453	0.00000	8.16055	1.00000
Regional location	0.99382	0.95034	1.07609	1.10516	1.02363	0.95100	0.12500	1.17122	
Rural road length factor	0.67466	0.49780	1.25254	1.88553	1.31974	0.92321	0.00000	9.14562	1.00000

Note: A regional location factor has been applied in calculating the rural road length factor, to recognise the effect of regional differences in wages and other costs.

Source: Commission calculation using ABS population data and results in Table 17-11.

- 81 Table 17-13 shows the derivation of the rural traffic volume factor, measured using vehicle kilometres travelled. The Northern Territory is assessed to have the highest rural traffic volume per capita, followed by South Australia. The ACT is assessed to have no rural traffic volume (because its entire area is defined as urban for the Roads assessment).

**Table 17-13 Rural traffic volume factor, 2008-09**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Rural traffic volume (million km)	11 097	9 057	8 167	4 280	3 833	1 080	0	570	38 084
Population ('000)	7 041	5 365	4 350	2 204	1 612	500	348	222	21 642
Rural traffic volume per '000 population	1.6	1.7	1.9	1.9	2.4	2.2	0.0	2.6	1.8
Rural traffic volume factor	0.89557	0.95934	1.06705	1.10351	1.35106	1.22702	0.00000	1.46041	1.00000

Source: BITRE unpublished VKT estimates, 2009. NTC unpublished arterial road use factors, 2009. ABS unpublished disaggregated dataset of distance travelled by State of operation, *Survey of Motor Vehicle Use, 2002-2007*.

82 Table 17-14 shows the derivation of the rural heavy vehicle use factor, measured using average gross mass-kilometres. The Northern Territory is assessed to have the highest rural heavy vehicle use per capita, followed by South Australia. The ACT is assessed to have no rural heavy vehicle use (because its entire area is defined as urban for the Roads assessment).

**Table 17-14 Rural heavy vehicle use factor, 2008-09**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Rural HV use (million AGM-km)	43 671	32 198	31 464	18 633	16 719	3 845	0	2 524	149 054
Population ('000)	7 041	5 365	4 350	2 204	1 612	500	348	222	21 642
Rural HV use per '000 population	6.2	6.0	7.2	8.5	10.4	7.7	0.0	11.4	6.9
Rural HV use factor	0.90049	0.87142	1.05030	1.22747	1.50586	1.11588	0.00000	1.65330	1.00000

Source: BITRE unpublished VKT estimates, 2009. NTC unpublished arterial road use factors and trend gross tonne-kilometres and vehicle kilometres travelled, 2009. ABS unpublished disaggregated dataset of distance travelled by State of operation, *Survey of Motor Vehicle Use, 2002-2007*.

83 Table 17-15 shows the composite rural roads factor, which combines the length, traffic volume and use factors.

**Table 17-15 Combined rural roads factor, 2008-09**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Weight
Rural road length	0.67466	0.49780	1.25254	1.88553	1.31974	0.92321	0.00000	9.14562	24.9
Rural traffic volume	0.89557	0.95934	1.06705	1.10351	1.35106	1.22702	0.00000	1.46041	42.8
Rural heavy vehicle use	0.90049	0.87142	1.05030	1.22747	1.50586	1.11588	0.00000	1.65330	32.3
Rural roads factor	0.84219	0.81611	1.10779	1.33811	1.39327	1.11554	0.00000	3.43473	1.00000
Rural road weight (%)									39.5
Rural roads factor	0.93770	0.92741	1.04255	1.13347	1.15525	1.04561	0.60524	1.96114	1.00000

Note: The weights for the road length, traffic volume and heavy vehicle factors are those for rural from Appendix 17A, scaled to total 100 per cent. A regional location factor has been applied to rural road length.

Source: Table 17-12, Table 17-13 and Table 17-14.

*Bridges factor*

- 84 The Commission has not been able to find a reliable method to support a differential assessment for the bridges factor, and has decided to assess service use on an equal per capita basis.

*A factor for other roads services*

- 85 The Roads category includes expenses associated with corporate services, driver licensing and vehicle registration. These expenses may be driven by a number of factors including road length, population in the driving age groups, total population and number of registered vehicles.
- 86 The Commission initially considered assessing these expenses using road length, but was unable to find a clear correlation between them and road length. Victoria and the ACT said population was the most appropriate measure of the underlying influences.
- 87 For reasons of simplicity, we have decided to assess service use on an equal per capita basis — implying they are primarily driven by total population.

*Combining the road services disabilities*

- 88 The road services disabilities affect different aspects of the expenses on road services, so a method was devised to align each one with the expenses it affects and combine them so that there is no double counting.
- 89 Each disability is weighted by the proportion of the service delivery expenses it affects. The assessed service delivery expenses for each State are then determined by adding its weighted disabilities together, multiplying the result with the interstate location factor and applying the final factor to its per capita share of the total service delivery expenses.
- 90 We have derived the weights applied to each disability from work done by the NTC in estimating heavy vehicle road use charges. For its purposes, the NTC makes a detailed dissection of road expenses according to their type. Twelve types of expenses are identified including routine maintenance, rehabilitation (parts of the road are rebuilt to their original specifications), minor safety improvements, corporate services and pavement improvements. The NTC defines six specific measures and subsets of these that influence each type of expense. We have simplified that process for our purposes. The details of our calculations are in Appendix 17A.
- 91 Table 17-16 shows the Commission's expense weights for 2008-09.

**Table 17-16 Roads expense proportions, 2008-09**

Disability	Weight
	%
Local roads	5.0
Urban roads	
- Road length	3.9
- Traffic volume	21.0
- Heavy vehicle use	<u>5.7</u>
Total urban roads	30.6
Rural roads	
- Road length	9.8
- Traffic volume	16.9
- Heavy vehicle use	<u>12.8</u>
Total rural roads	39.5
Bridges	4.6
Other services	<u>20.4</u>
Total	<u>100.0</u>

Source: Commission calculation using unpublished expense data provided to the NTC annually by State road authorities.

- 92 The weights suggest road use (which we measure using indicators of traffic volume and heavy vehicle use) is a more important driver of road maintenance expenses than road length because it affects 56.4 per cent of State expenses, compared with 13.7 per cent for road length<sup>13</sup>. They also indicate rural road disabilities (39.5 per cent weight) are more important than urban road disabilities (30.6 per cent) reflecting greater spending on rural roads by States.
- 93 States were broadly supportive of using NTC data to derive expense weights, but they disagreed on how the weights should be derived.
- 94 Queensland, South Australia and the Northern Territory said the implication of the Commission's expense weights that road use had a greater effect on road expenses than length, was not consistent with their experience. Our weights are national averages; it is not surprising that the experience of States with relatively large rural road networks is different and suggestive of a higher weight for road length. Queensland and the Northern Territory said the Commission should set the road length and road use proportions by judgment. Queensland advocated equal weights, the Northern Territory advocated the 2004 Review proportions —

<sup>13</sup> These weights are national averages and do not imply that the assessed expenses for every State will fit these proportions, due to State variations in length and use factors. The Depreciation and Investment assessments for Roads use different expense weights calculated using only capital expenses. In those assessments road length is a more significant driver (around 65 per cent) than road use (around 12 per cent). See the Infrastructure chapter.

60 per cent to road length, 40 per cent to road use<sup>14</sup>. The Commission has chosen to use NTC expense data because it was extensively researched and more reliable than using judgment to determine the weight to apply to road length and road use disabilities.

- 95 Tasmania said total NTC expenses did not match total GFS road expenses and so the Commission's expense weights should be discounted to reflect their unreliability. The Commission has not discounted the expense weights because when we investigated this discrepancy most States said NTC expense data on which our expense weights were based were more reliable than the GFS road expense data. While there may be larger differences at the State level between GFS and NTC, the aggregate difference was small. The Commission only uses the aggregate figure.
- 96 For data reliability reasons, the Commission had initially proposed to separate road length into urban and rural but not do the same for road use. Western Australia and the Northern Territory were concerned about disaggregating road length into urban and rural roads but not road use. They said this would lead to a higher cost per kilometre for urban roads than for rural roads, which was not supported by data. Western Australia suggested that we not disaggregate road length.
- 97 To separate road disabilities into urban and rural, we have to assume urban road use affects urban road costs in the same way that rural road use affects rural road costs because the NTC cost allocation model does not distinguish between these two road types. The NTC advised that it was reasonable for the Commission to assume the same cost allocation rules apply to urban and rural roads<sup>15</sup>.

#### *Assessed expenses for the service delivery component*

- 98 Table 17-17 shows the calculation of the assessed expenses for the service expenses component for 2008-09.

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<sup>14</sup> These comments were made before depreciation expenses were removed from this category and separately assessed. Depreciation expenses comprised about 30 per cent of the category and their removal markedly increased the weighting for use in the Roads category.

<sup>15</sup> The NTC advised that there is no research to support the application of different cost allocation proportions to urban and rural roads. It said that until there is reasonably strong evidence suggesting that different proportions apply to urban and rural roads, it was reasonable for the Commission to assume they are the same.

**Table 17-17 Assessed expenses, Service expenses component, 2008-09**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
Service expenses (\$m)	1 899.8	1 447.5	1 173.5	594.7	434.9	135.0	93.9	59.8	5 839.0
Local roads	0.96400	0.95297	1.02916	1.11858	1.03944	0.95040	0.95040	1.43341	
Urban roads (a)	0.98996	1.01079	1.01989	1.01070	0.94815	0.98339	1.04834	0.89980	
Rural roads (b)	0.93770	0.92741	1.04255	1.13347	1.15525	1.04561	0.60524	1.96114	
Bridges	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	
Other services	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	
Interstate location	1.01445	0.99227	0.98291	1.01004	0.98859	0.97994	1.02911	1.04607	
Assessed expenses (\$m)	1 718.5	1 280.0	1 259.2	758.5	491.4	129.6	58.3	143.6	5 839.0

- (a) The urban roads factor is the sum of the disabilities for urban road length, urban traffic volume and urban heavy vehicle use, as shown in Table 17-10.
- (b) The rural roads factor is the sum of the disabilities for rural road length, rural traffic volume and rural heavy vehicle use, as shown in Table 17-15. It includes a regional location factor which was applied to rural road length only.

Source: Commission calculation.

99 The assessed service delivery expenses for each State are derived by:

- starting with aggregate service delivery expenses, shared between States on the basis of their population shares (that is, equal per capita); and
- adjusting for:
  - the effects of differences between States in local roads, rural roads (measured using road length incorporating a regional location disability, traffic volume and heavy vehicle use), urban roads (measured using urban population, traffic volume and heavy vehicle use), bridges and other services. Each of these disabilities are weighted using weights calculated as shown in Appendix 17A and the weighted disabilities were summed; and
  - the effect of location on costs. Interstate location effects are applied to all services disabilities by multiplying the combined service expenses disabilities by the interstate location factor. Regional location effects are applied in an earlier step to calculate the rural road disability.

### Other expenses

100 The Other expenses component includes:

- disabilities reflecting States' need to provide a minimum level of administrative and policy formulation services to roads. The base administrative scale affected expenses are adjusted for the effects of interstate location disabilities. The calculation of this amount is explained in the chapter on Administrative scale;
- disabilities reflecting the additional costs arising from the ACT's status as the national capital. The calculation of this amount is explained in the chapter on National Capital allowances; and

- expenses faced by States due to the operation of the Commonwealth's Native title and land rights legislation. The calculation of this amount is explained in the chapter on Native title and land rights.

101 Table 17-18 shows the Other expenses component for 2008-09.

**Table 17-18 Assessed expenses, Other expenses component, 2008-09**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Administrative scale expenses	4.0	3.9	3.9	4.0	3.9	3.8	4.1	4.1	31.8
National capital	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	3.3
Native title and land rights	0.1	0.0	1.5	0.0	0.0	0.0	0.0	1.0	2.5
<b>Assessed expenses</b>	<b>4.1</b>	<b>3.9</b>	<b>5.4</b>	<b>4.0</b>	<b>3.9</b>	<b>3.8</b>	<b>7.4</b>	<b>5.1</b>	<b>37.6</b>

Source: Commission calculation.

### Bringing the category assessment together

102 Table 17-19 brings the assessed expenses for the two components together to derive the category assessed expenses for each State.

**Table 17-19 Assessed expenses, Roads, 2008-09**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Service expenses	1 718.5	1 280.0	1 259.2	758.5	491.4	129.6	58.3	143.6	5 839.0
Other expenses	4.1	3.9	5.4	4.0	3.9	3.8	7.4	5.1	37.6
<b>Total</b>	<b>1 722.6</b>	<b>1 283.9</b>	<b>1 264.6</b>	<b>762.5</b>	<b>495.3</b>	<b>133.4</b>	<b>65.7</b>	<b>148.6</b>	<b>5 876.6</b>
Assessed expenses (\$pc)	244.65	239.32	290.74	345.95	307.26	266.59	188.91	670.52	271.54
Cost of service provision ratio	0.9009	0.8813	1.0707	1.2740	1.1315	0.9818	0.6957	2.4693	1.0000

Note: The cost of service provision ratio is the ratio of each State's assessed expenses per capita to the average assessed expenses per capita.

Source: Commission calculation.

103 Table 17-20 summarises the category factors. It shows for each disability how the expenses per capita in each component and in total are affected by differences in State characteristics. Disability factors below 1.0 indicate a State needs to spend less than average. Disability factors above 1.0 indicate States need to spend more than average.

104 Table 17-19 and Table 17-20 show that service expenses are the main drivers of assessed expenses in this category.

**Table 17-20 Category factor, Roads, 2008-09**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Average
<b>Service expenses (component weight = 99.36 %)</b>									
Local roads	0.96400	0.95297	1.02916	1.11858	1.03944	0.95040	0.95040	1.43341	1.00000
Urban roads (a)	0.98996	1.01079	1.01989	1.01070	0.94815	0.98339	1.04834	0.89980	1.00000
Rural roads (b)	0.93770	0.92741	1.04255	1.13347	1.15525	1.04561	0.60524	1.96114	1.00000
Bridges	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
Other services	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
Interstate location	1.01445	0.99227	0.98291	1.01004	0.98859	0.97994	1.02911	1.04607	1.00000
Component factor	0.90459	0.88430	1.07299	1.27547	1.12984	0.95979	0.62158	2.40012	1.00000
<b>A. Weighted component factor</b>	<b>0.89880</b>	<b>0.87865</b>	<b>1.06613</b>	<b>1.26731</b>	<b>1.12261</b>	<b>0.95365</b>	<b>0.61760</b>	<b>2.38477</b>	<b>0.99360</b>
<b>Other expenses (component weight = 0.64 %)</b>									
Administrative scale	0.39095	0.49858	0.60687	1.23740	1.64752	5.20147	8.00778	12.64710	1.00000
National capital	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	62.21647	0.00000	1.00000
Native title and land rights	0.06655	0.00000	2.96140	0.00000	0.00000	0.00000	0.00000	37.40616	1.00000
Component factor	0.33482	0.42127	0.71291	1.04552	1.39204	4.39488	12.20906	13.21396	1.00000
<b>B. Weighted component factor</b>	<b>0.00214</b>	<b>0.00269</b>	<b>0.00456</b>	<b>0.00669</b>	<b>0.00890</b>	<b>0.02811</b>	<b>0.07809</b>	<b>0.08451</b>	<b>0.00640</b>
<b>Category factor</b>									
[A+B]	0.90094	0.88134	1.07069	1.27400	1.13151	0.98176	0.69569	2.46928	1.00000

Note: The disability factors in the service expenses component are added together and multiplied by the interstate location factor. The result is rescaled so that the average remains one. The component factors are then multiplied by the component weight. The weighted component factors are summed to obtain the category factor.

- (a) The urban roads factor is the sum of the disabilities for urban road length, urban traffic volume and urban heavy vehicle use, as shown in Table 17-10.
- (b) The rural roads factor is the sum of the disabilities for rural road length, rural traffic volume and rural heavy vehicle use, as shown in Table 17-15. It includes a regional location factor which was applied to rural road length only.

Source: Commission calculation.

## WHAT IS THE IMPACT ON THE GST DISTRIBUTION?

105 Table 17-21 shows the extent to which the Roads assessment moves the recommended distribution of the GST away from an equal per capita distribution. It shows Queensland, Western Australia, South Australia and the Northern Territory are assessed as needing to spend more than average to provide the average level of service, while New South Wales, Victoria, Tasmania and the ACT are assessed to be able to provide the average level of service at less than average cost.

**Table 17-21 Impact on the GST distribution of the Roads assessment**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Redist
Dollars million	-172.2	-154.0	79.9	149.5	47.6	-3.4	-24.6	77.2	354.3
Dollars per capita	-24.15	-28.20	17.94	66.10	29.22	-6.81	-69.70	341.11	16.09

Note: The difference from an equal per capita assessment, derived using 2006-07 to 2008-09 assessed revenue and 2009-10 GST.

Source: Commission calculation.

106 As shown in Table 17-17, the underlying causes of the difference in assessed per capita expenses vary from State to State. These are explained below.

- New South Wales and Victoria have, in per capita terms, relatively small rural networks, lower rural traffic volume and rural heavy vehicle use and relatively few State managed local roads. These disabilities were not outweighed by Victoria's above average urban network and urban traffic volume nor by the above average urban heavy vehicle use in New South Wales. Consequently both States are assessed to be able to provide road maintenance services at below average cost.
- Queensland, Western Australia, South Australia and the Northern Territory have above average rural networks, rural traffic volume, rural heavy vehicle use and State managed local roads, leading to their above average assessed needs for delivering roads services.
- While it has above average rural disabilities, Tasmania has no assessed State managed local roads and below average urban disabilities, leading to an assessment that it can deliver road services at below average cost.
- The ACT has no assessed rural network, as well as no State managed local roads. Consequently it is assessed to be able to deliver roads services at below average cost.

107 Table 17-22 provides a summary of how different components of the assessment move State GST shares away from an equal per capita distribution.

**Table 17-22 Drivers of difference from EPC, Roads**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Redist
	\$pc	\$pc	\$pc	\$pc	\$pc	\$pc	\$pc	\$pc	\$pc
Local roads	-9.80	-12.75	7.85	32.21	10.33	-13.44	-13.44	116.65	6.86
Rural road length	-6.06	-9.30	4.49	16.25	6.88	0.08	-20.49	146.56	4.60
Rural traffic	-4.44	-1.65	2.90	4.55	14.30	9.03	-41.49	18.98	2.51
Rural HV use	-2.93	-3.69	1.54	6.72	14.25	3.08	-28.61	19.11	2.32
Urban traffic	-3.09	2.63	3.14	3.44	-8.69	-3.18	16.26	-17.72	1.90

Note: The difference from an equal per capita assessment, derived using 2006-07 to 2008-09 assessed revenue and 2009-10 GST.

Source: Commission calculation.

108 Table 17-22 shows that the local roads disability is the most significant for redistributing GST between the States. Although it accounts for only five per cent of service expenses, the significance of the disability is caused because there is wide disparity between the relative

sizes of States' remote rural areas. As shown in Table 17-6, Tasmania and the ACT are assessed to have no local roads and New South Wales and Victoria very few. In contrast, the Northern Territory is assessed to have nearly ten times the national average per capita of local roads and Queensland, Western Australia and South Australia also have larger than average assessed local roads needs.

- 109 Queensland, Western Australia, South Australia, Tasmania and the Northern Territory all have larger than average rural networks, causing redistributions arising from the rural road length, rural traffic volume and rural heavy vehicle use disabilities. These disabilities are higher than average per capita for these States, as shown in Table 17-12, Table 17-13 and Table 17-14.
- 110 Victoria, Queensland, Western Australia and the ACT receive redistributions arising from their higher than average per capita urban traffic volume (as shown in Table 17-8).
- 111 New South Wales, Victoria and the ACT have below average per capita local roads and rural networks, so that GST is distributed away from them in the most redistributive disabilities in this category.
- 112 Table 17-23 provides a summary of the main reasons for changes since the 2009 Update.

**Table 17-23 Changes since the 2009 Update, Roads**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Redist
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
Shortening the review period	-48.5	7.9	-14.4	24.7	16.3	1.6	4.6	7.8	62.9
Method changes (a)	-70.5	158.7	66.6	-90.5	49.6	-13.1	-2.9	-97.8	274.9
State circumstances	-11.0	-13.2	4.7	11.5	4.2	0.5	-2.4	5.8	26.7
<b>Total</b>	<b>-130.1</b>	<b>153.3</b>	<b>57.0</b>	<b>-54.3</b>	<b>70.1</b>	<b>-11.1</b>	<b>-0.8</b>	<b>-84.1</b>	<b>280.3</b>

Note: The difference from an equal per capita assessment, derived using five or three year assessments ending in 2008-09, and 2008-09 GST from Table 3.17 of Commonwealth of Australia *Budget Paper No.3, 2009-10*.

(a) The effect of method changes is contaminated by differences in category composition between the 2009 Update and the 2010 Review, due to the inclusion of depreciation expenses in the former and not the latter.

Source: Commission calculation.

- 113 The modelled effect of the move from five years to three years in the 2009 Update method saw the complete removal of the National highways disability and an increase in the influence of the arterial roads disability (comprising length, use, physical environment and urban influences). New South Wales and Queensland had been assessed as having higher than average national highway needs, so that the removal of this disability reduced our estimate of their redistributions. The increase in the influence of the arterial roads disability compounded the effect for New South Wales because it was assessed to have a below average arterial roads disability. For Queensland, although it had a higher than average arterial roads disability, the influence of arterial roads did not increase by the same amount as the decrease in the influence of National highways. Victoria, Western Australia, South Australia, Tasmania and the ACT had all been assessed to have below average National highway needs, so that the removal of this disability increased our estimate of their redistributions.

- 114 Western Australia, South Australia, Tasmania and the Northern Territory are modelled to have increased redistributions moving from five years to three years because of the increase in the influence of the arterial roads disability where they were all assessed to have higher than average arterial roads needs.
- 115 Adopting the 2010 Review assessment method resulted in changing the treatment of bridge expenses. The 2009 Update included a differential bridge disability, whereas the Commission concluded that the higher data quality demanded in the 2010 Review meant it could not develop a reliable method and so did not assess a bridge disability. In the 2009 Update, New South Wales, Western Australia, Tasmania, the ACT and the Northern Territory were all assessed to have above average per capita bridge disabilities and the disability comprised 7.8 per cent of the category. The change to an EPC assessment of service use has consequently redistributed GST away from these States to Victoria, Queensland and South Australia.
- 116 In the 2009 Update, road length had a more significant influence in our assessment than in the 2010 Review. Victoria was assessed to have below average per capita road length in the Update and Western Australia and the Northern Territory above average. Reducing the significance of length in the Review redistributes GST to Victoria and away from Western Australia and the Northern Territory. While the GST shares of New South Wales and the ACT increase as a result of the change in the influence of road length, the change in the assessment of bridges outweighs this effect.

## UPDATE PROCESS

- 117 We recommend that data used in these assessments be updated when new data become available to ensure the relativities remain contemporary and consistent with the circumstances of the States. We expect the following data would be updated annually:
- ABS population data, including the urban population data for the urban length disability;
  - the GFS expense data;
  - BITRE's road use data; and
  - the NTC's State expense data that is used to weight disabilities.
- 118 We expect the following assessment data would not be updated annually:
- NTC trend data. They would only be updated if updated by the NTC;
  - NTC disability proportions. They would only be updated if the NTC updates its Heavy Vehicle Determinations;
  - the length of rural roads, including unsealed roads;
  - the urban-rural split, which was based on a six year average of SMVU data; and
  - the unsealed rural road cost weight of 0.50.

## SIMPLIFICATION

- 119 Compared with the 2004 Review assessment method, simplification has been achieved through:
- fewer elements. The 2004 Review assessment comprised 13 components and 28 factors, many of which were not material;
  - reduced data. Many of the 2004 Review disabilities involved complex calculations;
  - more reliable data and methods. Some of the 2004 Review disabilities were based on data or methods that would not satisfy the Commission's 2010 Review assessment guidelines.
- 120 The 2010 Review approach concentrates the assessment on the primary drivers of roads expenses — road length and road use.

## FURTHER INFORMATION

- 121 Background material in support of this assessment is published on the Commission's website. That material includes the following documents, released for comment in the development of this assessment, together with State submissions responding to those documents.
- Staff discussion paper *2006/03 Roads data project — defining arterial roads*;
  - Staff discussion paper *2006/08 State responses to Staff discussion paper 2006/03*;
  - Staff discussion paper *2006/09-S Proposed approach to obtaining consistent and reliable estimates of the length of State arterial roads*;
  - Staff discussion paper *2007/02-S Road length consultancy — preliminary report*;
  - *Consultancy to Measure the Length of State managed roads, June 2007*;
  - Staff discussion paper *2007/14-S Roads consultancy — Report to roads working party*;
  - Staff discussion paper *2007/24-S Assessing Roads in the 2010 Review*;
  - Staff discussion paper *2007/30-S Roads consultancy — Report of the roads working party*;
  - Staff discussion paper *2007/35-S Final Report of the roads working party*;
  - Commission Position Paper *2008/25 Roads*;
  - *Consultancy to Measure the Length of State managed roads, January 2009*; and
  - *2010 Review Draft Report*.

## APPENDIX 17A: COMBINING FACTORS

- 1 The appropriate weights for use and length have been a source of debate among States. This could reflect their individual experiences, where, for some States, length is a more significant driver of road expenses, whereas for others, use is a more significant driver. States with short road networks but heavy traffic would ascribe more of their expenses to road use and vice versa.
- 2 The Commission has decided to use the work of the NTC, on which all the States are represented, to inform a decision on the appropriate weights to be applied to the effects of road length and use.
- 3 The NTC apportions road expenses reported to it by the States into those attributable to road use and those which are not. It also allocates attributable costs to different classes of use, such as traffic. For example, according to the NTC, 38 per cent of expenses on routine maintenance are due to the effect of loads carried by heavy vehicles, measured using the average gross mass travelled (AGM-km). Table 17A-1 shows the NTC’s apportionment of costs to use.

**Table 17A-1 NTC allocation of road costs to measures of road use**

NTC Category	Attributable costs					Non-attributable
	VKT Prop'n	PCU-km Prop'n	ESA-km Prop'n	AGM-km Prop'n	HV-VKT Prop'n	Prop'n
A. Servicing and Operating	1.00	0.00	0.00	0.00	0.00	0.00
B1. Routine maintenance	0.00	0.38	0.00	0.38	0.00	0.24
B2. Periodic surface maintenance	0.00	0.10	0.00	0.60	0.00	0.30
C. Bridge Maintenance/Rehab	0.00	0.00	0.00	0.33	0.00	0.67
D. Road Rehabilitation	0.00	0.00	0.45	0.00	0.00	0.55
F1. Pavement improvements	0.00	0.00	0.45	0.00	0.00	0.55
F2. Bridge improvements	0.00	0.15	0.00	0.00	0.00	0.85
F3. Land acquisition, earthworks, extensions	0.00	0.10	0.00	0.00	0.00	0.90
E. Low-cost Safety/Traffic	0.80	0.20	0.00	0.00	0.00	0.00
G1. Corporate services	0.00	0.00	0.00	0.00	0.00	1.00
G2. Enforcement of heavy vehicle regulations	0.00	0.00	0.00	0.00	1.00	0.00

Note: The NTC also has categories for Vehicle registration, Driver licensing, Loan servicing and State expenses on local roads, which it excludes from its cost allocation for heavy vehicle determinations.

The NTC uses the following measures of road use: VKT: vehicle kilometres-travelled; PCU-km: passenger car unit equivalent-kilometres; ESA-km: equivalent standard axle-kilometres; AGM-km: average gross mass-kilometres; HV-VKT: heavy vehicle kilometres-travelled.

Source: NTC, 2007 *Heavy Vehicle Charges Determination: Regulatory Impact Statement Vol II Appendices*, Melbourne, 2007, page 19, Table 7.

- 4 The Commission has modified the NTC approach in several ways.

*Treatment of expenses not included in NTC analysis*

- 5 States report to the NTC spending on other items that are not used in the NTC's cost allocation for heavy vehicle determinations. These include vehicle registration (G3), driver licensing (G4), loan servicing (G5) and State spending on local roads (H3, H4, H5).
- 6 For the purpose of determining road expense weights, the Commission included vehicle registration, driver licensing and spending on local roads.
- 7 Western Australia and the Northern Territory said loan servicing (G5) proportions should be excluded as they were assessed in another category. The Commission agreed and excluded G5 expenses from its calculations.

*Treatment of expenses not attributable to length or use*

- 8 The Commission considers that some part of roads expenses not attributed to use is determined by population size and should be assessed equal per capita (EPC). This includes NTC expenses on corporate services, vehicle registration and driver licensing expenses. Victoria and the ACT said population was a more appropriate measure for these items. The Commission named this group of expenses 'Other services'.
- 9 Tasmania said that G2 expenses (enforcement of heavy vehicle regulations) should be assessed equal per capita rather than included with Heavy vehicle use expenses. It said the benefit of enforcement was increased safety, which was shared by the community as a whole. The Commission believes that, while heavy vehicle enforcement may lead to greater road safety, benefitting the community as a whole, this is not a justification for assessing those expenses equal per capita. Most roads expenses could be said to directly or indirectly improve road safety. The Commission followed the NTC allocation and allocated heavy vehicle enforcement expenses to heavy vehicle use.

*Treatment of capital expenses (NTC categories F1, F2 and F3)*

- 10 As a consequence of our decision to assess Depreciation expenses as a separate category, we have removed capital and depreciation-related NTC expense data from the roads assessment. These capital expenses will be used to derive the expense proportions for the roads parts of the Depreciation and Investment assessments (see the chapters dealing with these categories).

*Translation of the NTC cost allocation to the Commission's assessment*

- 11 Table 17A-2 summarises the Commission's treatment of NTC expenses for the Roads recurrent assessment. It shows that the Commission has:
  - combined the two NTC measures of traffic volume (VKT and PCU-km) into its traffic volume disability;
  - combined the three NTC measures of heavy vehicle use (ESA-km, AGM-km and HV-VKT) into its heavy vehicle use disability;
  - excluded expenses related to capital (F1, F2, F3);
  - allocated expenses relating to Bridges (C) to the bridges disability;

- allocated the Corporate services proportions (G1) and all the Vehicle registration (G3) and Driver licensing (G4) expenses to its other services disability;
- allocated all of the expenses relating to local roads (H3, H4, H5) to its local roads disability; and
- allocated the remaining non-attributable proportions to its road length disability.

**Table 17A-2 Application of NTC cost allocation to roads disabilities**

NTC Category	Disability					
	Traffic volume	Heavy vehicle use	Road length	Other services	Local roads	Bridges
	Prop'n	Prop'n	Prop'n	Prop'n	Prop'n	Prop'n
A. Servicing and Operating	1.00	0.00	0.00	0.00	0.00	0.00
B1. Routine maintenance	0.38	0.38	0.24	0.00	0.00	0.00
B2. Periodic surface maintenance	0.10	0.60	0.30	0.00	0.00	0.00
C. Bridge Maintenance/Rehab	0.00	0.00	0.00	0.00	0.00	1.00
D. Road Rehabilitation	0.00	0.45	0.55	0.00	0.00	0.00
E. Low-cost Safety/Traffic	1.00	0.00	0.00	0.00	0.00	0.00
F1. Pavement improvements	0.00	0.00	0.00	0.00	0.00	0.00
F2. Bridge improvements	0.00	0.00	0.00	0.00	0.00	0.00
F3. Land acquisition, earthworks, extensions	0.00	0.00	0.00	0.00	0.00	0.00
G1. Corporate services	0.00	0.00	0.00	1.00	0.00	0.00
G2. Enforcement of heavy vehicle regulations	0.00	1.00	0.00	0.00	0.00	0.00
G3. Vehicle registration	0.00	0.00	0.00	1.00	0.00	0.00
G4. Driver licensing	0.00	0.00	0.00	1.00	0.00	0.00
H3-H5. Local roads	0.00	0.00	0.00	0.00	1.00	0.00

Source: Commission calculation using NTC Heavy vehicle determination (Table 17A-1).

- As shown in Table 17A-3, the Commission has calculated disability weights using the proportions from Table 17A-2. Weights for each disability were calculated by distributing reported expenditure according to the modified NTC proportions. Reported rural expenses have been allocated to the rural disabilities of length, traffic volume and use, while urban expenses were allocated to the urban disabilities of length, traffic volume and use. For example, the \$88.4 million in routine urban maintenance has been allocated to urban road length (24 per cent), urban traffic volume (38 per cent) and urban heavy vehicle use (38 per cent).
- Once all expenses had been allocated, the shares of total expenses allocated to each disability are the weights the Commission used to combine State specific measures of disability to derive assessed State roads expenditure.
- There are some contentious issues in this allocation process. Ideally, road expense and assessment data would be apportioned between urban and rural roads and between road length

and road use. This would enable the Commission to associate road disabilities with the expenses that gave rise to them. While road expense data are apportioned between urban and rural, a further apportionment between length and use was not available. Conceptually, the apportionment could differ for urban and rural road expenses, but in the absence of data we have used Table 17A-2 to apportion both<sup>16</sup>.

- 15 The weights the Commission is using to combine its road disabilities for 2008-09 are:
- 5.0 per cent for local roads;
  - 39.5 per cent for rural roads (comprising 9.8 per cent for length, 16.9 per cent for traffic volume and 12.8 per cent for heavy vehicle use);
  - 30.6 per cent for urban roads (comprising 3.9 per cent for length, 21.0 per cent for traffic volume and 5.7 per cent for heavy vehicle use);
  - 4.6 per cent for bridges; and
  - 20.4 per cent for other services.
- 16 The weights suggest road use (which we measure using indicators of traffic volume and heavy vehicle use) is a more important driver of road maintenance expenses than road length because it affects 56.4 per cent of State expenses, compared with 13.7 per cent for road length.

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<sup>16</sup> The NTC advised that there is no research to support the application of different cost allocation proportions to urban and rural roads. It said that until there is reasonably strong evidence suggesting that different proportions apply to urban and rural roads, it was reasonable for the Commission to assume they are the same.

**Table 17A-3 Weighting of Roads expense drivers, 2008-09**

NTC Category		Expenses	Disabilities								Total	
			Local roads	Urban road length	Urban traffic volume	Urban HV use	Rural road length	Rural traffic volume	Rural HV use	Bridges		Other services
		\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	
A. Servicing and Operating												
	Urban	472.4	0.0	0.0	472.4	0.0	0.0	0.0	0.0	0.0	0.0	472.4
	Rural	408.2	0.0	0.0	0.0	0.0	0.0	408.2	0.0	0.0	0.0	408.2
B1. Routine maintenance												
	Urban	88.4	0.0	21.2	33.6	33.6	0.0	0.0	0.0	0.0	0.0	88.4
	Rural	340.8	0.0	0.0	0.0	0.0	81.8	129.5	129.5	0.0	0.0	340.8
B2. Periodic surface maintenance												
	Urban	161.3	0.0	48.4	16.1	96.8	0.0	0.0	0.0	0.0	0.0	161.3
	Rural	289.4	0.0	0.0	0.0	0.0	86.8	28.9	173.7	0.0	0.0	289.4
C. Bridge Maintenance/Rehabilitation												
	Urban	99.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	99.8	0.0	99.8
	Rural	121.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	121.5	0.0	121.5
D. Road Rehabilitation												
	Urban	218.6	0.0	120.2	0.0	98.4	0.0	0.0	0.0	0.0	0.0	218.6
	Rural	560.7	0.0	0.0	0.0	0.0	308.4	0.0	252.3	0.0	0.0	560.7
E. Low-cost Safety/Traffic												
	Urban	496.0	0.0	0.0	496.0	0.0	0.0	0.0	0.0	0.0	0.0	496.0
	Rural	254.3	0.0	0.0	0.0	0.0	0.0	254.3	0.0	0.0	0.0	254.3
F1. Pavement improvements												
	Urban	1 312.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Rural	617.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 17A-3 Weighting of Roads expense drivers, 2008-09 (continued)

NTC Category	Expenses	Disabilities									Total
		Local roads	Urban road length	Urban traffic volume	Urban HV use	Rural road length	Rural traffic volume	Rural HV use	Bridges	Other services	
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
F2. Bridge improvements											
Urban	570.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rural	565.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F3. Land acquisition, earthworks, extensions											
Urban	2 658.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rural	1 327.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
G1. Corporate services	413.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	413.6	413.6
G2. Enforcement of heavy vehicle regulations											
Urban	49.6	0.0	0.0	0.0	49.6	0.0	0.0	0.0	0.0	0.0	49.6
Rural	63.8	0.0	0.0	0.0	0.0	0.0	0.0	63.8	0.0	0.0	63.8
G3. Vehicle registration	363.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	363.8	363.8
G4. Driver licensing	213.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	213.5	213.5
H3-H5 Local roads	240.9	240.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	240.9
<b>Total</b>	<b>11 908.4</b>	<b>240.9</b>	<b>189.9</b>	<b>1 018.1</b>	<b>278.4</b>	<b>477.0</b>	<b>821.0</b>	<b>619.2</b>	<b>221.3</b>	<b>990.9</b>	<b>4 856.8</b>
Disability weight (% of total expenses)		5.0	3.9	21.0	5.7	9.8	16.9	12.8	4.6	20.4	100.0

Source: Commission calculation using unpublished NTC expense data provided annually by State road authorities.