

Audited Key Performance Indicators

Main Roads' Purpose and Government Desired Outcome

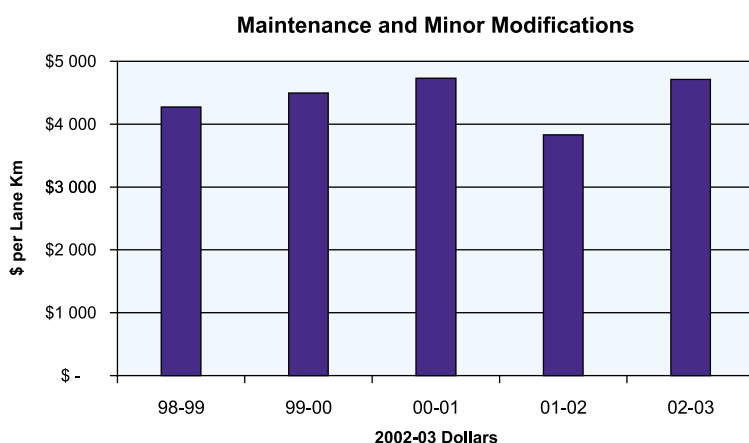
To provide a safe and efficient road network as part of an integrated Western Australian transport system within a sustainability framework.

Summary of Key Performance Indicators

OUTPUT (4 Outputs)	EFFICIENCY (4 Efficiency Indicators)	EFFECTIVENESS (6 Effectiveness Indicators)
1. Road Maintenance and Minor Modifications	1.1 Maintenance and Minor Modification Costs: Cost per lane kilometre to maintain and undertake minor modifications to the National and State road network.	1.2 Smooth Travel Exposure: The percentage of vehicle kilometres travelled on roads meeting roughness standard as used by Austroads. This indicator shows the extent to which Main Roads has maintained the road asset. It records travel on the network meeting recognised roughness benchmark intervention standards, therefore providing a measure of the delivery of a safe and comfortable ride. Well-maintained roads contribute to lower operating costs for road-users. 1.3 Community Perceptions of Ride Quality: Ride quality. This indicator complements the Smooth Travel Exposure Indicator by giving the public's opinion of ride quality.
2. Road Improvements	2.1 Improvement Expenditure: Cost per lane kilometre to undertake improvement works (such as widening, passing lanes and road reconstruction) and cost per intersection treatment (improvements to existing intersections).	2.2 Road Standards: This measure shows the extent to which vehicles travel on roads conforming to the operational standards of seal width, shoulder width and design speed. Improvement of the road network to meet operational standards enables more safe and efficient transport. 2.3 Road Network Permitted for Use by Heavy Freight Vehicles: The percentage of the network available to large freight vehicles. This indicator relates to the efficient transportation of goods within Western Australia. 2.4 Peak Hour Travel Times: Morning peak travel time from Metropolitan centres to the boundary of the Perth Central Area. This indicator relates to the efficiency of urban commuting.
3. Road Construction	3.1 Road Construction Costs: Cost per lane kilometre to construct various types of new roads.	3.2 Return on Construction Expenditure: Benefit Cost Ratios as used by Austroads. This indicator shows the benefits to the community that are delivered by the road and bridge construction program through reduced vehicle operating costs, travel time, crashes and flood closures.
4. Bridge Construction	4.1 Bridge Construction Costs: Cost per square metre of bridge deck to undertake various bridge works including, provision of new concrete and timber bridges, replacement bridges, replacement of bridges with culverts and strengthening works.	4.2 Bridge Standards: Bridges rated for higher productivity freight vehicles (percentage of bridges accessible). This indicator relates to the efficient transportation of goods within Western Australia. 4.3 Load Restricted Bridges The load restricted bridge indicator gives an indication of Main Roads ability to maintain bridges to minimum standards on the important transport routes. 4.4 Refer 3.2

1. Road Maintenance and Minor Modifications

1.1 Maintenance and Minor Modification Costs (Efficiency)



Works undertaken to preserve the existing road asset to specified standards. Maintenance costs refer to State and National Roads.

This indicator represents the financial efficiency of road and roadside maintenance works by showing the cost per lane kilometre to maintain acceptable travel conditions on Urban and Rural National and State Roads.

During 2000-01 Main Roads progressively implemented delivery of the maintenance and minor

(<\$1.5 million) modification works through long (10 year) Term Network Contracts (TNC's). The fall in 2001-02 reflects a transitional adjustment to this new form of contracting. The 2002-03 result indicates a return to a more normal level of network maintenance costs.

1.2 Smooth Travel Exposure (Effectiveness)

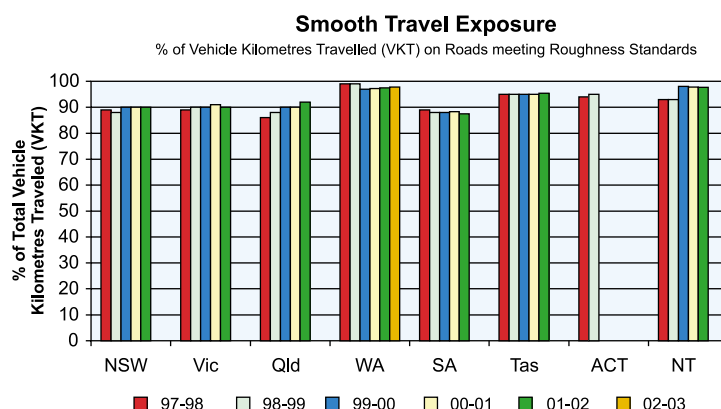
Maintenance works are undertaken to meet recognised benchmark intervention standards, which limit the exposure of road users to unexpected defects. Well maintained roads provide a safer and more comfortable ride and contribute to lower vehicle operating costs, particularly for heavy vehicles. They are also more likely to achieve their optimum life at minimal total cost to the community. A key measure of road condition is road roughness.

Smooth Travel Exposure is a key indicator of the effectiveness of road maintenance expenditure. It represents the proportion of travel undertaken each year on all roads with surface roughness less than 110 NRM (NAASRA Roughness Meter), the national standard that provides acceptable travel conditions for passenger car users.

Of the total travel on Western Australian sealed national and state roads, 97.5% is undertaken on roads that meet the roughness standard. From the length perspective, 97.8% of these roads meet the roughness standard. These figures indicate that Western Australia continuously provide smooth travel for road users.

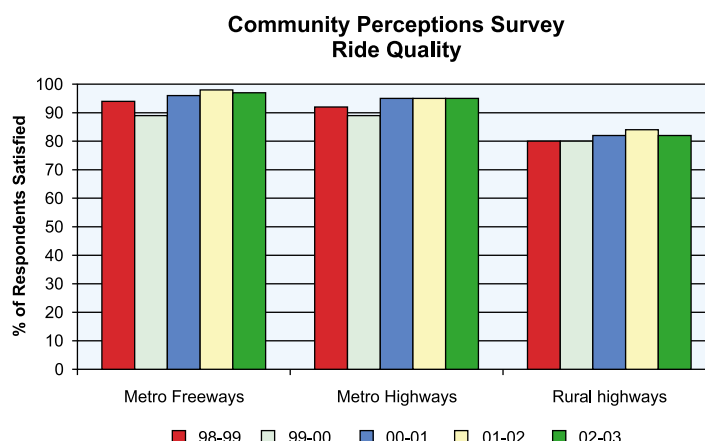
This indicator shows Western Australia with better performance than the other states (except Northern Territory). However, this very specific indicator must be read in conjunction with the Road Standards indicator at 2.2.

While 2002-03 figures are not yet available for other States, prior years figures have been included to allow historical comparisons.



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1.3 Community Perceptions of Ride Quality (Effectiveness)



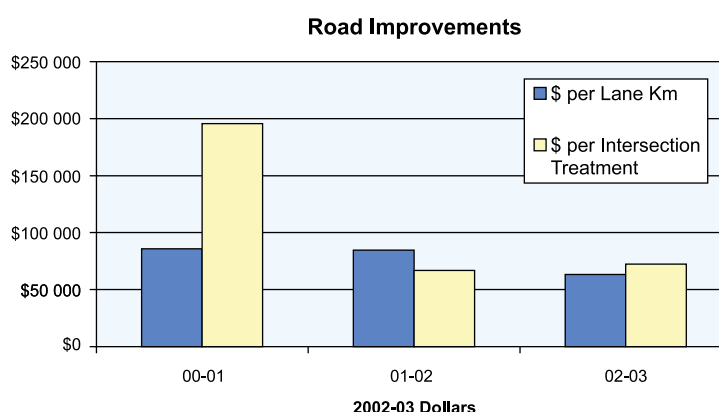
Physical measurements of the road network are further supported by results from the annual Community Perceptions Survey. Respondents were asked to give their opinion to conditions of road or ride quality of the road network under Main Roads' control. Indicator 1.3 also complements the previous indicator 1.2 by presenting road user perceptions of the condition to Freeways and Highways. These results are compatible with the large proportion of vehicle kilometres travelled on roads that meet roughness standards as shown in indicator 1.2 and shows the standard set as being acceptable, and meeting community standards. The results represent all respondents who gave a "just OK" rating or better, and are based on a random sample of 1150 people (250 persons in the metropolitan area and 900 persons in the rural areas). This gives an outcome within +/-3% of the actual figures at a 95% level of confidence.

2. Road Improvements

2.1 Improvement Expenditure (Efficiency)

Indicator 2.1 shows the cost per lane kilometre of improvements undertaken during the last 3 years and the cost per intersection treatment.

Improvement works are undertaken to maintain and improve the capacity of the existing road network. This is achieved through works that improve road standards and incorporate major geometric improvements (examples being, reconstruction of failed sections of existing roads, widening and provision of passing lanes).



This indicator must be read in conjunction with other performance indicators such as Road Standards.

Note: Works included in intersection treatments are not generic in nature and may vary considerably in cost. Therefore care should be taken when comparing the cost per intersection treatment between years, as variations in the average unit rate may be more to do with the mix of works undertaken than efficiencies in production.

2.2 Road Standards (Effectiveness)

Indicator 2.2 is a demand related measure of the effectiveness of improvement expenditure. It shows the extent to which vehicles travel on roads, which conform, to the operational standards of seal width, shoulder width and design speed. These standards provide for a safe and efficient road network and are based upon National Standards relating to road usage.

2.3 Road Network Permitted for Use by Heavy Freight Vehicles (Effectiveness)

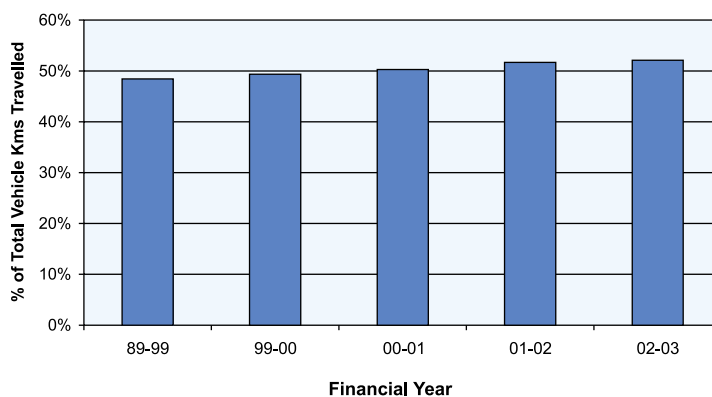
The use of larger vehicles with greater payloads can increase the overall efficiency of freight operations, resulting in lower transport costs. However, to maintain road safety and guard against infrastructure damage, restrictions are placed on trucks that are larger than AUSTROADS Class 9; these include B-doubles (Class 10), double road trains (Class 11) and triple road trains (Class 12).

Because of the relatively high efficiency of these vehicles, the proportion of roads accessible to them is an important factor in the overall efficiency of freight transport in this State. The accompanying chart shows the extent to which the combined National and State road network in Western Australia is accessible to these classes of vehicle. The indicator was established in 1997-98 and therefore 6 years of data is available.

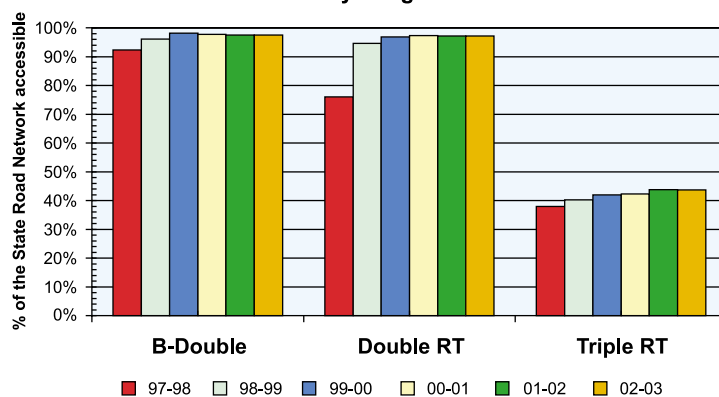
As there are very few B-double roads that are not also accessible by double road trains, the B-double statistic is only fractionally larger than the double road train statistic.

The percentages have not changed appreciably from 2001-02, since any extensions to network access over this period have been matched by a small increase in the size of the classified road network.

**Road Standards
Vehicle Kilometres Travelled on Roads Meeting
Operational Standards**



**Road Network Permitted for Use by
Heavy Freight Vehicles**



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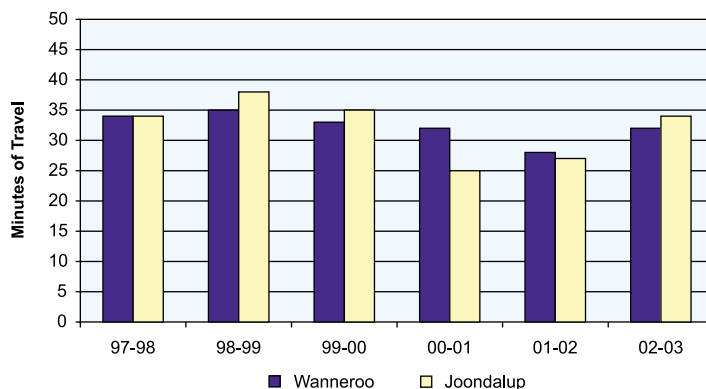
2.4 Peak Hour Travel Times (Effectiveness)

Main Roads' effectiveness in facilitating the efficient movement of people and goods across the state road network is indicated by morning peak-hour travel times. Indicators in the three graphs on this page, show the trend in morning peak-hour travel times over the last six years from seven Metropolitan centres to the boundary of the Perth Central Area.

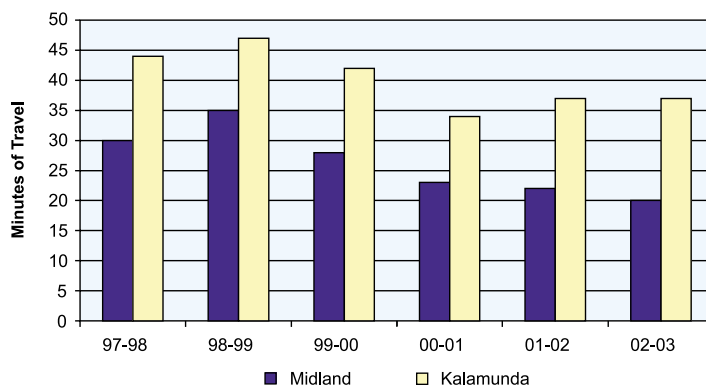
There was a significant improvement in morning peak-hour travel times from 2001-02 to 2002-03 over the Armadale route. This improvement can be attributed to the changes to the road network, which has affected traffic flows on Albany Highway.

There was a significant increase in the morning peak-hour travel time over the Wanneroo, Rockingham and Joondalup routes. The increased congestion over Wanneroo Road, Kwinana Freeway and Mitchell Freeway contributed to the increases in morning peak-hour travel times.

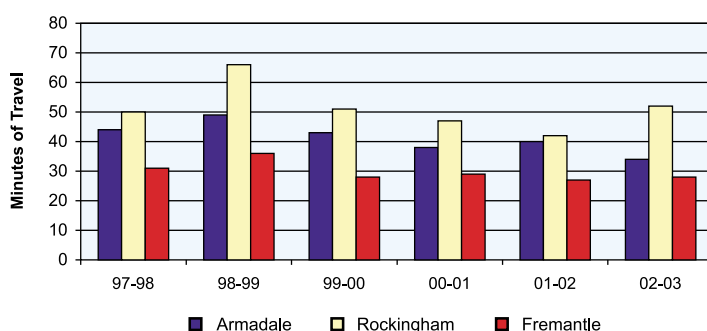
A.M. Peak Hour Travel Times: Wanneroo and Joondalup



A.M. Peak Hour Travel Times: Midland and Kalamunda



A.M. Peak Hour Travel Times: Armadale, Rockingham and Fremantle



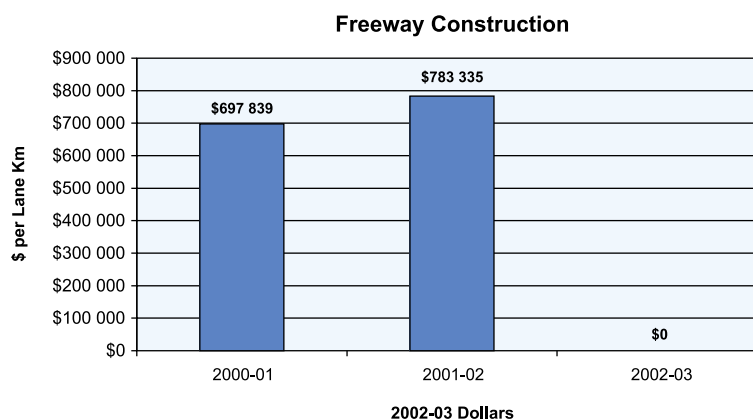
3. Road Construction

3.1 Road Construction Costs (Efficiency)

Indicator 3.1 shows the cost per lane kilometre of constructing various types of new roads over the last 3 years. The 5 graphs below show the unit rates of construction for Freeways, Urban Highways, Rural Highways, Rural Main Roads and Local Roads (Note: not all categories of road are constructed each year)

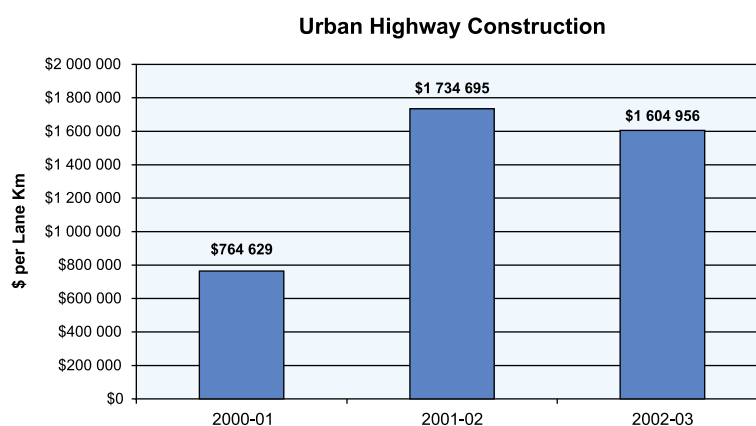
Freeways:

No expansion activities were undertaken on the Freeway network during 2002/03.



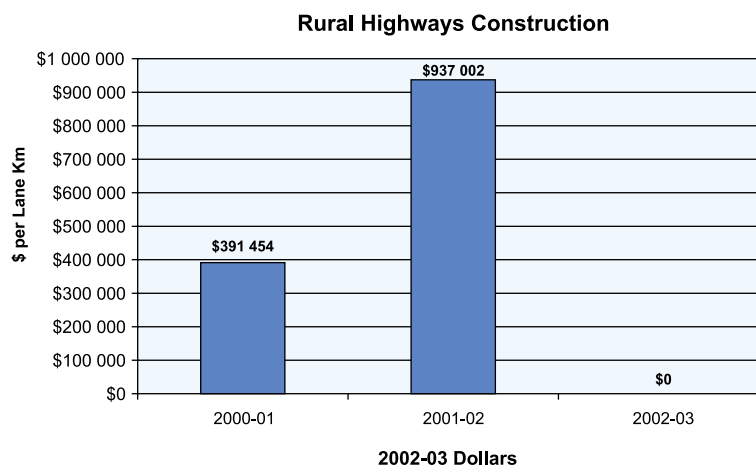
Urban Highways:

Higher unit rates in 2001-02 and 2002-03 reflect the higher standards adopted for Roe and Tonkin Highways in comparison to Fremantle - Rockingham and Wanneroo Road in 2000-01.



Rural Highways:

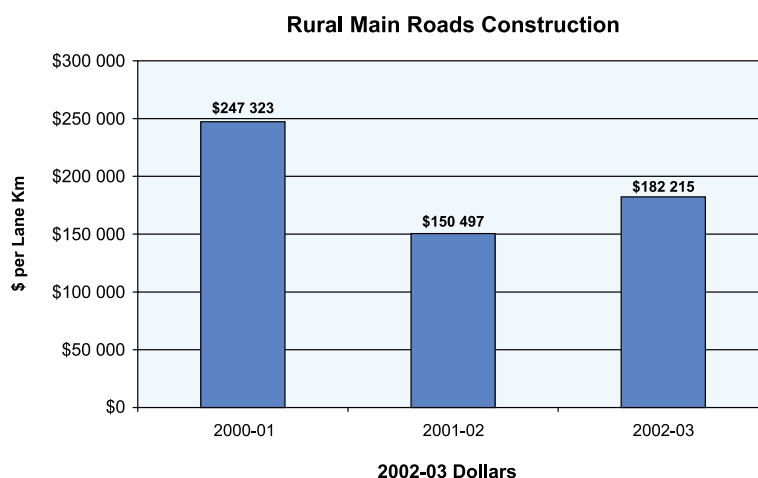
No expansion activities were undertaken on Rural Highways during 2002-03. The high cost in 2001-02 reflect the abnormal costs associated with the Northam Bypass project.



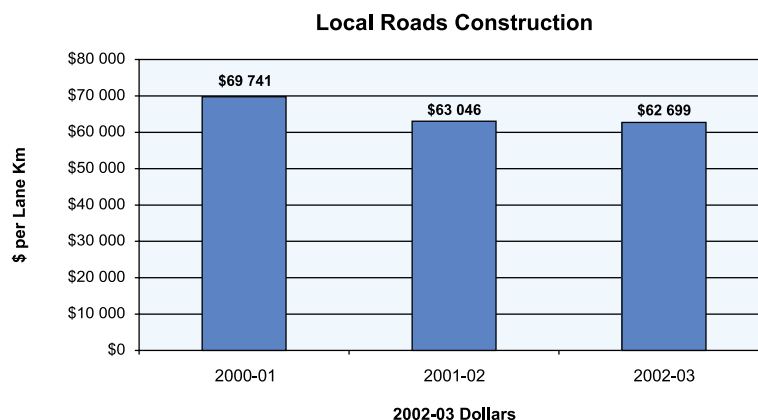
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Rural Main Roads:

The high unit rate in 2000-01 reflects the cost of constructing the Karratha Western Access.



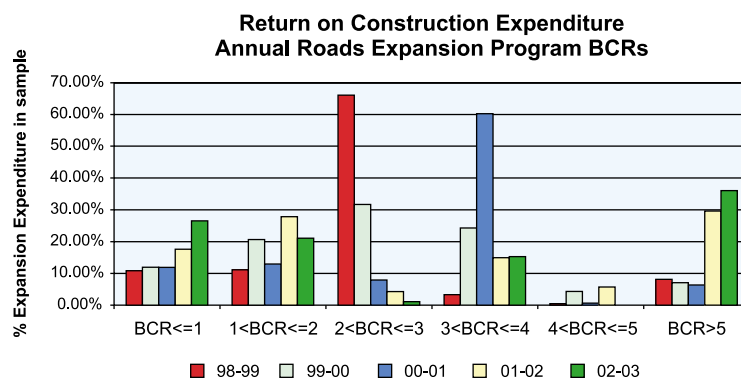
Local Roads Construction.



3.2 Return on Construction Expenditure (Effectiveness)

New road construction works add to the capacity of the road network. Return on Construction Expenditure is based on Benefit Cost Ratio (BCR) estimates of a data set of projects undertaken each year by Main Roads. It indicates the extent to which road construction expenditure will deliver future economic benefits to the community.

Indicator 3.2 represents the distribution of BCRs for all new road construction projects over \$500,000. The graph expresses the total dollar value of projects with BCRs within each range as a percentage of the total for evaluated works over \$500,000.

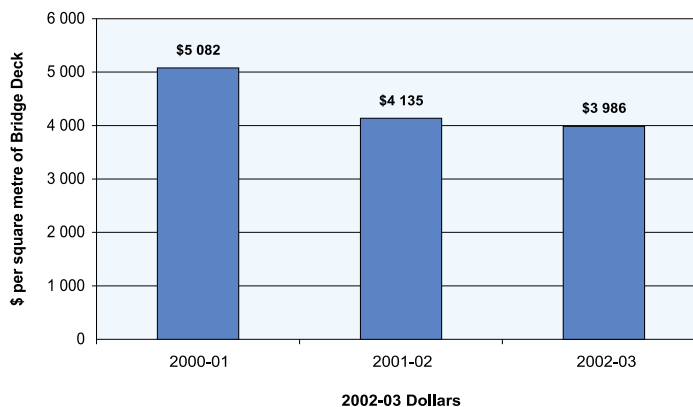


4. Bridge Construction

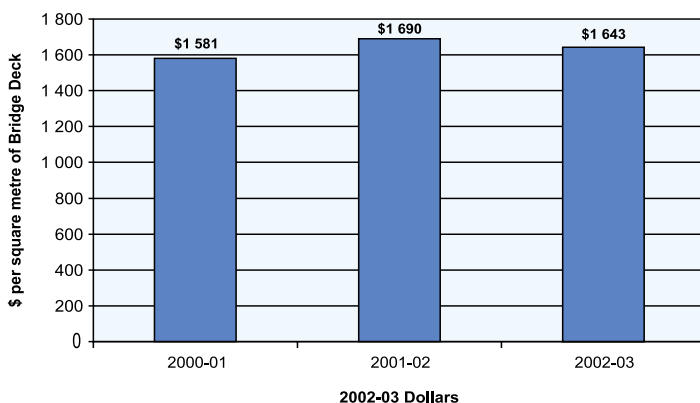
4.1 Bridge Construction Costs (Efficiency)

Indicator 4.1 shows the cost per square metre of constructing various bridge works. The 4 graphs below show the unit rates for construction of new concrete bridges, new timber bridges, replacement of bridges with culverts and strengthening works.

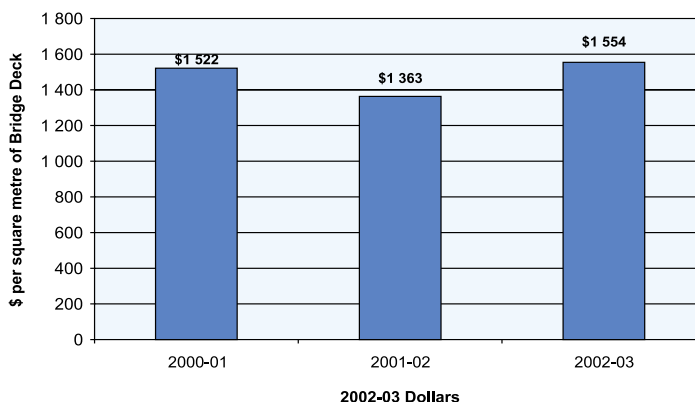
Construct New Concrete Bridge



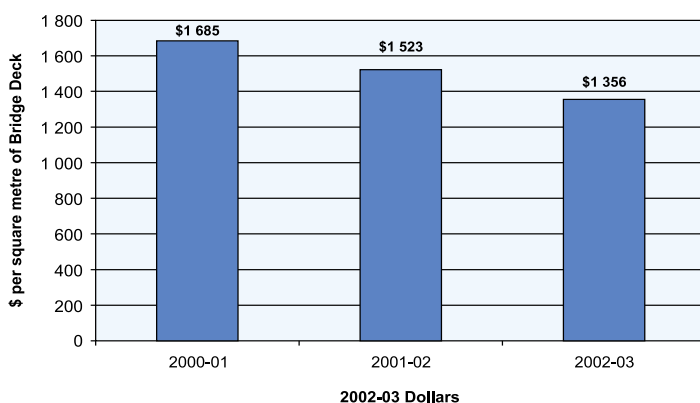
Construct New Timber Bridges



Replace Bridge With Culverts



Bridge Strengthening Works



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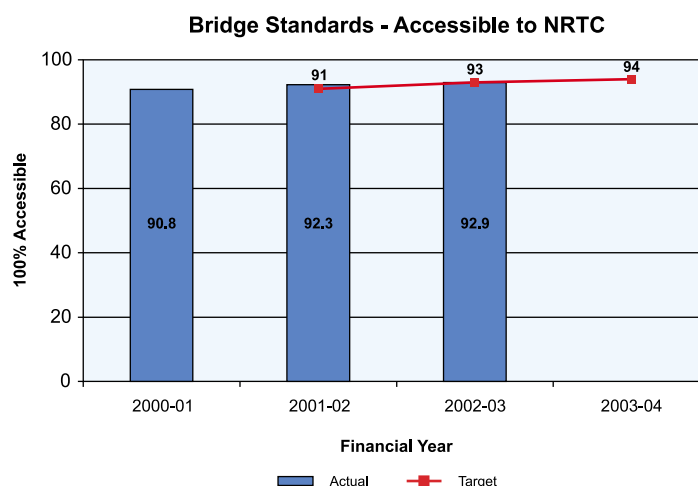
4.2 Bridge Standards – Accessible to National Road Transport Commission (NRTC) Vehicles (Effectiveness)

This indicator shows the extent to which NRTC vehicles can travel on bridges, governed by strength requirements. This standard provides for a safe and efficient road network and is based upon standards relating to improved transport efficiencies. The bridge standards indicator gives an indication of Main Roads ability to plan for and maintain bridges to changing load standards for freight vehicles.

The following graph indicates the percentage of bridges accessible to NRTC vehicles, reported over time:

Note: NRTC vehicles include four different vehicles (semi trailer, tri-tri b-double, double bottom road train and triple bottom road train) up to 124.5t in gross mass and 49m in length, defined as part of the National Mass Limits Review.

There is a project under way to upgrade the NRTC deficient bridges, having been identified in a National study titled 'The Effect of the NRTC Mass Limits Review'. Federal funds have been committed to National Highway bridges and some State Road bridges, with further funds being sought on other deficient bridges throughout Western Australia.



As such, the percentage of bridges accessible to these NRTC vehicles should continue to rise slightly in subsequent years. There is a commitment to open up the road freight network to road friendly suspensions that accommodate higher axle loadings and therefore provide increased freight efficiency.

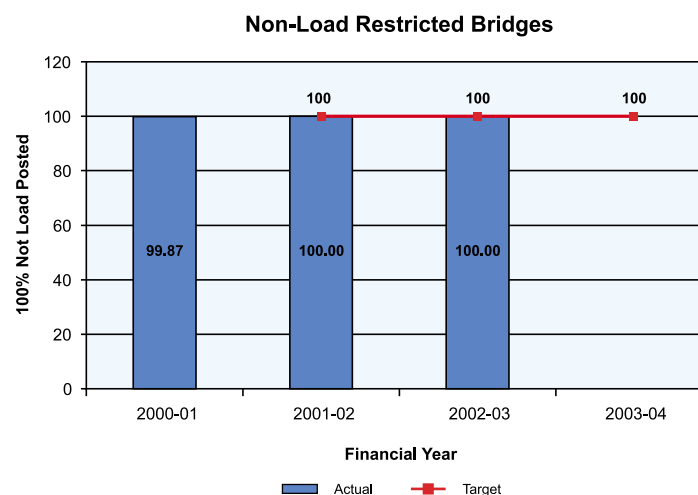
4.3 Load Restricted (Posted) Bridges (Effectiveness)

This indicator shows the extent to which general as-of-right vehicles at vehicle standard regulation (VSR) loads (those vehicles not requiring special permit for movement) can travel on bridges because of no posted load limit restrictions. This standard provides for a safe and efficient road network and is based upon standards relating to improved access. The non-load restricted bridge indicator gives an indication of Main Roads ability to maintain bridges to minimum standards on the important transport routes.

The following graph indicates the percentage of bridges not load posted, reported over time:

Main Roads has statutory responsibility to rate all bridges on public roads for safe load capacity. If a bridge rating indicates load carrying capacity below VSR limits a posted load limit is required to restrict the load legally permitted to cross the bridge.

The target for the percentage of non-load posted bridges on National Highways and State Roads is 100%. This aim is set to ensure no restrictions for general as-of-right vehicles on these main links in the State.



Road Industry Fact Summary

Road Industry Fact Summary (2002)

	WA	Aust	WA (%)
Area (Square km)	2 529 875	7 692 024	32.89
Population	1 927 322	19 662 781	9.80
Licensed drivers and riders	1 421 801	15 496 304	9.18
Vehicles on register including motor cycles	1 405 676	12 821 961	10.96
Annual Vehicle Kilometres Travelled (100M VKT)	188.22 *	1 961.23 *	9.60
Road length excluding forestry roads (kms)	147 297 **	810 022 **	18.18
Fatalities (for calendar year 2002)	179	1 724	10.38
Fatalities/100 million VKT	0.95	0.88	
Fatalities /100,000 persons	9.29	8.77	
Fatalities/10,000 vehicles	1.27	1.34	
Serious injuries (for calendar year 2002)	2 895	N/A	
Serious injuries/100 million VKT	15.38		
Serious injuries /100,000 persons	150.21		
Serious injuries/10,000 vehicles	20.60		

* Main Roads Estimates.

** WA road length as at 30 June 2003, Australia road length as at 30 June 2002 (indicative % only).

*** Serious injuries for Australia are not available

Sources

Area	Australian Bureau of Statistics Year Book 2003
Population	Australian Demographic Statistics (30 June 2002)
Licensed Drivers	Australian Bureau of Statistics Year Book 2003 (30 June 2002)
Road Length	Australian Bureau of Statistics Year Book 2003 (30 June 2002) and Main Roads WA (30 June 2003)
Fatalities	Main Roads Accidents System and Australian Transport Safety Bureau (31 Dec 2002)
Vehicles on Register	ABS Motor Vehicle Census (31 Mar 2002)

Road Classification (as at 30 June 2003)	Sealed (km)	Unsealed (km)	Total (km)	Sealed %
National Highways	4 649	0	4 649	100
State Highways	6 061	167	6 228	97
Main Roads	5 825	1 033	6 858	85
Sub-Total	16 535	1 200	17 735	93
Local Roads regularly maintained	32 458	89 829	122 287	27
Local Roads not regularly maintained	77	3 772	3 849	2
Sub-Total	32 535	93 601	126 136	26
Forestry Roads	70	26 980	27 050	0
National Park Roads	54	2 250	2 304	2
Privately maintained Roads	119	1 003	1 122	11
Sub-Total	243	30 233	30 476	1
Total WA Road Network	49 313	125 034	174 347	28

Source

Main Roads (30 June 2003)

Map of Western Australian State Road Network

