

# *Performance Audit Report*

**Roads and Traffic  
Authority of NSW**

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**Planning for  
Road Maintenance**

**State Library of New South Wales cataloguing-in publication data**

New South Wales. Audit Office.

Performance audit report : Roads and traffic Authority of NSW : planning for road maintenance / [The Audit Office of New South Wales].

0734721056

1. Roads and Traffic Authority of NSW – Auditing. 2. Roads – New South Wales – Maintenance and repair – Finance – Auditing. 3. Roads – New South Wales – Maintenance and repair – Planning – Auditing. I. Title: Roads and Traffic Authority of NSW : planning for road maintenance.

354.7724609944

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# **Executive Summary**

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## **The Audit**

The audit had as its objective an evaluation of the efficiency and effectiveness of planning by the Roads and Traffic Authority (RTA) for road maintenance in NSW. In its approach the audit compared the RTA's policy and practices with better practice in road maintenance.

The audit focused on State Funded Roads, that is, those roads which comprise the major arterial links between the States, regional links across NSW and major urban arterial routes.

The term "road" in this report includes pavements, bridges and the roadside (where maintenance is referred to as route maintenance). Individual projects of maintenance are collectively described as the *Road Network Infrastructure Maintenance Program* (RNIM).

## **Recent Developments**

The course of the audit has witnessed significant changes in the RTA particularly in its approach to road maintenance. These changes include:

- The release of a *Road Network Infrastructure Strategic Plan* and a greater emphasis on strategic planning on road maintenance which mirrors the Government's *Action for Transport 2010 Plans and the RTA's plan for traffic and road management (The Journey Ahead)*
- a clearer separation of the roles of funder and provider to enable the identification and improved transparency of costs for road maintenance
- a shift from a RTA in-house "preferred service provider model" to competitive tendering to reflect the Government's Service Competition Policy which has the objective of achieving greater value for money
- accelerated investigation of road management information systems
- a review of the *Roads Act 1993*.

## **Audit Opinion**

The Audit Office is of the opinion that the RTA is taking positive steps in planning for road maintenance and in many instances follows better practice. There are, however, some important improvements which need to be implemented in order to enhance the efficiency and effectiveness of that function.

<b>Audit Findings</b>	The audit opinion is based on the following findings.
<i>Strategic Approach</i>	<p>The RTA has adopted a strategic approach to road maintenance, the objectives of which are linked to the Government's transport plan and to the RTA's plan for roads and the management of traffic.</p> <p>The way in which priorities for maintenance are set follows recognised asset management principles. Resources are allocated first to works requiring attention in terms of access and safety. Projects where roads and bridges are of strategic economic and social importance are determined in order of priority by factors such as use by freight carrying vehicles.</p>
<i>Measuring and Reporting of Performance</i>	<p>The RTA reports on certain road maintenance network measures. These include outputs such as the proportion of roadway rehabilitated and outcomes such as ride quality, pavement durability and pavement rutting.</p> <p>However, the reporting of Program measures in terms of network performance requires a greater focus on monitoring output and performance against plans and the reporting of variations and exceptions against targets. There is also a need for the regular and systematic reporting of the reasons for delays in maintenance projects. This does not currently occur.</p> <p>The RTA is developing interim and longer term reporting arrangements to address these issues.</p>
<i>Information Systems</i>	<p>There is a gap between better practice and current information systems.</p> <p>The RTA has however, the elements to construct an integrated, corporate system to support sound investment decisions in road maintenance. The constraints of current systems:</p> <ul style="list-style-type: none"><li>▪ inhibit a more efficient and effective analysis of the relative need for road maintenance resources and their allocation across the network</li><li>▪ render benchmarking and trend analysis more difficult. The analysis of information is, at present, labour intensive and time consuming.</li></ul> <p>The approach of each Region of the RTA to data collection and analysis often differs in important aspects. Southern and Western Regions have used information systems to produce relevant planning data and reports on network conditions and needs.</p>

These initiatives provide commendable examples of ways to use management information in maintenance planning. The RTA would benefit from ensuring that examples of good practice in particular Regions are promulgated to other Regions.

The RTA is currently evaluating database systems to store road inventory, condition and engineering data (an existing data management system is currently used for bridge structures which meets current information requirements of the RTA).

*Value for Money*

To date, there has been limited competitive tendering where road maintenance can potentially be undertaken by any of a number of service providers, including RTA in-house teams.

RTA “in-house teams” have generally been the “preferred service provider” with only around 7 per cent of road maintenance on State Funded Roads currently contracted out. This compares unfavourably with most other States.

The lack of market testing (which involves inviting tenders for maintenance and comparing bids in terms of value for money) and competitive tendering has created uncertainty as to whether the RTA is achieving maximum value from its maintenance expenditure.

Recent changes by the RTA to clarify the roles of funder and service provider and to introduce competitive tendering in line with the Government’s Service Competition Policy are designed to address this concern.

*The Concept of the “Roads Authority”*

There is a tension between the legislative and the administrative frameworks as to the role, responsibilities, powers and most importantly, accountabilities of local government as “the roads authority”.

A council acting in its capacity as the “roads authority” for example, may see its role as the controller of a project rather than as an agent of the RTA (and therefore simply the provider of road maintenance on behalf of the RTA).

It is understood the current review of the *Roads Act 1993* will clarify the relative positions of the RTA and councils in regard to road maintenance.



*The Environment*

The RTA has shown leadership in regard to environmental and heritage issues in terms of road maintenance. For example the RTA has won awards for environmental initiatives and has developed Codes of Practice and Environmental Guidelines endorsed by environmental and heritage agencies.

The RTA makes a concerted effort to comply with all relevant legislation concerning the environment. In doing so it takes a no risk approach to the assessment and management of environmental issues.

The processes for assessing environmental and heritage impacts and for consultative processes do seem cumbersome however for certain types of maintenance works. These processes, the resultant costs and delays and extensions to projects warrant review. For these reasons there is a need for the RTA to consider a more strategic approach to environmental assessments undertaken in compliance with the law.

The current Protocol between the RTA and the EPA on managing road work issues requires review because of recent changes to pollution control legislation. It would also seem timely to assess the effectiveness and efficiency of a range of discretionary consultations with other environmental and heritage agencies.

*State-wide Issues*

Currently, issues common to certain maintenance works across the State (such as timber bridge replacements) are dealt with project by project resulting in a duplication of effort. There is a need to develop procedures to deal with common issues.

The processes for managing community consultation have improved. Corporate guidelines and community consultation models and checklists developed in one Region should provide assistance in other Regions.

## Summary of Recommendations

### It is recommended that the RTA:

- Information Systems*
- continue to examine options for an integrated road information system incorporating those elements of better practice that are relevant to the needs of the RTA. The model used by the Department of Infrastructure, Energy and Resources (DIER) in Tasmania provides a role model.
- Measuring and Reporting Performance*
- finalise the range of key performance indicators to be used across the road network in terms of road maintenance
  - give greater focus to the monitoring and reporting of outputs and outcomes and variations and exceptions against key performance indicators/ targets.
- Value for Money*
- continue to pursue its recent strategies including competitive tendering to achieve better value for road maintenance expenditure.
- Project Planning*
- improve Program/ project planning and management by:
    - identifying reasons for project delays
    - systematically and regularly collating information on project delays
    - identifying all maintenance costs, including costs associated with environmental assessments.
- State-Wide Management of Environmental Issues*
- consider the need for a state-wide strategy for managing environmental issues common to maintenance works (such as country timber bridges, emergencies)
  - evaluate the effectiveness of the RTA/NPWS Environmental Management Plan for Road Maintenance Activities within Kosciuszko National Park as a model for environmental issues on a locality basis
  - continue its program of pre-qualifying contractors in environmental and heritage issues, particularly if the practice of contracting out is to be expanded.

*Protocols and Agency Consultation*

- review the effectiveness and the efficiency of the current Protocol with the EPA
- review the efficiency and effectiveness of discretionary consultative arrangements with other regulatory agencies.<sup>1</sup>

*Community Consultation*

- provide guidance and training to staff in community consultation, utilising *Community Consultation Guidelines* and consider using mediation resources to manage community consultation on sensitive projects
- consider better practice in some Regions (for the management of environmental issues) for promulgation to all Regions within the RTA, for example, the state-wide use of the *Community Impact/ Involvement Checklist* developed by Western Region.

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<sup>1</sup> Agencies which would need to be involved would include RTA, Land and Water Conservation (LAWC), Fisheries, National Parks and Wildlife Service (NPWS) and Agriculture.

## **Response from the Roads and Traffic Authority**

I refer to the Performance Audit Report prepared on Planning for Road Maintenance and am pleased to note the Audit Observations and findings recognise the substantial change that has occurred in the management of Road Maintenance over the last year and the changes proposed for the future.

The report acknowledges the recent developments during the course of the Audit ie:

- the release of the “*Road Network Infrastructure Strategic Plan*” reflecting the Government’s “*Action for Transport 2010*” plans and the “*RTA’s Plan For Traffic and Road Management*” and “*The Journey Ahead*”
- clearer separation of the roles of funder and provider
- development of a strategy to ensure value for money in delivery and reflect the Government’s Service Competition Policy
- accelerated investigation of road management information systems
- *Report on a Review of the Roads Act.*

Implementation of a reform agenda such as the above will take some time to complete but the RTA is committed to implementing these changes to improve road maintenance outcomes.

Comparison of the RTA management against “better practice” has shown that the RTA is achieving or striving for, the greatest benefit to the road users and the people of NSW through the maintenance of the state road network.

Recognition of the RTA’s strong environmental management record in the report is also noted. The RTA has strived to show strong corporate leadership in the way it handles its environmental obligations. The report has recognised our success in this area.

Having made these general remarks, the following comments are provided on the recommendation included in the Report.

*(Response continued overleaf)*

## Comments on the Recommendations

- Information Systems**
- *Continue to examine options for an integrated road information system incorporating those elements of better practice that are relevant to the needs of the RTA. The model used by the Department of Infrastructure, Energy and Resources (DIER) in Tasmania provides a role model.*

The RTA agrees that the road information systems to support the management of maintenance are not best practice.

Following a public expression of interest process for an integrated road information system, a short listed proponent was trialed in early 1999. The trials were not satisfactory and hence discontinued in July 1999.

Since that time the RTA has approached the Department of Infrastructure Energy & Resources in Tasmania and obtained agreement to trial the next version of their road information system (due mid-November 1999).

At the same time the RTA has investigated world-wide, the available systems for road management. Three other systems that meet the RTA's information technology architecture have been located. Preliminary discussions are being held with the suppliers of each.

The RTA intends to adopt an integrated road information system in the near future.

- Measuring and Reporting Performance**
- *Finalise the range of key performance indicators to be used across the road network in terms of road maintenance.*
  - *Give greater focus to the monitoring and reporting of outputs and outcomes and variations and exceptions against key performance indicators / targets.*

Refocussing of the RTA through the refinement of the client, purchaser, provider model as part of the RTA's Change Management 2 restructure has allowed the opportunity to address accountabilities and responsibilities in the delivery of road maintenance.

Integral to the ongoing implementation of this reform will be the determination of key performance indicators and reporting requirements by the client. The proposed program reporting arrangements will initially address this issue.

### **Value For Money**

- *Continue to pursue its recent strategies including competitive tendering to achieve better value for road maintenance expenditure.*

The May 28 1999 announcement by the RTA of the competitive tendering initiative for selected maintenance works was an initial step in the introduction of business like arrangements. These arrangements are all directed towards improved accountability and an ability to demonstrate value for money.

The RTA is presently engaged in a process with key stakeholders to improve the effectiveness of and to introduce competitive pressures to road maintenance delivery.

### **Project Planning**

- *Improve Program / project planning and management by:*
  - ❑ *Identifying reasons for project delays*
  - ❑ *Systematically and regularly collating information on project delays*
  - ❑ *Identifying all maintenance costs, including costs associated with environmental assessments.*

The RTA accepts the Audit recommendation to improve practice on these aspects of program management. While regional understanding of these aspects is in place there is a need to address these issues on a state-wide basis.

### **State-Wide Management of Environmental Issues**

- *Consider the need for a state-wide strategy for managing environmental issues common to maintenance works (such as country timber bridges, emergencies)*
- *Evaluate the effectiveness of the RTA / NPWS Environmental Management Plan for Road Maintenance Activities within Kosciusko National Park as a model for environmental issues on a locality basis*
- *Continue its program of pre-qualifying contractors in environmental and heritage issues, particularly if the practice of contracting out is to be expanded.*

With a few exceptions, the assessment of environmental issues follows corporate guidelines and project by project analysis. For road maintenance the repetitive nature of the work has been addressed by reference to generic documents for environmental assessment but these are still adopted on a project by project basis.

The Audit Office's suggestion to investigate a state-wide approach to some of these issues has merit and will be investigated.

**Protocols and Agency Consultation**

- *Review the effectiveness and the efficiency of the current Protocol with the EPA*

The RTA / EPA protocol was put in place in 1996. Recent changes to the relevant legislation signal, that it is opportune to review the performance and ongoing appropriateness of the protocol. Any necessary changes to reflect the new legislation and any improvements possible to increase efficiency and effectiveness of road maintenance will be incorporated.

- *Review the efficiency and effectiveness of discretionary consultative arrangements with other regulatory agencies.*

Achievement of corporate leadership in environmental management has required an approach where the RTA has consulted widely on the possible effects of projects. Obviously there is a cost associated with this consultation.

The RTA will review its practices to determine whether guidelines can be given to regional staff to better manage this discretionary consultation without diminishing the RTA's record in environmental management.

**Community Consultation**

- *Provide guidance and training to staff in community consultation, utilising Community Consultation Guidelines and consider using mediation resources to manage community consultation on sensitive projects*
- *Consider better practice in some Regions (for the management of environmental issues) for promulgation to all Regions within the RTA, for example, the state-wide use of the Community Impact / Involvement Checklist developed by Western Region.*

The projects undertaken by the RTA are always highly visible and affect road users, communities and individuals. The RTA has produced Community Consultation Guidelines as a guide to staff to facilitate project planning and obtain the best possible outcomes for the community and road users.

Where best practice is identified in one area it is always the RTA's intention to facilitate technology transfer and adopt a more uniform approach.

In this case the RTA will investigate the wider adoption of the western region checklist approach.

(Signed)

Paul Forward  
Acting Chief Executive  
Date 10 November 1999

END OF RESPONSE BY THE RTA

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# **1. Introduction**

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## 1.1 Introduction

Road maintenance is concerned with the preservation of the roadway. This includes the pavement surface, its shoulders, the roadside and structures such as bridges and car carrying ferries.<sup>2</sup>

There are around 180,000 km of roads in NSW. The RTA is responsible for and manages around 20,000 km of these, most of which are State Funded Roads and the National Highways.<sup>3</sup> The remaining roads are mostly Regional and Local Roads, where maintenance is usually managed by local government.<sup>4</sup>

There are also around 4,000 bridges on State Roads including timber bridges which are currently being strengthened or replaced under the *Country Timber Bridge Program*.<sup>5</sup>

**Allocation of Funds** Roads are a considerable public investment. The replacement value of roads (excluding Council Regional and Local Roads) in NSW is estimated to be \$20.6b. Compared with the National Highways in NSW, State Funded Roads are more extensive, have a greater replacement value and carry more traffic (Table 1.1).<sup>6</sup>

The RTA has an annual budget of approximately \$2b of which the maintenance program for 1998/99 was \$674.5m. This included \$130.8m of Commonwealth funding for the National Highways and \$324m for State Funded Roads as financial assistance for maintenance (Table 1.2 at end of this chapter).

## 1.2 Types of Road Maintenance

Maintenance to pavements includes:

- fixing potholes, rough patches and broken edges
- recoating bitumen and concrete surfaces to waterproof the road and reduce skidding
- rebuilding roads when they are fatigued, often by recycling existing materials.<sup>7</sup>

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<sup>2</sup> In road maintenance terminology, “roads” are referred to as pavements. Where roads are referred to in this report, they include pavements, bridges and route maintenance. The maintenance of traffic facilities is sometimes included in a broader maintenance definition.

<sup>3</sup> Also referred to as part of the National Highway system or the National Highways.

<sup>4</sup> Around 3,000 km are Regional and Local roads in Unincorporated NSW. The maintenance of these is managed by the RTA. Note: the term “local government” is used interchangeably with councils in this report.

<sup>5</sup> State Roads include the National Highways and State Funded Roads.

<sup>6</sup> RTA *Infrastructure Maintenance Plan 1996-2001*, p.11.

<sup>7</sup> A process known as deep lift in-situ stabilisation is used.

Bridge maintenance includes work to expansion joints, bearings, railings, drains, tunnels and underpasses.

Maintenance may be routine (day to day), periodic or major work as outlined in Table 1.3.

**Table 1.1: Replacement Value of NSW Road Assets**

<b>Assets</b>	<b>Number</b>	<b>Replacement Value</b>
<b>Roads</b>	<b>KM</b>	<b>\$ m (1996)</b>
National Highways	3,010	5,000
Other State Roads	14,370	15,300
Toll Roads	30	n/a
Unincorporated Regional	510	100
Unincorporated Local Roads	2,460	170
<b>Sub-total</b>	<b>20,380</b>	<b>20,600*</b>
Council Regional Roads	18,550	n/a
<b>Bridges</b>	<b>Number</b>	<b>Replacement Value (\$m) 1996</b>
National Highways	982	825
Other State Funded Roads	2,905	2,800
Regional Roads (State Assets)	121	145
Local Roads (State Assets)	67	65
Sub-total	4,075	3,830*
<b>Ferries</b>	9	3
<b>Traffic Facilities</b>	2,780 signals 300,000 signs	340
Land under roads plus properties	82,600 ha	14,860
<b>Total</b>		<b>39,610*</b>

Source: figures as supplied by RTA *Infrastructure Maintenance Plan 1996-2001*, p.11. (\* figures are 20,570, 3,835 and 39,608).

**Table 1.3 The Classifications and Activities of Road Maintenance**

<b>Road Maintenance Activities</b>		
<b>Routine</b> <sup>8</sup>	<b>Periodic</b>	<b>Rehabilitation</b> <sup>9 10</sup>
↪ heavy patching	↪ reseals <sup>11</sup>	↪ pavement & shoulder restoration & replacement <sup>12</sup>
↪ hand patching	↪ asphalt resurfacing	↪ structural resurfacing
↪ crack sealing	↪ pavement rejuvenation	↪ shoulder widening
↪ shoulder grading	↪ micro surfacing	

Source: *Road Maintenance Benchmarking Project July 1998 Sydney, p. 2.1*

In addition to maintenance of pavements and bridges, the roadside environment requires maintenance. This includes:

- maintaining retaining walls<sup>13</sup>
- clearing drains/ pits
- clearing snow
- litter removal
- pavement sweeping in urban areas
- grass moving.

### 1.3 The Benefits of Road Maintenance

Road maintenance fulfils an important role in preserving the economic value of State assets as well as contributing to the economic and social well-being of the State.

Benefits of having roads that are well maintained include:<sup>14</sup>

- savings in vehicle operating costs through a reduction in:
  - oil and fuel consumption
  - vehicle maintenance
  - tyre wear
  - vehicle depreciation.
- savings in maintenance expenditure on these roads because they are not left to deteriorate beyond repair<sup>15</sup>

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<sup>8</sup> Routine maintenance occurs every year at various locations as required.

<sup>9</sup> In some States other than NSW rehabilitation is classified as construction.

<sup>10</sup> When a pavement reaches the end of its life it needs to be 'rehabilitated'. Rehabilitation is to substantially extend the life of the pavements.

<sup>11</sup> Resealing usually occurs every 10 years.

<sup>12</sup> Reconstruction or overlay is undertaken when the pavement reaches an unacceptable level of roughness (often caused by the weight of freight trucks over an extended period of time).

<sup>13</sup> This is a growing area of road inventory.

<sup>14</sup> See also Australian Road Research Board (ARRB), *Use of Road User Costs for the Economic Evaluation of Road Expenditures: Resource Document for Practitioners*, 1997, p.4.

- improvements in safety
- reductions in travel time
- improved customer satisfaction with ride quality
- preservation of the value of expensive assets<sup>16</sup>
- promotion of trade and tourism.<sup>17</sup>

## 1.4 Responsibility for Road Maintenance

### A Hierarchy of Responsibility

There is a hierarchy of responsibility for roads and road maintenance. In practice, no one level of government is totally responsible for planning, funding and implementing maintenance on the entire road network (see Table 1.2).

Responsibilities are shared according to the type of road:<sup>18 19</sup>

- the Commonwealth Government is responsible for funding for the National Highway system
- the State is responsible for other (State Funded/arterial Roads)
- local government is responsible for Regional and Local Roads.<sup>20</sup> The State Government assists local government to undertake maintenance on Regional Roads. In areas where there is no local government (known as the Unincorporated Area of NSW), the RTA has responsibility for maintenance.

### State Funded Roads

Funds for road maintenance come from a number of sources, with revenue from State sources (including taxes and Consolidated Fund) being about two and a half times the Commonwealth contribution.

Maintenance on State Funded Roads can be done by RTA in-house teams, by local government (in its capacity as the roads authority) or by contractors. These arrangements are undergoing major reform (this is discussed in Chapter 6).

<sup>15</sup> However, there may well be an increased need for road maintenance expenditure in the longer term resulting from the planned, extensive road construction program. Department of Transport *Action for Transport 2010: An Integrated Transport Plan for New South Wales*, 1998a.

<sup>16</sup> The replacement value of the roads, bridges and traffic infrastructure is almost \$40 billion, including the value of land under roads. See Table 1.1.

<sup>17</sup> This is the rationale for the Commonwealth funding maintenance of the National Highways.

<sup>18</sup> There are exceptions to the usual arrangements eg local government is responsible for Local Roads except in the Unincorporated Area of NSW.

<sup>19</sup> 1991 Special Premier's Conference Agreement established a hierarchy of responsibilities for each of the three tiers of government.

<sup>20</sup> These are administrative classifications, different from current legal classifications in the *Roads Act 1993*. The current review of the legislation is addressing the issue of different classifications.

Local government can be responsible for some route maintenance activities on the kerbs of State Funded Roads.

A portion of Commonwealth General Purpose (untied) Grants is used on State Funded Roads to fund maintenance. The Commonwealth encourages the setting aside of a proportion of these funds for this purpose.

## 1.5 Demands on Roads and Bridges

### Pavements

There are increasing demands made on an ageing road and bridge network. The total road length in Australia has remained relatively constant since 1945, although the proportion paved has increased.<sup>21</sup>

Flexible gravel and asphalt pavements are usually designed to accommodate loads for a 20 year life span. Concrete pavements are designed for a 40 year lifespan.<sup>22</sup>

A substantial proportion of roads have thin pavements, based on old design standards, which are inadequate to meet current and predicted traffic frequencies and loads.

The thickness of older pavements was based on:

- previous legal load limits for freight
- empirical pavement design practices
- funding and available natural materials.

The quantity of road freight carried and increases in mass limits have also placed considerable stresses and fatigue on pavements and bridges. Wear on pavements increases exponentially with load.

Natural disasters, eg floods also have an adverse effect on pavements. The impact of floods is both direct erosion and deterioration of the pavement structure under load while it is saturated with water.

Pavements often remain in service well beyond their notional design life. Pavements therefore require regular, preventive maintenance and rehabilitation treatments during their service life to ensure acceptable user performance.

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<sup>21</sup> J. Cox, *Roads in the Community: Are They Doing Their Job*, Part 1, Austroads, Sydney, 1996, p.96.

<sup>22</sup> Interview with Regional Asset Manager, 30/3/99.

**Bridges**

The 4,000 bridges on State Roads are an integral part of the road network and provide “critical links within transport routes”.<sup>23</sup>

Bridges are generally designed for 100 years. However, the RTA has bridges over 150 years old that still carry traffic. In the case of timber bridges regular replacement of deficient elements is required to maintain their structural integrity.

The RTA is responsible for a total of 186 timber bridges (including truss and beam construction). In the period between 1850 and 1920, 422 timber truss bridges were built in NSW.<sup>24</sup> Of the timber truss bridges originally constructed, 82 remain as at October 1998. These bridges have varying degrees of heritage significance.<sup>25</sup>

Bridges have been subject to the same demands or pressures as pavements. Current demands on these bridges have exceeded their original purpose. Many bridges:

- like pavements, were often designed for loads much less than those applied by modern trucks
- were built as single lane bridges, now unsuitable for current traffic levels
- have decking, cross girders and timber bottom cords which were designed for traffic travelling at speeds slower than today's standards. This results in greater impact and fatigue effects than would be the case on modern bridges.

**Local Government and Regional and Local Roads<sup>26</sup>**

Around 160,000 km of roads in NSW are mostly Regional and Local Roads, where maintenance is usually managed by local government.<sup>27</sup>

The RTA assists local government to maintain Regional Roads through:

- financial assistance grants (Regional Block Grants)<sup>28</sup>
- expert advice
- secretariat assistance to regional / local committees.

<sup>23</sup> Council on the Cost of Government, *Transportation: Service Efforts and Accomplishments*, 1997, p. 38.

<sup>24</sup> A truss bridge has a combination of members (either timber, concrete or steel used as beams, bars, or ties) arranged in a collection of triangles, to form a rigid framework, that gives support and rigidity to the whole or part of the bridge structure.

<sup>25</sup> The historic value of these bridges has been examined by consultants to the RTA and reported in *Study of Relative Heritage Significance of all Timber Truss Bridges in NSW*, December, 1998.

<sup>26</sup> Details of provisions for councils can be found in *Arrangements with Councils for Road Management*, 1993.

<sup>27</sup> Around 3,000 km are Regional and Local Roads in Unincorporated NSW. The RTA manages the maintenance of these.

<sup>28</sup> The RTA and the Local Government and Shires Association have an annual agreement re the Block Grant funding.

The RTA also provides:

- annual financial assistance grants for Repair and Improvement of Regional Roads (Repair) Program
- funds to repair any public road after a natural disaster
- traffic management facilities only
- specific projects (such as roundabouts)
- 3X3 Council Determined program
- Bus Route Subsidy Scheme.<sup>29</sup>

Untied grants to Local Government for Local Roads are provided through the Local Government Grants Commission (via the State Department of Local Government). Local Government may use these funds for any purposes it wishes, including road maintenance.

As indicated above, Local and Regional Roads in the Unincorporated Area of NSW (where there is no local government) are funded and maintained by the RTA in the absence of councils.

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<sup>29</sup> Under Section 106 of the *Transport Administration Act 1988*.



**Table 1.2: Responsibilities for Road Maintenance and the 1998-99 Program**

Type of Road	Description	Ownership <sup>30</sup>	Management of Maintenance	Funding \$'000s	Source of Funding	Form of Funding
National Highways <sup>31</sup>	Roads linking capital cities or trade and commerce centres	State (NSW)	RTA	91,016 6,821 14,666 8,862 9,464 ----- 130,829	Commonwealth	Specific Purpose Grant (SPG) Pavement & Data Collection Component including Minor Works) SPG (Bridge Component including Minor Works) SPG (Roadside Component including Minor Works) SPG (Traffic Facilities Component) SPG (Disaster Assistance)
State Funded Roads	Major arterial links between States and between major NSW urban arterial routes	State (NSW)	RTA	207,783 50,876 36,862 28,510 ----- 324,031	State Government	Pavement & Data Collection Bridge Component Roadside Component Disaster Repairs
Regional Roads	Subarterial roads linking urban areas; intra regional links.	Local Government	Local Government	69,765 10,361 19,222 3,379 8,404 ----- 111,131	State Government	Block Grants (Roads Component) Block Grants (Traffic Facilities Component) REPAIR (50% subsidy) Special Grants Disaster Assistance  All of above are RTA funded

<sup>30</sup> The issue of road ownership is discussed in Chapter 6.<sup>31</sup> Includes the Hume, Cumberland, Sturt, Newell, Federal Barton, New England Highways and Newcastle Freeway.

1. Introduction

Type of Road	Description	Ownership <sup>30</sup>	Management of Maintenance	Funding \$'000s	Source of Funding	Form of Funding
Local Roads		Local Government	Local Government	17,155 1,791  35,000 ----- 53,946	State Government	3x 3 Council Determined Bus Route Subsidy (Sydney, Newcastle and Wollongong Transport Districts only) Disaster Assistance
State/ Regional/ Local		Local Government	Local Government	10,205 36,651 ----- 46,856	State Government	Street Lighting Subsidy Traffic Facilities Maintenance
Local (Unincorporated Area)		State (NSW)	RTA	5,050 553 1,418 595 118 ----- 7,734	State Government	Pavement & Data Collection Bridge Component Roadside Component Disaster Repairs Traffic Facilities Maintenance
<b>Total</b>				<b>674,527</b>		

Source: RTA

## **2. About the Audit**

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## **2.1 Introduction**

The audit reviews whether the RTA's systems and approach to planning and delivery of road maintenance meet better practice.

In addition to the usual approach of analysing corporate files and conducting interviews with Head Office staff, the audit uses RTA's Western Region and Southern Region as case studies to demonstrate pertinent issues relevant to the audit.

## **2.2 Scope of the Audit**

The audit examines State Funded Roads only.

“Roads” include pavements, bridges and car carrying ferries. It also includes roadsides where maintenance includes work on retaining walls, clearing of drains and snow. (This activity is also known as route maintenance).

Maintenance work can be routine (eg hand patching), periodic (eg resealing) or rehabilitation (eg shoulder restoration).

This audit does not examine the Commonwealth funded National Highways or Regional and Local Roads.

It also does not review arrangements for traffic facilities maintenance which includes signs and road markings. The issues involved in that area often involve local government management and delivery.

## **2.3 Audit Methodology**

The audit methodology involved:

- research into Australian and international road maintenance literature
- discussions with Australian National Audit Office (ANAO)
- interviews with key personnel in the Road Network Infrastructure Maintenance Branch (RNIM)
- interviews with other key RTA staff (eg legal branch, finance)
- interviews with Regional Asset Managers and Asset Planners in two Regions (Southern and Western)
- analysis of key RTA documents and files
- analysis of legislation, better practice reports (national and international).

## 2.4 Audit Criteria<sup>32</sup>

The following criteria were applied during the course of the audit:

- the RTA should have a Road Maintenance Strategic Plan which reflects Government's transport objectives
- road maintenance planning should adopt a whole-of-life asset management approach
- information, information systems and processes should support the planning process. Detailed criteria regarding information systems are listed in Appendix 3
- roles, responsibilities and accountabilities of key parties in road maintenance planning should be clear and appropriate
- there should be a sound analytical framework for planning and prioritising road maintenance programs
- funding arrangements should support the needs of road maintenance planning and delivery
- road maintenance should enhance the environment as well as safeguard the road network asset.

## 2.5 Cost of the Audit

Direct salary costs and overheads	\$206,985
Printing (estimate)	5,000
Travel and incidentals	1,789
<b>Total Cost</b>	<b>\$213,774</b>

## 2.6 Audit Team

The audit team comprised Denis Streater, Director, Tania Sweeney, Senior Performance Audit Manager and Ai-Binh Phu, Senior Performance Audit Clerk.

<sup>32</sup> Derived from OECD, *Road Maintenance and Rehabilitation: Funding and Allocation Strategies*, Report prepared by an OECD Scientific Committee, 1994

## **2.7 Acknowledgment**

The Audit Office would like to thank the staff of the RTA for their extensive cooperation and assistance during the course of the audit.

In particular, The Audit Office would like to thank Mr Michael Bushby, General Manager, Infrastructure Maintenance, Road Network Infrastructure and Mr Neil Walker, Program Manager, Infrastructure Maintenance, Road Network Infrastructure. The assistance of Mr Mal Bilaniwskyj, Asset Manager and Mr Peter Meers, Maintenance Planner, Southern Region, Mr Dick Woodburn, Asset Manager and Mr Gary Mittelstadt, Maintenance Planner, Western Region is gratefully acknowledged Mr Graeme Smart, Manager, RTA Technology Library, provided considerable assistance to the audit team.

### **3. A Strategic Approach to Road Maintenance**

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### 3.1 Introduction

Roads and bridges are a valuable economic and social asset. The way in which they are maintained should depend on their strategic importance within an overall transport plan that takes account of the needs of various users, value for money and environmental needs. This chapter outlines the RTA's strategic approach to road maintenance. It then examines how the performance of the network is monitored and identifies issues which need to be addressed in reporting the achievement of maintenance plans.

### 3.2 Better Practice Focus on Outcomes

Several authoritative sources indicate that better practice in road maintenance investment should focus on a range of economic, social, safety and environmental outcomes for the Australian road system (see Table 3.1).

More specifically these outcomes should relate to achieving improvements in network links, managing travel demand or enhancing land use strategies.<sup>33</sup>

The OECD similarly concurs that:

*Formulating ...a road rehabilitation and maintenance program requires the quantification of net benefits, with a reasoned assessment of the non-quantifiable benefits, of road rehabilitation and maintenance at the network level rather than by individual projects. This approach is necessary not only to demonstrate the value for money of the plan, but also to offer a comparison of the social and environmental benefits...*

*...The rehabilitation and maintenance program must, therefore, be competitive even though there are difficulties in making true value-for-money comparisons...*<sup>34</sup>

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<sup>33</sup> J. Cox, *Roads in the Community, Part I: Are they Doing Their Job*, Austroads, 1997; D. Kneebone (ed), *Roads in the Community, Part II: Towards Better Practice*, Austroads; D. Kneebone and D. Berry (eds), *Australia at the Crossroads, Roads in the Community- A Summary*, Austroads, 1997; J. Cox, *Refocusing Road Reform*, Business Council of Australia, Victoria; C. Jordan, "Strategic Management in the 90's", *Road and Transport Research*, Vol 6, No.1, March, 1997, p.12; OECD, op. cit. OECD, *Performance Indicators for the Road Sector*, Report by an OECD Scientific Group, Road Transport Research, France, 1997.

<sup>34</sup> OECD, op.cit. p.93.



**Table 3.1: Austroads Outcomes for the Australian Road System**<sup>35</sup>

<b>Type of Outcomes</b>	<b>Range of Outcomes</b>
<b>Economic Outcomes</b>	Lower road user resource costs
	Lower non-road user costs
	Increased regional development
	Expansion of the scope of markets
	Economic-based choices of transport vehicles, modes, routes and times of use
<b>Social Outcomes</b>	A basic level of accessibility
	Wider range of choices and opportunities for interaction among people
	A fair distribution of costs and benefits of the road system
<b>Safety Outcomes</b>	Lower levels of road related deaths, injuries and costs
	Safer transport of hazardous loads
<b>Environmental Outcomes</b>	Lowered levels of air pollution and greenhouse gas emissions
	Reduced other adverse environmental impacts

Source: J Cox, *Roads in the Community, Part 1: Are They Doing Their Job*, Austroads, Sydney, 1997, p.21.

### 3.3 Transport and Road Planning

#### **An Integrated Transport Plan**

The Government has developed an integrated transport plan for NSW and Sydney to assist the movement of people and freight around country and urban NSW:

- *Action for Transport 2010: An Integrated Transport Plan for NSW*
- *Action for Transport 2010: An Integrated Transport Plan for Sydney.*

<sup>35</sup> Austroads is the Australian and New Zealand Association of road transport and traffic authorities which promotes better practice in the effective management and use of the road system.

Among the key strategies outlined in *Action for Transport Plans* include:

- keeping the road network in good order
- improving access for rural communities
- meeting the needs of growing suburbs
- preventing accidents and saving lives
- improving air quality and reducing car dependency
- safeguarding the environment
- giving the community value for money.

Road maintenance is regarded as an important means of:

- improving access to residential areas
- facilitating economic development by improving access to regional and city development centres
- reducing traffic accidents by providing the safest possible road and traffic environment.

Maintenance of the road network (along with rail) is regarded as the first funding priority to ensure the safe operation of roads.

The *Plans* emphasise that safeguarding the environment and heritage is an integral part of planning for and implementing transport strategies.

**The Journey Ahead** The RTA's five-year Strategic Plan (*The Journey Ahead*) sets overall direction and priorities for the organisation. The *Plan* identifies maintenance of the State's roads and bridges as a major RTA responsibility to achieve improved:

- traffic flows
- safety
- linkages between roads and public transport.

Full commercialisation, competitive tendering and an organisational structure which proposed a funder/provider separation were envisaged. Plans for greater use of competitive tendering and a clearer funder/provider split are currently being implemented.

**Road Network Infrastructure Strategic Plan** The most recent *Road Network Infrastructure Strategic Plan* bases its strategies directly on the customer and transport objectives outlined in *The Journey Ahead* and *Action for Transport 2010 Plans*.

A range of strategies are outlined to achieve social, economic, safety and environmental outcomes, for example:

- social objectives - ensure country roads are reliable and accessible, especially during prolonged periods of wet weather through introducing the *Rebuilding Country Roads Program*
- economic objectives - recognise freight use in the production of maintenance and infrastructure improvement plans for major corridors in the road network
- safety - improve the safety of country bridges, especially those that carry heavy freight through the *Country Timber Bridge Replacement Program*
- environmental - minimise impacts on the natural and built environment through improved acceptance of environmental responsibility.

### 3.4 Monitoring the Network

#### Pavements

RTA measures the Ride Quality, Pavement Durability and Pavement Rutting.<sup>36 37</sup> Cracking of pavements is measured using new automated technology.

There has been a reported overall improvement in Ride Quality since the early 1990s.<sup>38</sup> There are of course variations in Ride Quality on various parts of the road network.<sup>39</sup> Pavement Durability (measured by surface cracking) on Sealed Country State Roads (including the National Highways) has improved from 61 per cent in 1993 to 74% in 1997.<sup>40 41</sup>

The lower rating for Pavement Durability compared with Ride Quality can be interpreted as indicating that pavements are smooth but are thin and vulnerable. This is a consequence of their age and old design standards.

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<sup>36</sup> Ride quality is measured by evaluating roughness when weighted by travel. It affects fuel consumption, vehicle operating costs and the level of driver fatigue.

<sup>37</sup> Rutting is defined as a longitudinal depression that forms in the wheel paths of a road under traffic loading. A rutted road will usually require major treatment.

<sup>38</sup> RTA, *Annual Report*, 1998, p.15.

<sup>39</sup> RTA, *ibid.*, pp 16-17.

<sup>40</sup> Sources: RTA, *op. cit.*, p.16 and Council on the Cost of Government, *Transportation: Service Efforts and Accomplishments*, 1997, p.36.

<sup>41</sup> RTA, *op. cit.*, p.16. It is important to note that new technology (laser technology) is now used to measure surface cracking (referred to as RoadCrack). This means that it may not be fully valid to compare data over a timeframe longer than the use of the measuring tool, in this case laser technology.

## Bridges

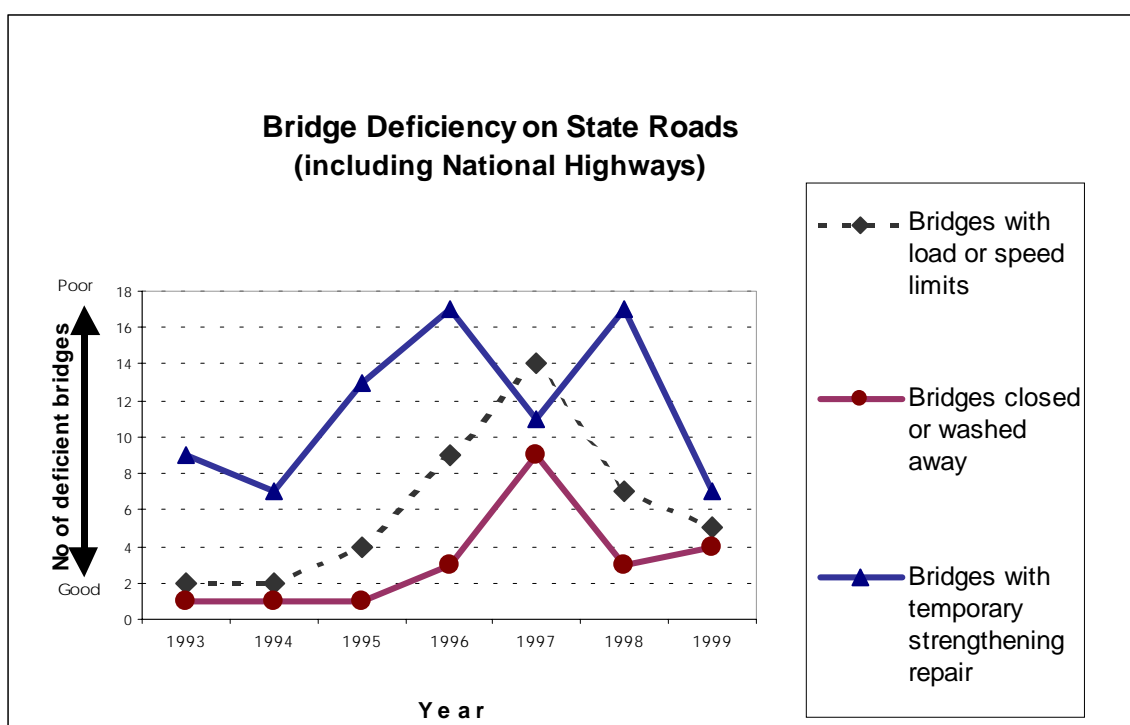
In June 1998, 27 of bridges (0.7%) on State Roads were identified as being deficient.<sup>42</sup> A “Bridge Deficiency Index” represents the number of bridges that:

- have either been washed away or closed to traffic
- have load or speed limits imposed for structural reasons
- are supported by temporary strengthening.

In addition, the five year \$129m *Country Timber Bridge Program* has been introduced to restore or replace, where necessary, 140 timber bridges in country NSW. Works will be undertaken at 51 of these bridges during 1999-2000. The effects are already being seen in improvements to the Bridge Deficiency Index.

Graph 3.1 indicates a significant improvement in the bridge index in recent years.

**Graph 3.1: Bridge Deficiency Index**



Source: Council on the Cost of Government, *Transportation: Service Efforts and Accomplishments*, 1997 for 1993-1997 data; RTA for 1998-1999 data.

<sup>42</sup> RTA, op. cit., p.17.

### 3.5 Issues in Reporting

<b>Better Practice</b>	<p>Better practice in road maintenance requires monitoring and reporting against strategic objectives.</p> <p>Quality performance reporting in road maintenance requires information that is:</p> <ul style="list-style-type: none"><li>▪ relevant and quantifiable</li><li>▪ consistent/ standardised across Regions</li><li>▪ concise with explanations for variations against targets</li><li>▪ user friendly eg use of graphs to indicate trends, achievements against benchmarks.</li></ul> <p>Regions report monthly to senior executives of the RTA on program achievements and against targets for different kinds of maintenance.</p>
<b>Current Information Systems</b>	<p>Monthly reporting of the road maintenance program addressed:</p> <ul style="list-style-type: none"><li>▪ progress against the agreed plan for financial and output information summarised to support program budgeting for outcomes</li><li>▪ emerging local issues, including local concerns on road conditions</li><li>▪ progress against commitments</li><li>▪ delivery methods, including unit rates.</li></ul> <p>Currently, individual Regional Asset Managers provide Road Network Infrastructure Maintenance (RNIM) with separate monthly reports which are consolidated for reporting to RTA management.</p>
<b>Audit Observations</b>	<p>There is an absence of an integrated and reliable information system in the reporting of regional activity in regard to road maintenance.<sup>43</sup> Monthly analysis of reports is currently labour intensive and very detailed.</p> <p>While reports contain considerable useful information, accountability would be improved if:</p> <ul style="list-style-type: none"><li>▪ RNIM reports relate achievements more directly to the RTA Corporate Plan and <i>Road Network Infrastructure Strategic Plan</i></li></ul>

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<sup>43</sup> This in part reflects the preferences of the various RNIM managers over the last few years and the reduced emphasis on corporate information systems.

- there were more rigor in illustrating achievements against targets
- more consistent and systematic explanations of the patterns of, and reasons for, significant variations from RNIM's road maintenance plan were provided.

The RTA (RNIM) recognises the deficiencies in reporting arrangements. It is introducing reports which better focus on illustrating achievements and monitoring performance against targets.

An interim system is being put in place using the Financial Management System. This will report some outputs and outcomes until integrated corporate systems are able to do so.

**Exception Reporting**

An analysis of Monthly Reports by Regional Asset Managers to RNIM during 1997-98 and 1998-99 indicate maintenance works have been delayed by:

- wet (and dry) weather
- flooding caused by natural disasters
- local government being slow to initiate works
- the need to manage environmental issues
- community consultation.

The data have not been collected consistently nor are the effects usually quantified. In one period, May to July 1998, \$8.4m of works were delayed because of environmental/community consultation issues.<sup>44</sup>

Delays do occur to road works. This increases the lead time on important projects and often results in a reallocation of funds within the program. Key reasons for this are examined in Chapters 6 and 7.

**Performance Indicators**

Improved performance (and the accountability for performance) requires a degree of certainty about the value of what is being measured and whether performance standards are both appropriate and measurable.

**Adequacy of Measures**

There is currently considerable debate about what indicators to use in road maintenance, for example:

- output measures (for example the percentage of heavy patching per annum) or
- outcome measures such as the level of client satisfaction (for example perceptions of roughness).

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<sup>44</sup> The extent of "double counting" from month to month cannot be identified.

**Client Satisfaction** Client satisfaction measures present a difficulty in determining what is a “reasonable expectation” in terms of service delivery for user charges.<sup>45</sup> The provision of optimum road quality may not be a viable option without considerable increases in user charges.<sup>46</sup>

**Other Measurement Difficulties** Other measurement problems include:

- lack of adequate network measures for some significant aspects of road maintenance eg pavement strength
- changes in standards or approaches to road maintenance
- some lack of clarity as to what or whose standards to apply
- changes in performance being attributable to changes in the measurement tools used rather than to changes in road quality
- changes in demands on roads over the lifecycle need to be made more explicit<sup>47</sup>
- policy decisions such as that to increase the weight of freight trucks create an important additional demand on roads and road maintenance<sup>48</sup>
- changes in the regulatory environment. This may lead to increased costs and thereby reduce the total quantity of resources available for maintenance.

**Audit Conclusion** The RTA has adopted a strategic approach to road maintenance. The objectives of the *Road Network Infrastructure Maintenance Program* (RNIM) are directly linked to both the Government’s transport plans and the RTA’s strategic plan for the management of traffic and roads.

*Reporting* The RTA reports on the outputs from the program and outcomes in terms of customer satisfaction. However, additional information as to why delays in the program occur should be more systematically reported.

RNIM faces several challenges in deciding what measures to use in reporting on the network condition and program performance.

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<sup>45</sup> A significant source of roads funds comes from hypothecation. This refers to taxes levied on roads users being spent only on roads.

<sup>46</sup> See OECD, op. cit., 1994.

<sup>47</sup> OECD have noted that “during the lifecycle of a road the responsibilities and life styles of people, their travel demands as well as communities will change and the road network has to be adapted to the new circumstances”, OECD, op. cit., p.9.

<sup>48</sup> see National Road Transport Commission, “Increases in Mass Limits: Government Revenue Impacts”, February, 1998, Melbourne.

With the shift to a more distinct funder, purchaser/ provider split there is a more urgent need for corporate leadership to improve and control information and information systems.

This would entail:

- defining what information and analyses are required at corporate and regional levels of the organisation
- setting information standards
- benchmarking (over time, across Regions and service providers)
- economic modelling/forecasting to test various road maintenance scenarios/ strategies.

The introduction of the interim and long term plans for RNIM Monthly Reporting Systems are supported. The new approach should provide better quality and consistent program monitoring and accountability. This issue is discussed further in Chapter 5.



## **4. Setting Project Priorities**

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## 4.1 Introduction

This chapter examines:

- better practice in managing the road asset in terms of its maintenance
- how the RTA sets standards for, and monitors, road and bridge condition
- how priorities for maintenance are determined.

## 4.2 Better Practice

The OECD identifies three approaches to identifying, analysing and prioritising need for road maintenance. These approaches are the:

- Needs Based approach
- Zero-Maintenance approach
- Engineering-Economic approach.

### **Needs-Based**

In the Needs-Based approach a road system is designed, built and maintained in accordance with set standards in relation to:

- perceived technical requirements
- acceptable service level for users
- affordable budget levels based on historical trends.

### **Zero-Maintenance**

A Zero-Maintenance approach refers to where a road system is designed and built with capital financing, and then operated with little maintenance until a failure occurs. In this approach, there is little/no emphasis on preventative maintenance.

### **Engineering-Economic**

The OECD advocates the Engineering-Economic approach to road maintenance which focuses more than the other approaches on the costs and benefits of maintenance.

Using the Engineering-Economic approach, a road system is designed, built and maintained based on functional and technical standards that maximise the asset life and benefits of roads (economic, social, environmental or otherwise) while minimising the Whole of Life Cycle Cost (WOLCC).<sup>49</sup> The aim of road maintenance is not solely to maintain the asset “in an appropriate condition as a structure” for its own sake.<sup>50</sup>

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<sup>49</sup> The Whole of Life Cycle Cost (WOLCC) is the evaluation of the total cost to be expended on an asset over its entire life span.

<sup>50</sup> OECD, op.cit., p.9.

In better practice asset management the WOLCC methodology is used to develop benchmarks for different classes of road, taking into account geographic or regional differences.

### **Austrroads**

Austrroads follow these principles by advocating an Asset Management approach where key objectives are to:

- ensure that assets meet service provision requirements
- maximise community benefits arising from the use of assets
- reduce the dependency on new asset solutions through managing demand, seeking alternatives to new asset creation, extending the lives of assets and ensuring that existing assets are better utilised
- reduce the cost of holding assets through better planning, asset rationalisation, and investment decisions based on whole of life costs and comparative economic appraisals
- identify the costs of acquisition, utilisation, maintenance and replacement
- set asset management and performance standards that can identify the service return on assets
- manage the rate of asset replacement so that it is matched to the rate of asset consumption
- ensure the level of asset holding is sustainable.<sup>51</sup>

Applying these principles:

- road and bridge assets should be maintained in an economical way
- a framework for analysing road maintenance options should include economic and environmental factors as well as user costs
- a competitive approach to the provision of maintenance should be used as a means of managing budget constraints.<sup>52</sup>

The Department of Public Works and Services (DPWS) also provides guidance on asset management in the form of its *Total Asset Management* (TAM) Manual. The manual is currently being reviewed.

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<sup>51</sup> Austrroads, *Road Asset Management Guidelines*, 1994, p1.

<sup>52</sup> OECD, op. cit., p.13.

### 4.3 Priorities in Road Maintenance

Until 1996 the RTA allocated road maintenance funds with a strong historical bias.

The *Road Network Infrastructure Maintenance Program* now seeks to maintain the network as a long term renewable asset.

**Table 4.1: Project Priorities for State Funded Roads<sup>53</sup>**

Priority	Program Area	Activities
1	Access/ availability of State Roads for Travel	Major repairs to (non bridge sized) culverts Structural bridge maintenance Repairs to slopes and retaining walls Rehabilitation of causeways
2	Management of Risks to Safety Outcomes	Routine and heavy patching of pavements Maintenance of roadside vegetation obscuring traffic facilities eg guideposts Rehabilitation of lane and shoulder widths
3	Management of Risks to Asset Integrity	Roadside drainage Pavement resurfacing / bridge repainting
4	Delivery of Pavements Levels of Service	Pavement rehabilitation

#### Project Priorities

In allocating funds for State Funded Roads first priority is given to ensuring access to, and safety of, roads and bridges (see Table 4.1).

Second priority is given to improving pavement condition to minimise wear utilising pavement rehabilitation to improve route smoothness.

Funds are allocated according to the route's:

- strategic importance
- use by freight
- traffic volume
- travel speeds.<sup>54</sup>

<sup>53</sup> Other parts of the Program include Business Management: collection of data on asset condition and usage; maintenance planning; Regional and Local Roads: Government commitments to local government for managing Regional and Local Roads: Disaster Repairs: for State, Regional and Local Roads.

<sup>54</sup> Categories of routes based on these criteria are known as sub-networks.

Regional Asset managers recommend the nature and level of maintenance needed for roads and bridges. This recommendation is based on the standards for, and service level required from, the road network or bridge. Once approved, a Project Brief is prepared for each project which defines the extent of the intervention required.

**Audit Conclusion** The *Road Network Infrastructure Maintenance Program* follows better practice by allocating resources across the network using asset management principles rather than historical funding trends.

**Setting Standards** The RTA's document *Routine Maintenance Standards* aims to ensure a consistent approach to the efficient and effective management of the network.<sup>55</sup> The standards identify when:

- inspections of roads and bridges should take place
- maintenance is needed
- how quickly maintenance problems should be attended to.

Under the competitive tendering arrangements, most of road maintenance works will be contracted out. These contracts will specify the levels and standards of maintenance required (see Chapter 6).

**Audit Observations** The RTA follows better practice in planning for and setting priorities in road maintenance projects. The RTA:

- supports the life cycle approach to road maintenance. In this sense, the RTA supports the OECD Engineering-Economic approach to road maintenance and Austroads Asset Management principles
- attempts to consider whole of life cycle costs in determining priorities.<sup>56</sup> Some costs are not factored in eg all costs associated with environmental and heritage assessment and management. This issue is examined later in this report
- requires evaluation of project candidates at regional level and business cases to be considered centrally for projects of state-wide importance.

<sup>55</sup> See Road Network Infrastructure Directorate, *Routine Maintenance Standards*, May 1998. These standards are being reviewed and updated in the preparation for competitive tendering initiatives.

<sup>56</sup> The advantage of using sub-network classifications should result in a consistent and equitable allocation of funds across route with similar needs.

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## **5. Information Management**

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## 5.1 Introduction

This chapter examines whether current information and information systems are providing the RTA with sound and integrated information to aid good decision-making.

The chapter suggests that while the elements of a good information system exist within the RTA better asset management could be achieved by having an integrated information system which links data on maintenance needs and changes in road condition to maintenance costs.<sup>57</sup>

## 5.2 Better Practice

Accountability for road investment decisions for maintenance requires information systems that yield:

- more accurate cost estimates and benchmarking of different maintenance treatments for like sections of the network
- precise assessments of the performance of each like section of the network
- assessments of the cost effectiveness and benefits derived from each kind of maintenance treatment
- evaluation of the benefits of proposed maintenance strategies and programs
- better estimates of causes and rate of deterioration<sup>58</sup>
- productivity measures
- estimates of the future demand for roads (scenario planning).

A performance monitoring system therefore, needs to:

- use data that are objective and accurate
- be flexible, containing independent but linked modules
- be sustainable and cost effective
- include economic as well as technical criteria
- contain strategy, program and project modules
- support the allocation of funding between different regions according to economic criteria and network condition
- be capable of allocating funds according to the required maintenance standards depending on the road class
- produce outputs adequate to support the decision-making model at each level of the decision-making process.<sup>59</sup>

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<sup>57</sup> OECD, op.cit., p.137.

<sup>58</sup> Transport Research Board, *Pavement Management and Performance*, 1992, p.5.



Such a system would need to have automated and integrated databases. These are needed to link information across the organisation to support decision-making in road maintenance activities. The elements of an integrated road management system should include:

- a traffic database
- traffic monitoring control and information
- speed studies
- weight studies
- road weather information<sup>60</sup>
- accident database
- bridge and pavement management systems.<sup>61</sup>

### 5.3 Other Models

The Audit Office reviewed the literature in regard to road information systems but found few systems that met better practice.

The Finnish Highway Performance Monitoring System was the nearest to better practice. The system is used in the strategic planning of road maintenance at the central and regional levels. Its outputs include:

- current road condition
- long-term optimal road condition and funding levels
- short-term optimal funding level
- allocation of budgets between Regions.

The system is able to examine and report on the relationship between current condition, maintenance options and feasible options, given budgetary constraints and economic indicators (benefit-cost ratio and net present value of benefits).<sup>62</sup> This level of analysis requires a system with linked modules and integration across the organisation.<sup>63</sup>

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<sup>59</sup> Permanent International Association of Road Congresses (PIARC), *Highway Performance Monitoring Systems: Final Report*, 1977, pp. 61-65.

<sup>60</sup> Although this is more of an issue in OECD member countries where they experience severe weather conditions in winter.

<sup>61</sup> OECD, *op. cit.*, p.97.

<sup>62</sup> PIARC, *op.cit.*, p.17.

<sup>63</sup> Sweden is testing the feasibility of using the Finnish system for network analysis.

## 5.4 The Tasmanian Model

### Road Information Management System

In 1996 a Road Information Management System (RIMS) Project was introduced by the Tasmanian Department of Transport (now the Department of Infrastructure, Energy and Resources (DIER)).<sup>64</sup> The RIMS became operational in 1998.

Prior to the introduction of the RIMS the DIER held a myriad of small independent road databases on individual computers. These were not linked to one another and did not use a common road referencing system.<sup>65</sup> <sup>66</sup>

This meant that information was of unknown quality, inconsistent across the organisation and difficult to collate, analyse and report upon. It was therefore difficult for the organisation to account for its management of the road network.

The RIMS (see Diagram 5.1) contains the essential components:

- road inventory
- road management information
- bridge inventory
- environment information
- planning data and indexes
- road use data
- traffic statistics.

There is also provision for data modelling to further assist planning and resource allocation.

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<sup>64</sup> The need for data integration had been investigated during 1993-94.

<sup>65</sup> The ability to accurately correlate different data sets is dependent on reliability of the location referencing of the data.

<sup>66</sup> The RTA likewise holds data on separate, local “systems” and various databases.

The benefits of the RIMS include:

- improved data integrity, accuracy and timeliness achieved by having common counting rules, definitions and standards
- better asset valuation. This is achieved by using condition, inventory and financial data to evaluate maintenance options of, for example, maintenance and restoration
- more effective resource allocation and priorities setting information for the network, thereby enhancing the “purchaser” role of the road agency<sup>67</sup>
- enhanced accountability by the road agency by giving it more useful and timely reports as to how the network is performing and how it is managed.<sup>68</sup>

*Audit Observation*

The RIMS introduced by DIER closely reflects the better practice model suggested by the OECD. It integrates essential road information elements and links them to other systems.

## **5.5 Road Condition and Other Data and Systems**

Data are collected, organised and analysed at both central and/or regional levels. The one data source common across the organisation is the general project ledger.

Program reporting currently requires significant manual input of data supplied by Regions to corporate level.

*Audit Observation*

The RTA data collection and analysis “systems” do not meet better practice because there is not one core data base that is accessed, analysed and managed at different levels of the organisation.

Data integrity and consistency can be difficult to achieve in these circumstances and benchmarking becomes difficult.

There is significant opportunity to improve the data collection systems to support asset management decisions and practices.

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<sup>67</sup> Currently RNIM relies heavily on bids from regions to formulate a maintenance program. There is an incentive for regions to “overstate” their needs and a number of checks and balances are in place to ensure equity in resource distribution.

<sup>68</sup> Source: Department of Transport “Road Information Management System” handout. DIER presentation to Austroads, Asset Management Reference Group Meeting, 15 April 1999.

## 5.6 Regional Initiatives

### Local Needs

Some Regions have created their own information databases and systems, or modified corporate systems to meet their information needs.

Information regarding the regular assessment of inventory, pavement condition and expenditure at project level provide the basis for regional planning. Both Southern and Western Regions have condition data to develop a range of projects, program planning and management tools to support their road maintenance strategies. They have good analyses of road condition, treatment data and analyses of unit rates of expenditure per lane kilometre.

### Southern Region

Southern Region, for example, produces an annual *Road Network Condition Report*. The Report contains:

- current condition data by subnetworks and zones
- key performance of roads (roughness, cracking)
- expenditure data by kilometre of subnetwork type
- condition summary data by subnetworks and roads/ LGAs
- resurfacing and restoration accomplishments
- performance data by which authority carries out the road maintenance
- key indicators by road (best, worst pavement, best and worst average roughness, highest travel, highest percentage of commercial vehicles, worst widths)
- benchmarks the Region's performance over time and against targets
- a Pavement Condition Index (PCI).<sup>69</sup>

Southern Region also uses spreadsheets to analyse data to:

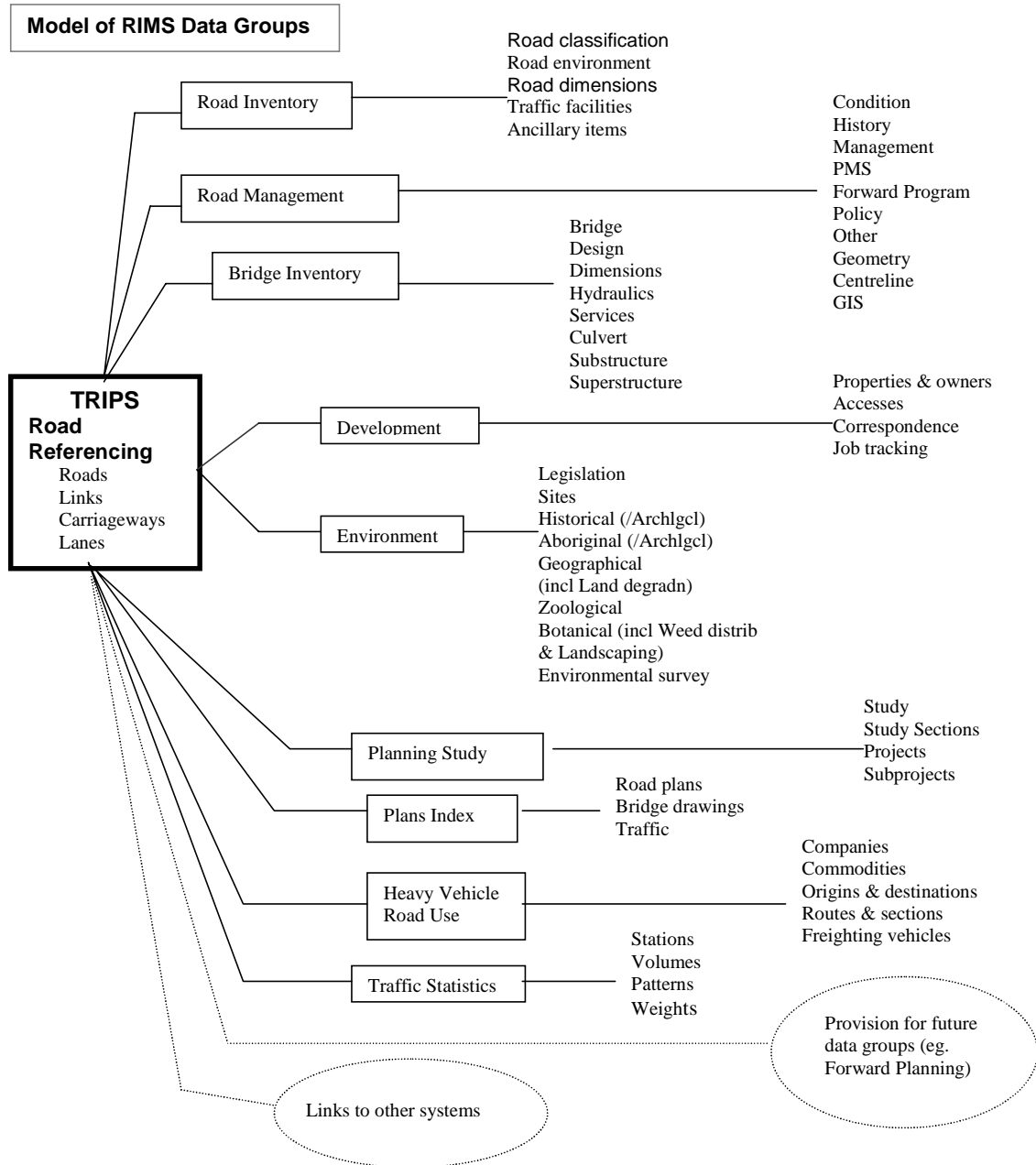
- generate project candidates and plan resurfacing and rehabilitation projects at segment level
- measure and predict pavement condition
- track engineering history.

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<sup>69</sup> This is a single figure representation of the relative condition of different parts of the network. This index uses a formula which translates all the pavement distresses into a linear scale and combines them using weighing factors into a number between 0 (worst) and 100 (best).

<b>Western Region</b>	<p>Western Region produces:</p> <ul style="list-style-type: none"> <li>▪ a road condition atlas using mapping technology</li> <li>▪ road plans (outlining standards, usage, use projections, issues, deficiencies) proposed plan of works for each section of road</li> <li>▪ <i>Road Network Performance Reports</i> by council/work centre.</li> </ul>
<i>Audit Observations</i>	<p>Better practice in road maintenance data management requires that network, program and project levels utilise the same interlocking databases although the kind and level of data used might be different.</p> <p>The RTA has attempted to introduce a philosophy which focuses on the OECD Engineering-Economic approach to road maintenance. Its success in implementing this approach is constrained by inadequate information systems.</p> <p>In an endeavour to achieve an appropriate information system the RTA has for the past two years competitively evaluated available database systems to store road condition, inventory and engineering history data. However, the favoured system, whilst being a sound analytical tool, did not fully satisfy the RTA's network and integration requirements and was rejected in July 1999. An investigation of available systems for road data management has recommenced. The RTA has an existing data management system for bridge structures, which meets its current information system requirements.</p> <p>There is a gap between better practice and current RTA information systems. The RTA has the elements to construct an integrated, corporate system to support sound investment decisions in road maintenance. However, the lack of such a system prevents the most efficient and effective analysis of the relative need for road maintenance resources across the road network. Any data comparisons are, at present, labour intensive and time consuming.</p> <p>Such a system for road maintenance decisions at corporate and regional levels would enable the use of existing data for benchmarking, forecasting and economic modelling.</p>
<b>Audit Conclusion</b>	<p>Southern and Western Regions management information initiatives in planning, monitoring and reporting their road maintenance needs should assist the RTA in designing and implementing new corporate information systems.</p>

**Diagram 5.1 – RIMS Data Model and Content Guide**



Source: Department of Infrastructure, Energy & Resources, *Road Information Management System, Presentation to Austroads.*

## **6. Value for Money and Competition**

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## 6.1 Introduction

Until the last 30 years, road maintenance in Australia had been undertaken mainly by public sector organisations.

These organisations owned much of the road plant and employed direct labour to undertake road works. This arrangement meant that there was little competitive bidding for maintenance work.

Pressures to reduce road maintenance costs have resulted in road maintenance work being subject to increased levels of competitive tendering.

Organisational changes have accompanied this trend. Increasingly there has been a separation of the role of client or “principal” from the service provider function.<sup>70</sup>

NSW has been slower than other States (and overseas) to respond to these competitive pressures. The RTA is however taking significant steps to open up road maintenance to competition. This chapter examines these developments.

## 6.2 Better Practice

### Setting Objectives

The key tasks of providing road infrastructure to achieve the Government’s road-related objectives are:

- setting road-related outcomes for the organisation to pursue
- developing the institutional framework or operating environment in which road tasks are allocated and undertaken
- deciding on the aggregate level of expenditure on road provision
- deciding on how that expenditure is to be allocated to different projects
- undertaking project appraisals to support the above decisions
- supervising project delivery to ensure these decisions have been implemented efficiently.<sup>71</sup>

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<sup>70</sup> Austroads, *Delivering Best Practice: Competition in the Supply of Roadworks to Government*, 1998, p.3.

<sup>71</sup> Productivity Commission, *A Comparison of Institutional Arrangements for Road Provision*, Productivity Commission, Melbourne, 1998, p.61.



## Transparency in Service Delivery

Different organisational arrangements provide for different levels of transparency in decision-making, accountability and value for money.

Austrroads, the Productivity Commission and the OECD endorse the principles that road providers should be directly accountable to road users and that there should be competition in the supply of road services.<sup>72 73</sup>

The Productivity Commission<sup>74</sup> and the Permanent International Association of Road Congress (PIARC)<sup>75</sup> consider maximum efficiency in road maintenance cannot be effectively met by having a traditional government department where the client and service providers for road maintenance are employed by the same organisation.

The PIARC indicates that greatest efficiency is achieved when:

- private contractors are provided with support and training
- there is a proper market testing and adequate competition between contractors.<sup>76</sup>

These organisations believe that costs can only be reduced and made transparent by having competition between service providers. To achieve this, it is necessary to separate the purchaser of road maintenance services from the deliverer of those services.

Such an arrangement is known as the “Road Fund” model, that is where the client and the service provider are separated in an organisational sense. Under this model, the government department, rather than delivering road maintenance directly, has the “client” functions of:

- policy development and planning
- setting specifications
- setting standards
- providing and allocating budgets
- arranging contracts
- monitoring work and quality.

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<sup>72</sup> Kneebone, op. cit., p.328; Productivity Commission, ibid, p.9; OECD, op. cit, p.137.

<sup>73</sup> OECD, op.cit and PIARC, *Road Management*, xxth World Congress, Montreal, September, 1995, p.13.

<sup>74</sup> Productivity Commission, op. cit., p79.

<sup>75</sup> PIARC, op. cit., p.9.

<sup>76</sup> PIARC, op. cit., p13.

The NSW Government's approach to service competition required that all Government agencies incorporate market testing and contracting out reviews as part of their formal business planning.<sup>77</sup>

Market testing is a way for the client agency to determine whether suppliers outside a Government agency are able to provide the same service more efficiently and cost-effectively than in-house providers. While market testing involves inviting tenders and comparing bids in terms of value for money, it does not always lead to contracting out, where contracts are made with outside suppliers for the provision of services.

Contestable activities can be performed potentially by any of a number of service providers, including in-house teams or contractors. Competitive tendering allows this contestability.

### **6.3 The New Zealand Approach**

New Zealand Road Fund model has totally separated the roles of road maintenance "funder" from that of network manager and provider.

Transfund New Zealand established in 1996 as a Crown agency is organisationally separate from Transit New Zealand.<sup>78</sup> Transfund New Zealand in its role as "funder" is responsible for:

- development, approval and purchase of a national road program
- approval of competitive pricing procedures
- auditing performance of all road controlling authorities
- provision of advice to local authorities and the New Zealand government.

State Highways are managed by Transit New Zealand with funding provided by Transfund through a bidding process.

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<sup>77</sup> Announced in the Treasurer's Financial Statement June 1995. See also NSW Government *Service Competition Guidelines*, 1997, p5.

<sup>78</sup> Prior to 1 July 1996 Transit New Zealand was both funder and provider of road projects.

## 6.4 The RTA Model

The RTA is currently a statutory authority subject to Ministerial control and direction.

The RTA was created in 1989 from a number of separate organisations, including the Department of Main Roads which focused on road building.

Since that time there has been a focusing of the role of the RTA to that of a road manager.

While the functions of client, purchaser and provider of road maintenance have now been separated under Change Management Stage 2 (described below), NSW has not created separate organisations such as those operating in New Zealand.

### Stage 1

Change Management Stage 1 (1996-98) included:

- the elimination of duplication and overlap in functions
- the adoption and implementation of commercially based business practices to focus attention on improving the levels of efficiency in delivering the roads program, including maintenance.

In the change process three core “client” Directorates were created:

- Driver and Vehicle Policy and Regulation/ Registry Services
- Road Safety and Traffic Management
- Road Network Infrastructure (RNI)<sup>79</sup>.

In addition, two service provider Directorates (Sydney and Country Operations) and a Technology/ Technical Directorate plus corporate services Directorates were formed. Internal charging by the Technology Directorate was put in place.

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<sup>79</sup> This includes road construction and road maintenance.

While these initiatives were a step toward making costs more transparent, there were some constraints, for example:

- Regional Asset Managers who represented the purchaser (RNI) in Regions were accountable to the Regional Manager. Regional Managers were also responsible for the provider section of the organisation. This “dual” accountability had the potential of creating divided loyalties when deciding priorities preferred by Regional Managers which could be different from those preferred at a corporate level
- opportunities in Regions for market testing was limited. With the exception of Sydney Operations Directorate, RTA Regions primarily used in-house RTA teams and/ or councils to deliver road maintenance.

The difficulties in accountability referred to above which were manifested in a potential conflict of duty have been recognised by the RTA and addressed in Stage 2 of the Change Management Program.

## **Stage 2**

Stage 2 was introduced during 1999. Its key features are structural realignment clearly identifying:

- RNI as funder and client for road maintenance services
- a Client Services Directorate acts as an agent for RNI to purchase services from Operations Directorate, councils or private contractors, in accordance with client policy and programs
- RTA Operations Directorate as one provider of services.
- a staged Competitive Tendering Program for road maintenance works to implement the Government’s Service Competition Policy. This will:
  - be undertaken on significant area based contracts for routine maintenance, resurfacing and rehabilitation works to the north, south and west of Sydney as far as Raymond Terrace, Kiama and Mount Victoria, respectively, from March 2000<sup>80</sup>
  - involve 50 per cent of rehabilitation and resurfacing in the remainder of the State (excluding the Far West area that will only be benchmarked)
  - be extended from 50 per cent to 100 per cent in the second year.

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<sup>80</sup> Routine bridge maintenance will not be subject to market testing until September 2000.

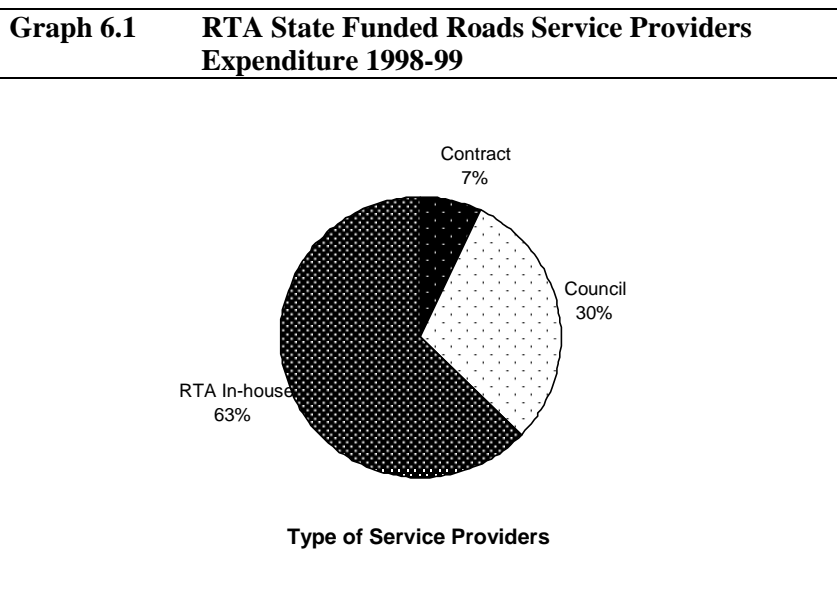
The rationale for these changes is that the RTA will be in a better position to:

- provide competitive services
- deliver improved value for money.

#### *Audit Observations*

Currently the RTA contracts out a relatively small proportion of road maintenance (around 15%) compared to other States (with the exception of Queensland).<sup>81</sup> This figure includes maintenance on the National Highways and State Funded Roads. RTA data indicate that around 7 per cent of road maintenance on State Funded Roads is contracted out.

Most road maintenance on State Funded Roads has been undertaken “in-house” by RTA teams rather than by contractors (Graph 6.1).<sup>82</sup>



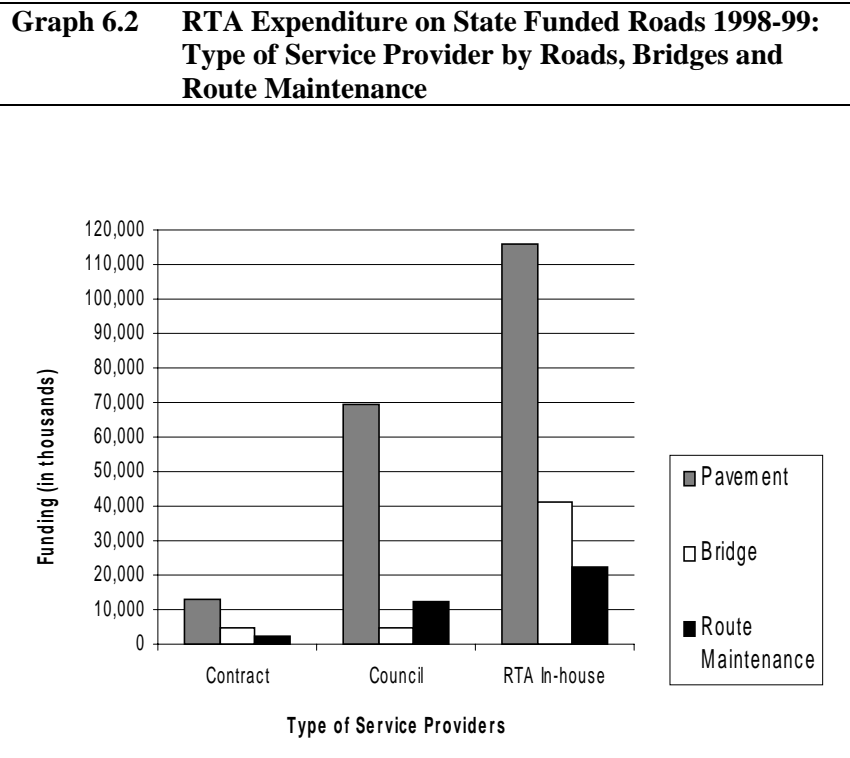
**Source:** RTA Constructing Body Report Allocations 1998/99

**Note:** Data include sub-programs 1210, 1220, 1240. Data do not include National Highways, Business Management, Traffic Facilities, Disaster Repairs, Regional or Local Roads. However, data do include Regional & Local Roads in the Unincorporated Area of NSW.

<sup>81</sup> The NSW figure includes reseals and rehabilitation which other States exclude. WA and Victoria contract out over 50 per cent of road maintenance. Austroads, op. cit. 1998, p.9.

<sup>82</sup> The reported figures in Graphs 6.1, 6.2 and 6.3 for the amount by RTA or Council include some degree of “sub-contracting” to the private sector. The separation of these figures from the overall figures reported involves fairly complex analyses to identify the level and type of risk transfer or private sector involvement. This sub-contracting includes activities such as contracts to repair fencing and to pick up litter.

Of the work contracted out, more work is undertaken on pavements rather than bridges or route maintenance (Graph 6.2).

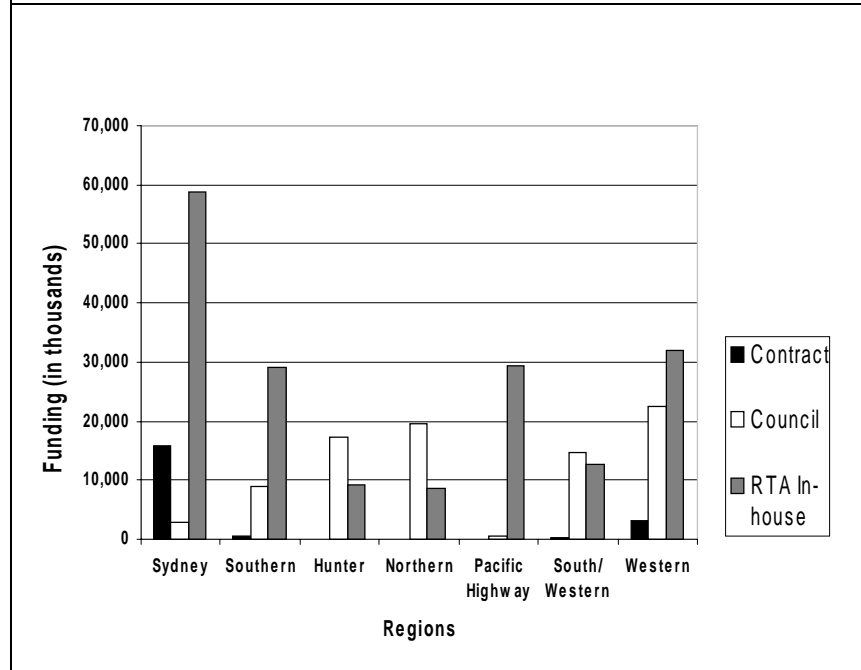


**Source:** RTA Constructing Body Report

**Note:** Data include sub-programs 1210, 1220, 1240.

Data do not include National Highways, Business Management, Traffic Facilities, Disaster Repairs, Regional or Local Roads. However, data do include Regional and Local Roads in the Unincorporated Area of NSW.

In country areas particularly, local government or RTA teams tended to undertake most maintenance work because the use of competitive tendering in those areas has been limited. This contrasts with the Sydney Region which tend to make greater use of in-house teams or contractors (Graph 6.3).

**Graph 6.3: RTA State Funded Roads Regional Expenditure 1998-99**

Source: RTA Constructing Body Report Allocations 1998/99

Note: Data include sub-programs 1210, 1220, 1240. Data do not include National Highways, Business Management, Traffic Facilities, Disaster Repairs, Regional or Local Roads. However, data do include Regional & Local Roads in the Unincorporated Area of NSW.

The Change Management Program Stage 2 has the potential to achieve improved accountability and transparency in decision-making, and better value for road maintenance funds by:

- RNI, the client/ funder more clearly defining objectives to the purchaser
- the RTA Client assessing how best to achieve value for money in planning, investing and purchasing services at a regional level
- providers tendering for work in a competitive and open environment.

The greatest benefit from separating client and contractor roles is achieved when the client specifies and controls maintenance activities for the best level of service and direct labour forces are subject to competition.<sup>83</sup> The new RTA organisational model and proposed competitive tendering strategies are designed to achieve better value for money.

<sup>83</sup> PIARC, 1995, pp.13-17.

## 6.5 Local Government

Better practice in road maintenance requires clarity about the role, expectations and accountability of the various stakeholders involved in the planning and implementation of road maintenance.

### **The Roads Act**

The *Roads Act 1993* (Section 7) defines which body is the roads authority.

Local Government, with certain exceptions, is the “roads authority” for roads within its geographical area of responsibility. Section 64 of the *Roads Act 1993* however allows the RTA to exercise the functions of a road authority when it so chooses.<sup>84</sup>

Currently a council when maintaining a State Funded Road does so in its capacity as the “roads authority” (although the RTA funds councils to undertake maintenance work).

In these circumstances a council may view that it is acting not as an agent of the RTA but in its own right as the “roads authority”. Contributing to this view may be the *Roads Act 1993* which allows a council to decide how maintenance work will be undertaken (but the *Act* gives the RTA the power to decide what work is to be undertaken).

### *Audit Observations*

There can be uncertainty for a council in terms of the extent to which they are accountable to the RTA for maintenance work undertaken on State Funded Roads.

The RTA tends to see a council as acting as agent for the RTA whereas a council (as the “roads authority” maintaining a road in its geographical area) may view its role independently with some support provided by the legislation.

The *Roads Act 1993* is currently under review. There is an opportunity to clarify roles, responsibilities and accountabilities of State and local governments in regard to road maintenance on State Funded Roads.

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84 Note: the RTA is the roads authority for all freeways, the Minister for Land and Water Conservation is the roads authority for Crown roads eg those managed by Department of Land and Water Conservation and (generally) councils are the roads authority for all other public roads.



This development when combined with an expanded role for competitive tendering, is likely to mean that councils will be used less for maintenance work in the future than is currently the case. In effect a council will become a contractor to the RTA.

The review of the *Roads Act 1993* is supported. An evaluation of the clarity of the concept of the “roads authority” is also warranted.

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## **7. Environment and Heritage Issues**

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## 7.1 Introduction

This section reviews legislation affecting the environment and heritage assets. More specifically comment is provided on the impacts of the legislation, relevant guidelines and practices, how these are managed, and their effect on road maintenance. Opportunities for improving administrative processes are suggested.

## 7.2 Better Practice

### OECD

The OECD emphasises that maintenance:

*is an opportunity for enhancing the environment as well as safeguarding the road network asset.*<sup>85</sup>

The legislation, relevant policy guidelines and practices should reflect a simple, consistent, relevant set of principles to enable road maintenance planning and implementation to enhance the environment and preserve heritage assets.

## 7.3 Environment and Heritage Legislation

Road maintenance for State Funded Roads must comply with state legislation and guidelines as well as RTA guidelines.<sup>86</sup>

Key pieces of environmental legislation are the:

- *Environment Planning & Assessment (EP&A) Act 1979*
- *Environmental Planning and Assessment Regulation 1994*
- *Protection of Environmental Operations Act 1997.*

Other relevant environmental legislation affecting road maintenance includes, but is not limited to:

- *Threatened Species Conservation Act 1995*
- *Heritage Act 1977, Heritage Amendment Act 1998*
- *Fisheries Management Act 1994, Fisheries Amendment Act 1997*
- *National Parks and Wildlife Act 1974*
- *Native Vegetation Conservation Act, 1997.*

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<sup>85</sup> OECD, op.cit., p.137.

<sup>86</sup>Where the road is on Commonwealth land or a project is funded by the Commonwealth, works must comply with Commonwealth environmental legislation.

In addition to legislation, there are numerous Better Practice guidelines on the management of various but specific aspects of the environment such as soil erosion, stormwater control and heritage management.

*Audit Observation* There seems to be copious legislation on the environment and a complex “system” of administrative arrangements to manage and consult on environmental issues affecting road maintenance projects.

## 7.4 Environmental Assessments

**EP&A Act** The *EP&A Act* and the *Regulation* aims to integrate environmental impact assessments (EIA) into planning for individual projects.

The *EP&A Act 1979* requires an assessment of the likely environmental impacts for all work prior to it being undertaken (Section 111).

For most RTA road maintenance works, this assessment takes the form of a Review of Environmental Factors (REF).

The purpose of an EIA is to determine whether an Environmental Impact Study (EIS) is required (Section 112).

The form of the assessment depends on the nature of the work and whether the impact of works is likely to be significant.<sup>87</sup> If the proposed work is likely to have significant impact on the environment, an EIS is required. A Species Impact Statement may also be required.

**EP&A Regulation** The *EP&A Regulation 1994* sets down what aspects or issues must be addressed in a review of environmental factors. Clause 82 of the *EP&A Regulation* identifies 15 factors that must be considered in undertaking an EIA.

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<sup>87</sup> The *EP&A Act 1979* provides for planning controls over “designated development” which includes carrying out of stormwater, drainage work and carriage of waste. These are activities which are part of, or related to, road maintenance. Section 79 of the *Act* provides for public consultation/participation in designated developments.

Environmental assessments may be supported by more detailed evaluation of the impact of the work on:

- flora and fauna<sup>88</sup>
- fish and marine vegetation<sup>89 90</sup>
- Aboriginal sites<sup>91</sup>
- potential pollution- water, soil, noise.

### **DUAP Guidelines**

Guidelines issued by the Department of Urban Affairs and Planning (DUAP) (titled *Is an EIS Required?*) suggest that the EIA can take different forms depending on:

- whether the work requires development approval by local government
- the nature of the work itself
- the likely impact of the work on the environment.

An EIA may take the form of a Review of Environmental Factors (REF) where no development approval is required and where there are not likely to be significant impacts on the environment.

Together with identification of environmental impacts and the preparation of a Project Plan, an Environmental Management Plan (EMP) must be prepared. These are required to outline the safeguards to be put in place to minimise likely environmental impacts.<sup>92</sup>

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<sup>88</sup> A Species Impact Statement (SIS) is prepared under the *EP&A Act 1979* and the *Threatened Species Conservation Act 1995*.

<sup>89</sup> These assessments are prepared under the *Fisheries Management Act 1994*, the *Fisheries Management Amendment Act 1997*.

<sup>90</sup> Note: recovery plans, threat abatement plans and licences may be required for an activity likely to threaten endangered or critical populations or habitats of fish, flora and fauna. These procedures require considerable consultation and time.

<sup>91</sup> Aboriginal and protected archaeological areas are protected by, and regulated under, the *National Parks and Wildlife Act 1974*. Ministerial approval must be obtained before work is carried out in designated conservation areas.

<sup>92</sup> RTA *Environmental Impact Assessment, Policy, Guidelines, Procedure*, 1998, 9-4.

- Audit Observations* The environmental and heritage legislation poses four key issues for road maintenance, namely its:
- *quantity*: there are over 100 pieces of environmental legislation in NSW and since 1995 there has been a significant increase in new areas covered by environmental legislation<sup>93</sup>
  - *complexity*: individual pieces of legislation may require:
    - environmental assessments
    - joint management plans between agencies
    - public exhibition of plans
    - receipt of public submissions about the plan, a licence, monitoring and review
  - *consistency*: some legislation such as the new *Protection of the Environment Operations Act 1997*<sup>94</sup> is concerned essentially with construction while the *EP&A Act 1979* and *Regulation 1994* are concerned with planning. Within this context, the *Act* and *Regulation* is concerned with *all* works likely to affect the environment. The latter requires the same initial environmental assessment process for all types of works
  - *relevance*: the *EP&A Act 1979* and the *Regulation 1994* require an EIA be undertaken and the *Regulation* necessitates that this assessment be wide ranging.

### **Impact on Road Maintenance**

Legislative and policy requirements have resulted in:

- an EIA being conducted for every road maintenance activity ranging from routine maintenance to more significant rehabilitation works.
- the process of assessment for each project must consider the same 15 potential impacts for road maintenance activities ranging from filling potholes, restoration of pavement shoulders, washing and spot painting of bridges to bridge replacements.

*Audit Observation* It is acknowledged that some minor or routine works may have an adverse impact on the environment. However, having the same initial assessment process for construction and for maintenance may in certain circumstances not be cost efficient and effective. Similarly, having the same initial assessment process for all types of maintenance works also may not be cost efficient and effective.

<sup>93</sup> Interview with Senior Advisory Officer, Legal Services, RTA, 11 May 1999; see also Freehill Hollingdale and Page, *Environmental Audit Guidebook*, 1999.

<sup>94</sup> Enacted 1 July 1999.

**RTA Responses to EIA Requirements** The RTA has developed different documentation to be used in the preparation of a REF in an attempt to deal more effectively with the complexity of road maintenance works. The assessment form used depends on whether work is to be carried out on a pavement or a bridge and the expected scale of the impact of the work on the environment.

<b>Type of REF - Proforma<sup>95</sup></b>	<b>Use</b>
<i>Pavements - a Generic REF</i>	This REF is intended for a range of routine road (pavement) maintenance activities undertaken within the existing road formation, that is, the area between the table drains where environmental impacts are expected to be low or medium. Routine maintenance activities include resealing, pot hole patching, crack sealing. <sup>96 97</sup>
<i>Bridges - a Generic REF</i>	This has been developed for <i>Maintenance Activities on Bridges</i> . <sup>98</sup> It is designed to cover maintenance activities which are expected to have a low to medium environmental impact. The REF is to cover activities carried out in the 12 month period till 1 July 2000.
<i>Pavements - work outside the existing road formations are subject to a project Specific REF.</i>	REF Proforma I (REF I) is designed for smaller works (for example, road safety and traffic management proposals, overtaking lanes). REF Proforma 2 (REF II) is designed for larger works.

**Numbers of REFs** REFs for rehabilitation and periodic work undertaken in 1989/99 totalled 435 (see Table 7.2).

The number of REFs is recorded at Regional level but is not systematically collated at a corporate level. Information about the total number and pattern of REFs is needed corporately to identify total costs of maintenance projects.

By comparison the RTA has 12 EIS (11 for construction and 1 for maintenance) which have been submitted or are due to be submitted to DUAP between June and December 1999.<sup>99</sup>

<sup>95</sup> The RTA recommends that their staff use a proforma but emphasise that these proforma are designed as a guide only to help the preparation of a REF using a logical and systematic method.

<sup>96</sup> Prepared by the former Country Operations Division (COD), RTA.

<sup>97</sup> Southern Region has utilised this generic REF to develop its own generic REFs for Routine Road Maintenance (I and II). These cover different kinds of routine road maintenance. Generic REF I is designed for works such as pot hole patching, concrete patching etc while Generic REF II covers activities such as resealing, asphalt overlay and shoulder restoration.

<sup>98</sup> Prepared for the former COD by Environmental Technology Section, Asset Performance Technology Branch, RTA.

<sup>99</sup> Data provided by Environment and Community Policy, RTA. Projects requiring an EIS are usually large scale construction works such as new roadways or motorways.



<b>Region</b>	<b>REF I</b>	<b>REF II</b>	<b>Other (including not defined)</b>	<b>Total</b>
Hunter	87	0	14	101
Northern	74	12	0	86
Southern	68	4	1	73
South-Western	12	7	9	28
Western	53	7	1	61
Sydney	86	0	0	86
<b>Total</b>	380	30	25	435

**Source:** Data provided by RTA Regional Environmental Advisers

### **Environment and Asset Management**

The RTA *Environmental Assessment Policy: Guidelines and Procedures* provide for “do nothing” option as a maintenance option.<sup>100</sup>

### *Audit Observation*

The Generic REFs for Bridges and Pavements and the audit case studies of rehabilitation works often describe safeguards to the environment rather than explain the impact of the works on the environment per se. Safeguards are again dealt with in the EMP.

Case Study 1 following is indicative of a number of REFs reviewed which, rather than identifying impacts, often explain the safeguards to be implemented to minimise environmental impacts. These safeguards tend to be repeated in the EMP.

<sup>100</sup> RTA *Environmental Assessment Policy: Guidelines and Procedures*, 1998, p.4-7. This document contains REF and Proformas I and II.

<b>Case Study 1: REF for Repainting of a Bridge (REF signed off in November 1998)</b>	
<b>Considerations (under the EPA Act, Part 8 Clause 82. (Sample of 15 items))</b>	<b>Reviewing Officer's Comments</b>
<b>Any environmental impact on the ecosystem of the locality?</b>	It is intended to use approved safeguards in the removal of the existing paintwork where necessary, to prevent any impact on air and water quality.
<b>Any long term effects on the environment?</b>	It is not conceived that there would be any long term effects on the environment, due to the nature and location of the operation and the protective measures to be implemented.
<b>Any risk to the safety of the environment?</b>	Approved safeguards would be incorporated during paint removal and repainting to minimise the risk to the safety of the environment.
<b>Any pollution of the environment?</b>	Any pollutants would be contained and collected using the required techniques to enclose the work area and protect workers. There would be minor leakage of very fine particles and water from jet washing activities.
<b>Any environmental problem associated with the disposal of waste?</b>	Any waste generated by the bridge maintenance activity would be disposed of in a manner which would not damage or disturb any native flora, fauna or archaeological sites. The disposal of contaminated liquid and solid waste would be in accordance with EPA approved methods of waste disposal.

*Audit Observations* As outlined in Chapter 4, on-going maintenance interventions based on WOLCC are required to maximise the life of road assets (see Chapter 4). From an environmental assessment perspective, one option is to “do nothing” because the activity will have some, if minimal, impact on the environment or heritage.

The “do nothing” or investigating the consequences of “not proceeding” is a legal requirement for EISs but not for REFs. It is included in REFs as a best practice EIA procedure.

There seems to be an inconsistency between these two approaches.

The legal implications of not proceeding with essential maintenance if public safety is threatened, or access to a road or bridge is reduced or denied needs to be considered.

## 7.5 Consultation

### With Regulatory Bodies

In order to ensure that maintenance works reflect broader government environmental policies and practices, the RTA invites comments from relevant agencies as to their views on the likely environmental impacts of proposed rehabilitation and works other than routine maintenance.<sup>101</sup>

This consultation may be:

- required in legislation
- agreed as a result of a Protocol (as in the case of EPA)
- undertaken to include comments or suggestions at an early stage
- because a licence may be needed and a fine may be imposed if it is not obtained
- the result of a “no risk” approach by the RTA so that regulatory agencies are not likely to adversely comment at a later stage :

*The person responsible for preparing the REF should decide which government agencies and public organisations should be advised of and invited to comment on the proposal. If...unsure whether a particular organisation should be contacted, it is preferable to err on the side of consultation.*<sup>102</sup>

### EPA and RTA Protocol

In 1996 the RTA and EPA put in place a Protocol to regulate and assess road works on the environment.<sup>103</sup>

Part of the agreement is that the RTA provides the EPA with REFs for comment or where licences are known or thought to be needed. Those maintenance activities that would trigger a REF to be referred to the EPA include:

- the generation of hazardous wastes
- environmentally sensitive locations
- works carried out over waters.

The Protocol notes that a REF is unlikely to be specific because it is a review of likely impacts at an early stage in the assessment process. Consequently the EPA is somewhat constrained in providing detailed assistance at this early stage in the life of a project.

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<sup>101</sup> These agencies include: EPA, DUAP, National Parks and Wildlife Service (NPWS), Fisheries, Land and Water Conservation (LAWC) and Agriculture.

<sup>102</sup> RTA *Environmental Impact Assessment Guidelines*, 1998, p.1-13.

<sup>103</sup> *Protocol Between RTA and EPA Concerning the Regulation and Assessment of Roads*, 1996.

**Consultation with other Agencies**

Consultation with other agencies regarding road maintenance works is also actively encouraged. Case Study 2 outlines the consultation that occurred in the replacement of a bridge.

**Case Study 2 : Bridge Replacement in Unincorporated NSW**

This project involved the replacement of a bridge. The original cost was estimated at \$1.12m and the timeframe at 26 months. The new bridge was expected to be open to traffic October 1997.

The REF was initiated in February 1996. During May 1996 a site survey was conducted.

The NPWS database had indicated that there were no Aboriginal sites previously recorded within a radius of 10 kilometres of the site. No sites in the area were on the Register of the National Estate.

The RTA sought comments from regulatory agencies and the Aboriginal Land Council with the following results:

- DUAP: had no comment on the REF but queried whether the works triggered the requirements of Western Division Regional Environmental Plan (REP) No.1- Extractive Industries
- Aboriginal Land Council: requested a protection buffer zone along the adjoining creek and requested monitoring of earth works.
- NPWS-requested that the REF fully describe the proposal, the existing environment and likely impact. This information would need to be provided before the NPWS could comment fully on the impact. Although the site had been disturbed by past activities, the impacts needed to be considered included:
  - site vegetation
  - fauna onsite or expected to occur and the impact of the development
  - archaeology onsite and methods to ameliorate potential impacts
  - requirements of *Threatened Species Conservation Act 1995*.
- LAWC: no formal response but informal discussions noted following issues:
  - indicated RTA should prepare an Environmental Management and Rehabilitation Plan<sup>104</sup> in consultation with LAWC, the Soil Conservation Service (SCS) and NPWS
  - details of sediment controls
  - erosion control
  - vegetation management
  - Western Division REP No. 1

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<sup>104</sup> Usually referred to as an Environmental Management Plan (EMP).

**Case Study 2 : Bridge Replacement in Unincorporated NSW**  
(continued)

- The EPA:
  - ❑ details of sediment control
  - ❑ relation of works to waters and residences
  - ❑ pollution control equipment
  - ❑ schedule of operating times
  - ❑ assessment of noise impacts
  - ❑ air quality control measures.

After further inspections and studies, the RTA Environmental Manager signed off the REF. The REF concluded that the impact of the proposal was not significant and no EIS was required.

The advice provided by regulatory agencies in the early stages of the environmental assessment tended to be generic environmental safeguards and work practices. The benefits of the existing consultation processes may be limited in these early phases of assessment.

**Consultation with  
the Local  
Community**

The RTA has developed *Interim Guidelines for Community Involvement* to assist staff with the management of community consultation.

Heritage issues are often sensitive matters requiring community consultation. Case Study 3 outlines how “lessons learned” resulted in Western Region developing guidelines as to how to better manage heritage issues in order to avoid excessive delays and costs.

**Case Study 3: Community Consultation on Heritage**

This project involved the management of highly heritage sensitive issues involving a community group in a small, rural village. In this case most of the community supported plans for road widening to improve safety.

Protracted negotiations with the community extended the lead time of this project by three years.

While the cost of the assessments may be minor, the consultations required significant staff time. The Region concerned developed a *Community Impact/ Involvement Checklist* to better manage community issues. A checklist and plan are now prepared for each project in the Region.

The outcomes of the extended consultations between the RTA, the local community and agencies such as the Heritage Office of NSW differed very little from the original proposals. This raises the question as to the extent to which these agencies add to the efficient and effective management of a community consultation process.

*Audit Observations*

- The RTA conducts a rigorous assessment of potential environmental impacts and issues of heritage. This is consistent with the RTA's legislative obligations and its view that it should show corporate leadership on environmental matters by undertaking an appropriate level of community consultation.

However, the assessment of environmental issues in Case Study 2 took a year to complete at a cost of approximately \$18,000. These costs do not include overhead costs or any additional capital costs arising from the delay to the construction of the bridge. The outcome of the assessment was that the environmental impact of the bridge replacement was not expected to be significant.

- responses received by the RTA on REFs from agencies such as EPA are general. These generic responses were predicted by the EPA Protocol document.

Again comments within REFs often related to work practices and environmental safeguards, for example, the need to have a soil erosion plan. The extent to which regulatory agencies such as the EPA are able to assist the RTA at the early stage in the environmental assessment (REF) would seem to warrant review.

- the *Protection of the Environment Operations Act 1997* is concerned primarily with construction rather than road maintenance except where pollution of waters is possible. It would seem timely to review the appropriateness and effectiveness of the existing Protocol between the EPA and the RTA with a view to identifying more cost effective arrangements which are targeted at significant environmental issues
- it is also timely for the RTA to review the effectiveness and efficiency of current informal consultative arrangements regarding REFs with the relevant agencies.

## 7.6 State-Wide Management of Issues

The *EP&A Act 1979* requires assessment of the impact of every work activity on an individual basis.<sup>105</sup>

### *Audit Observations*

A review of a sample of maintenance files indicates that project management on road maintenance is well documented.

The planning for, and implementation of, individual maintenance projects often identify similar issues that affect similar types of maintenance works, for example, timber bridge replacements. Common issues (of timber bridges) include:

- fish flow
- water flow (water and dry creek beds)
- Aboriginal sites in bridge approaches
- flora and fauna
- safety
- community access while the bridge is being replaced.

Case Study 4 illustrates a common concern about the possibility that a threatened species might be affected by the state-wide *Country Timber Bridge Program*.

Case Study 5 indicates the need for a state-wide strategy to manage contingencies such as the need for bridge closures.

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<sup>105</sup> Section 110 of the *EP&A Act 1979* defines “activity” to include, among other things, the use of land, the carrying out of a work or the demolition of a building or work.

**Case Study 4: Bridge Replacement**

Near the end of 1998 it was decided to widen the bridge approach on one side to suit the geometry of adjoining works and to lower the bridge approach. The REF for the project was expected to cost under \$3,000.<sup>106</sup>

At this time a concern was raised with the Minister for Roads about bat habitats being affected by the *Country Timber Bridge Program*. If the threatened bat species (a threatened species is identified in the Schedule to *Threatened Species Conservation Act 1995*) is likely to be significantly affected by a proposed work (as determined by an 8 part test), a Species Impact Study (and an EIS) are required.

In response to this representation, the RTA (the Environment and Community Policy Branch) concluded that

*It would be advantageous to determine the extent of bats using bridges, so as to avoid any delays in the program while assessments are made. It may be a good idea to do a preliminary assessment of bats using bridges proposed to be improved. A bat ecologist may need to be contracted to make this kind of assessment.*<sup>107</sup>

*Audit Observation*

While bats may not inhabit all timber bridges the proposal has merit because it sought to deal with a state-wide issue rather than managing the issue on a bridge by bridge basis.

It may also be helpful to identify those bridges which may need an EIS. This would assist in planning project lead times.

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<sup>106</sup> Other costs incurred on this project included the cost of sub-consultants commissioned to undertake an assessment of Aboriginal heritage. This assessment was undertaken in August 1998. The consultants recommended that further historical assessment of the bridge be undertaken (by the same sub-consultants) at an additional cost of \$3,000-\$3,900. This additional work was to be completed by November 1998.

<sup>107</sup> RTA Internal memo, 1/9/98. The REF, signed off in February 1999 concluded that, overall, the “potential significance of potential impacts on the environment” was low.



### Case Study 5: Bridge Replacement - Contingency Plans

In September 1997 a bridge in north western NSW was severely damaged when an excavator carried on a low loader struck the truss.

The cost of the repairs was initially assessed at \$0.5m extending over three months. A decision was made to replace the entire structure at an initial estimate of \$1.5m, with a timeframe of 12 months.

On the day of the collapse work commenced to provide the community with an alternative river crossing 500 metres downstream in order that the public might avoid a 12 km detour over an unsealed, dry-weather-only-road, with a 180 km detour required in wet weather.

Planning commenced for a permanent replacement of the bridge, and the requirements of regulatory agencies were sought including Fisheries, Water Resources and LAWC.

While the preliminary RTA estimate for the work was \$1.5m, the RTA estimated that meeting the requirements of other agencies meant an increase in cost by \$0.5m and extended the completion date by six months.

While most regulatory agencies were appreciative of the emergency nature of the work, and very supportive of fact tracking, there was considerable discussion between the RTA, the local council and NSW Fisheries in regard to:

- the nature of a temporary crossing
- whether permits were needed
- the need to ensure the free flow of fish
- problems faced by the community in having to use alternate river crossings over a lengthy period<sup>108</sup>
- high costs of temporary diversions associated with imposed conditions<sup>109</sup>
- the need to ensure access to the community on the other side of the river for ambulances etc.

The new bridge was opened in April 1999.

<sup>108</sup> Heavy rain resulting in high river flows forced the closure of the temporary bridge. The rain also closed the alternative 12 km detour route, forcing traffic onto a detour in excess of 180 km.

<sup>109</sup> The first temporary level crossing was expected to cost \$100,000.

*Audit Observations* Rather than dealing with issues on a case by case basis, a more strategic approach requires agreement between the RTA's RNIM and Environment and Community Policy that road maintenance:

- is different to road construction
- requires a proactive approach to preserve the asset.

Issues such as those described in Case Study 5 might be better managed by:

- RTA RNIM and Environment and Community Policy identifying key areas of the *Road Infrastructure Maintenance Program* which require management of environmental issues on a state-wide basis or
- having a state-wide strategy to manage environmental issues common to like maintenance projects, for example, timber bridges scheduled for maintenance under the *Country Timber Bridge Program*.

Environmental assessments could be conducted within a set of principles agreed upon by RTA and other regulatory agencies. These would be consistently applied across the State.

This strategy would thus translate environmental legislation and generic guidelines into working policies and strategies.

Alternatively an agreed plan could be prepared by stakeholder agencies for a geographic location (an example of this approach is the Kosciuszko National Park details of which are provided in the following Case Study).

### Case Study 6: Kosciuszko National Park: A Model

The RTA Southern Region and NPWS have jointly developed an Environmental Management Plan for *Road Maintenance Activities within Kosciuszko National Park*. This was signed off by the NPWS Regional Manager and the RTA Regional Manager.

The purpose of the Plan is to provide a framework for a joint environmental assessment and the management of road maintenance on Kosciuszko Road and the Snowy Mountains Highway. The framework was particularly useful in addressing the problem of there being no clearly defined road reserve and demarcation of responsibility was difficult to ascertain. The Plan:

- identifies key relevant environmental issues
- sets out the potential environmental impacts
- provides principles and guidelines for environmental protection
- describes appropriate environmental measures to be undertaken
- identifies the environmental criteria against which the performance of environmental controls and work practices can be measured and assessed
- prescribes monitoring regimes to provide adequate controls
- identifies responsibilities of stakeholder agencies
- assigns authority and responsibility for environmental undertakings to different agency personnel
- aims to assist the preparation of a REF.

## 7.7 The Impact of Assessments

The REF process can generally be planned for and can be undertaken concurrently with other aspects of the project.

REFs incur additional costs and may extend project lead times. These increased costs and extended lead times may be considerable, especially in the case of bridge replacements and projects which have road maintenance, construction and traffic facilities maintenance components.

The direct costs of environmental assessments vary considerably. A simple REF can take a day to a week for staff to prepare. Where background studies need to be prepared for example a flora study, the REF will take longer.

One Regional Asset Manager interviewed estimated that a REF assessment for a rehabilitation project:

- takes a week to prepare in most cases (many are undertaken by RTA staff)
- requires around 5 hours of management time (excluding community consultation)
- costs are between \$5,000 to \$10,000 for an assessment report prepared by consultants
- results in a two to three month process prior to commencement of the work.<sup>110</sup>

#### **Case Study 7: Bridge Replacement**

Replacement of this timber bridge was needed to overcome the problem of the existing approaches encroaching on flood overflow areas. The bridge was constructed prior to 1936. As the bridge was more than 50 years old a study of the heritage impacts was needed.<sup>111</sup>

Environmental and heritage studies added approximately \$8,000 to the cost of this project and extended the timeframe by almost 2 months.<sup>112</sup>

The REF concluded that the realignment and replacement of the bridge would

*not have significant effect on the environment and therefore an EIS is not required.*<sup>113</sup>

The report concluded that appropriate landscaping and bridge design would minimise the impact of the bridge replacement on significant local heritage values.<sup>114</sup>

A new bridge has since been constructed and the old bridge demolished.

Abutments of the old bridge have been retained and additional tree planting and revegetation has been completed.

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<sup>110</sup> Interview with Regional Asset Manager, 5/7/99.

<sup>111</sup> Studies found that the bridge had had a number of parts replaced so that these parts could not be considered relics.

<sup>112</sup> The \$8,000 does not include the cost of staff time associated with these studies nor staff time spent in consultation with community.

<sup>113</sup> REF, 1997, p.1

<sup>114</sup> Heritage Consultants, February, 1997, p.18.

### Case Study 8: Bridge Replacement

This bridge is to be replaced as part of the *Country Timber Bridge Program* in order to improve safety and reduce flooding and maintenance costs.

The original project proposal was developed in June 1998. Concept development for the bridge was to be complete by January 1999 and the REF by mid-April 1999.

It was expected that the REF would cost \$25,000, take four months and be publicly exhibited. While no specific environmental issues affected this project, factors which had to be taken into account included:

- sites of Aboriginal significance
- heritage issues
- waterway conservation issues
- flood levels and frequency

Further careful consideration was given to maintenance options and a REF finalised in September 1999. It concluded:

*This Review of Environmental Factors has determined that the impact resulting from the development proposal is unlikely to significantly affect the environment.*<sup>115</sup>

A Concept Plan with the alignment of the new bridge will now be developed.

#### *Audit Observations*

An analysis of a small sample of case studies indicated REFs:

- for bridges and projects involving maintenance, construction and traffic management tend to be complex. This is because they must consider issues related to Aboriginal sites, water pollution over a running or dry creek bed, fish passage, flora and fauna
- can add extra cost and time to project planning and preparation
- while the direct costs of the REF are known, the indirect costs such as time associated with the administration of the REF, community consultation etc are unknown.

<sup>115</sup> Consultants Report, September 1998, p.52.

**Audit Conclusion**      Based on a sample review of case studies, the RTA is displaying corporate leadership with regard to consideration of environmental and heritage issues in planning road maintenance.  
*Process*

There is an opportunity to re-examine the impact of environmental assessments (of all types) in an endeavour to streamline processes and minimise costs. Processes do seem to be unnecessarily cumbersome.

It will be important to continue to adhere to environmental legislative requirements under contracting out arrangements. Pre-qualification of contractors will make an important contribution to achieving this.

*Better Practice*      Better practice in road maintenance requires that all costs are identified and considered in reviewing maintenance options.

Currently the RTA does not adequately record and does not analyse *all* costs associated with REFs.

Better practice in road maintenance requires that all costs are identified and considered in reviewing maintenance options.

The RTA has accounting systems in place to measure the cost impost of environmental analyses and approvals. These costing systems are used for major network development projects but are not currently applied to maintenance works. The translation of these costing systems to the maintenance program is under investigation for major maintenance projects such as rehabilitation works.

## **Appendices**

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## **Appendix 1: Abbreviations and Acronyms**

ALTD	Australian Land Transport Development
ANAO	Australian National Audit Office
ARRB	Australian Road Research Board
CMP	Conservation Management Plan
COD	Country Operations Division
DPWS	Department of Public Works and Services
DIER	Department of Infrastructure, Energy and Resources
DUAP	Department of Urban Affairs and Planning
EIS	Environmental Impact Statement
EMP	Environment Management Plan
EPA	Environment Protection Authority
LAWC	Land and Water Conservation
NPWS	National Parks and Wildlife Service
OECD	Organisation for Economic Co-operation and Development
PAIS	Pavement Asset Information System
PCI	Pavement Condition Index
PIARC	Permanent International Association of Road Congresses
REF	Review of Environmental Factors
RIMS	Road Information Management System
RNI	Road Network Infrastructure
RNIM	Road Network Infrastructure Maintenance
RTA	Roads and Traffic Authority
SCS	Soil Conservation Service
SEE	Statement of Environmental Effects
SIS	Species Impact Statement
SOD	Sydney Operations Division
SPG	Specific Purpose Grant
TAM	Total Asset Management
WOLCC	Whole of Life Cycle Cost



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## Appendix 2: Definitions

<b>Asset Management</b>	the sum total of all activities aimed at providing cost effective infrastructure that meets organisational and stakeholder requirements.
<b>Contestable Activity</b>	a contestable activity is one which, potentially, can be performed by any of a number of service providers. In- house activities which could be performed by contractors are often called contestable activities.
<b>Earned Value</b>	earned value provides a measure of the actual value of work completed at a particular time.
<b>In-house</b>	The Department, Authority or entity that provides the client function is defined as the “house”. Where the supplier for any given works sits in the same “house” (reports to the same Chief Executive, Board or Minister) it is termed as in-house delivery.
<b>Integrated Asset Management</b>	policies, strategies, tools, methods and processes have been designed to complement and reinforce each other in achieving the stated objectives.
<b>Market Testing</b>	market testing is a way of determining whether suppliers outside a Government agency are able to provide the same service more efficiently and cost-effectively than in-house providers. While market testing involves inviting tenders and comparing bids in terms of value for money, it does not always lead to contracting out, where contracts are made with outside suppliers for the provision of services.
<b>National Highways</b>	roads linking capital cities or trade and commerce centres.
<b>Preferred Supplier</b>	A supplier which has some strategic or preferred status with the client. Normally this would involve the supplier getting some work from the client without having to competitively bid.
<b>Regional Roads</b>	Subarterial roads linking urban areas; intra regional links.
<b>Ride Quality</b>	measured by evaluating roughness when weighted by travel.
<b>Roads</b>	includes pavements, bridges and car carrying ferries.
<b>Route Maintenance</b>	work on roadsides including retaining walls, clearing of drains and snow.
<b>Rutting</b>	Longitudinal depression that forms in the wheel paths of a road under traffic loading. A rutted road will usually require a major treatment.

<b>Service Competition</b>	<p>service competition refers to the NSW Government policy of harnessing competitive forces, indirectly or directly, to achieve best value for money in the provision of services.</p> <p>Through indirect competition, by way of comparing in-house performance with the best known performance achieved elsewhere, in-house groups are encouraged to achieve equivalent levels of performance or better.</p> <p>Through direct competition, by way of competitive tendering, following consideration of all relevant factors, the work is allocated to the tenderer offering best value for money.</p>
<b>State Funded Roads</b>	<p>major arterial links between States and between major NSW urban arterial routes.</p>
<b>State Roads</b>	<p>includes the National Highways and State Funded Roads.</p>
<b>Value for Money</b>	<p>this is determined by considering all the factors which are relevant to a particular purpose and requires assessment against criteria appropriate to the case in point. Generic criteria include: satisfaction of a genuine need, the quality of a service or product, reliability, the timeliness of service or delivery and the initial and ongoing costs.</p>
<b>Whole of Life Cycle Cost</b>	<p>the evaluation of the total cost to be expended on an asset over its entire life span.</p>

### **Appendix 3: Information Systems Sub-criteria**

Information, information systems and processes should support the planning process in that:

- there should be a reasonable degree of consensus and consistency about what performance indicators for road maintenance are required
- information management should have corporate leadership and should be owned by all
- information systems should be integrated to provide the information for corporate decision-making
- the approaches / methods used at network, program and project levels must be different but interlocking and utilise the same database
- data systems which support the road and bridge maintenance systems must be appropriate, timely and reliable
- data systems should be utilised to support forecasting and economic modelling.

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# **Performance Audits by The Audit Office of New South Wales**

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## Performance Auditing

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Performance audits seek to serve the interests of the Parliament, the people of New South Wales and public sector managers.

The legislative basis for performance audits is contained within the *Public Finance and Audit Act 1983, Division 2A*, which differentiates such work from the Office's financial statements audit function. Performance audits examine whether an authority is carrying out its activities effectively and doing so economically and efficiently and in compliance with all relevant laws. These audits also evaluate whether members of Parliament and the public are provided with appropriate accountability information in respect of those activities.

Performance audits are not entitled to question the merits of policy objectives of the Government.

When undertaking performance audits, auditors can look either at results, to determine whether value for money is actually achieved, or at management processes, to determine whether those

processes should ensure that value is received and that required standards of probity and accountability have been met. A mixture of such approaches is common.

Where appropriate, performance audits provide recommendations for improvements in public administration.

Performance audits are conducted by specialist performance auditors who are drawn from a wide range of professional disciplines.

The procedures followed in the conduct of performance audits comply with The Audit Office's Performance Audit Manual which incorporates the requirements of Australian Audit Standards *AUS 806 and 808*.

Our performance audit services are certified under international quality standard *ISO 9001*, and accordingly our quality management system is subject to regular independent verification. The Audit Office of NSW was the first public audit office in the world to achieve formal certification to this standard.

## Performance Audit Reports

No.	Agency or Issue Examined	Title of Performance Audit Report or Publication	Date Tabled in Parliament or Published
1	Department of Housing	<i>Public Housing Construction: Selected Management Matters</i>	5 December 1991
2	Police Service, Department of Corrective Services, Ambulance Service, Fire Brigades and Others	<i>Training and Development for the State's Disciplined Services: Stream 1 - Training Facilities</i>	24 September 1992
3	Public Servant Housing	<i>Rental and Management Aspects of Public Servant Housing</i>	28 September 1992
4	Police Service	<i>Air Travel Arrangements</i>	8 December 1992
5	Fraud Control	<i>Fraud Control Strategies</i>	15 June 1993
6	HomeFund Program	<i>The Special Audit of the HomeFund Program</i>	17 September 1993
7	State Rail Authority	<i>Countrylink: A Review of Costs, Fare Levels, Concession Fares and CSO Arrangements</i>	10 December 1993
8	Ambulance Service, Fire Brigades	<i>Training and Development for the State's Disciplined Services: Stream 2 - Skills Maintenance Training</i>	13 December 1993
9	Fraud Control	<i>Fraud Control: Developing an Effective Strategy</i> (Better Practice Guide jointly published with the Office of Public Management, Premier's Department)	30 March 1994
10	Aboriginal Land Council	<i>Statutory Investments and Business Enterprises</i>	31 August 1994
11	Aboriginal Land Claims	<i>Aboriginal Land Claims</i>	31 August 1994
12	Children's Services	<i>Preschool and Long Day Care</i>	10 October 1994
13	Roads and Traffic Authority	<i>Private Participation in the Provision of Public Infrastructure</i> (Accounting Treatments; Sydney Harbour Tunnel; M4 Tollway; M5 Tollway)	17 October 1994
14	Sydney Olympics 2000	<i>Review of Estimates</i>	18 November 1994
15	State Bank	<i>Special Audit Report: Proposed Sale of the State Bank of New South Wales</i>	13 January 1995
16	Roads and Traffic Authority	<i>The M2 Motorway</i>	31 January 1995
17	Department of Courts Administration	<i>Management of the Courts: A Preliminary Report</i>	5 April 1995



No.	Agency or Issue Examined	Title of Performance Audit Report or Publication	Date Tabled in Parliament or Published
18	Joint Operations in the Education Sector	<i>A Review of Establishment, Management and Effectiveness Issues (including a Guide to Better Practice)</i>	13 September 1995
19	Department of School Education	<i>Effective Utilisation of School Facilities</i>	29 September 1995
20	Luna Park	<i>Luna Park</i>	12 October 1995
21	Government Advertising	<i>Government Advertising</i>	23 November 1995
22	Performance Auditing In NSW	<i>Implementation of Recommendations; and Improving Follow-Up Mechanisms</i>	6 December 1995
23	Ethnic Affairs Commission	<i>Administration of Grants (including a Guide To Better Practice)</i>	7 December 1995
24	Department of Health	<i>Same Day Admissions</i>	12 December 1995
25	Environment Protection Authority	<i>Management and Regulation of Contaminated Sites: A Preliminary Report</i>	18 December 1995
26	State Rail Authority of NSW	<i>Internal Control</i>	14 May 1996
27	Building Services Corporation	<i>Inquiry into Outstanding Grievances</i>	9 August 1996
28	Newcastle Port Corporation	<i>Protected Disclosure</i>	19 September 1996
29	Ambulance Service of New South Wales	<i>Charging and Revenue Collection (including a Guide to Better Practice in Debtors Administration)</i>	26 September 1996
30	Department of Public Works and Services	<i>Sale of the State Office Block</i>	17 October 1996
31	State Rail Authority	<i>Tangara Contract Finalisation</i>	19 November 1996
32	NSW Fire Brigades	<i>Fire Prevention</i>	5 December 1996
33	State Rail	<i>Accountability and Internal Review Arrangements at State Rail</i>	19 December 1996
34	Corporate Credit Cards	<i>The Corporate Credit Card (including Guidelines for the Internal Control of the Corporate Credit Card)</i>	23 January 1997
35	NSW Health Department	<i>Medical Specialists: Rights of Private Practice Arrangements</i>	12 March 1997
36	NSW Agriculture	<i>Review of NSW Agriculture</i>	27 March 1997
37	Redundancy Arrangements	<i>Redundancy Arrangements</i>	17 April 1997
38	NSW Health Department	<i>Immunisation in New South Wales</i>	12 June 1997
39	Corporate Governance	<i>Corporate Governance Volume 1 : In Principle Volume 2 : In Practice</i>	17 June 1997

<b>No.</b>	<b>Agency or Issue Examined</b>	<b>Title of Performance Audit Report or Publication</b>	<b>Date Tabled in Parliament or Published</b>
40	Department of Community Services and Ageing and Disability Department	<i>Large Residential Centres for People with a Disability in New South Wales</i>	26 June 1997
41	The Law Society Council of NSW, the Bar Council, the Legal Services Commissioner	<i>A Review of Activities Funded by the Statutory Interest Account</i>	30 June 1997
42	Roads and Traffic Authority	<i>Review of Eastern Distributor</i>	31 July 1997
43	Department of Public Works and Services	<i>1999-2000 Millennium Date Rollover: Preparedness of the NSW Public Sector</i>	8 December 1997
44	Sydney Showground, Moore Park Trust	<i>Lease to Fox Studios Australia</i>	8 December 1997
45	Department of Public Works and Services	<i>Government Office Accommodation</i>	11 December 1997
46	Department of Housing	<i>Redevelopment Proposal for East Fairfield (Villawood) Estate</i>	29 January 1998
47	NSW Police Service	<i>Police Response to Calls for Assistance</i>	10 March 1998
48	Fraud Control	<i>Status Report on the Implementation of Fraud Control Strategies</i>	25 March 1998
49	Corporate Governance	<i>On Board: guide to better practice for public sector governing and advisory boards (jointly published with Premier's Department)</i>	7 April 1998
50	Casino Surveillance	<i>Casino Surveillance as undertaken by the Director of Casino Surveillance and the Casino Control Authority</i>	10 June 1998
51	Office of State Revenue	<i>The Levying and Collection of Land Tax</i>	5 August 1998
52	NSW Public Sector	<i>Management of Sickness Absence NSW Public Sector Volume 1: Executive Briefing Volume 2: The Survey - Detailed Findings</i>	27 August 1998
53	NSW Police Service	<i>Police Response to Fraud</i>	14 October 1998
54	Hospital Emergency Departments	<i>Planning Statewide Services</i>	21 October 1998
55	NSW Public Sector	<i>Follow-up of Performance Audits: 1995 - 1997</i>	17 November 1998
56	NSW Health	<i>Management of Research: Infrastructure Grants Program - A Case Study</i>	25 November 1998
57	Rural Fire Service	<i>The Coordination of Bushfire Fighting Activities</i>	2 December 1998

No.	Agency or Issue Examined	Title of Performance Audit Report or Publication	Date Tabled in Parliament or Published
58	Walsh Bay	<i>Review of Walsh Bay</i>	17 December 1998
59	NSW Senior Executive Service	<i>Professionalism and Integrity</i> <i>Volume One: Summary and Research Report</i> <i>Volume Two: Literature Review and Survey Findings</i>	17 December 1998
60	Department of State and Regional Development	<i>Provision of Industry Assistance</i>	21 December 1998
61	The Treasury	<i>Sale of the TAB</i>	23 December 1998
62	The Sydney 2000 Olympic and Paralympic Games	<i>Review of Estimates</i>	14 January 1999
63	Department of Education and Training	<i>The School Accountability and Improvement Model</i>	12 May 1999
64	Key Performance Indicators	<ul style="list-style-type: none"> <li>• <i>Government-wide Framework</i></li> <li>• <i>Defining and Measuring Performance (Better practice Principles)</i></li> <li>• <i>Legal Aid Commission Case Study</i></li> </ul>	31 August 1999
65	Attorney General's Department	<i>Management of Court Waiting Times</i>	3 September 1999
66	Office of the Protective Commissioner Office of the Public Guardian	<i>Complaints and Review Processes</i>	28 September 1999
67	University of Western Sydney	<i>Administrative Arrangements</i>	17 November 1999
68	NSW Police Service	<i>Enforcement of Street Parking</i>	24 November 1999
69	Roads and traffic Authority of NSW	<i>Planning for Road Maintenance</i>	December 1999



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