Western Australian
Auditor General's Report

Maintaining the State Road Network – Follow-on Audit

Report 13: June 2016

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WESTERN AUSTRALIAN AUDITOR GENERAL'S REPORT

Maintaining the State Road Network – Follow-on Audit

Report 13
June 2016

THE PRESIDENT
LEGISLATIVE COUNCIL

THE SPEAKER
LEGISLATIVE ASSEMBLY

MAINTAINING THE STATE ROAD NETWORK – FOLLOW-ON AUDIT

This report has been prepared for submission to Parliament under the provisions of section 25 of the *Auditor General Act 200*6.

Performance audits are an integral part of the overall audit program. They seek to provide Parliament with assessments of the effectiveness and efficiency of public sector programs and activities, and identify opportunities for improved performance.

This audit examined whether the condition of the state road network has improved since my last report titled *Maintaining the State Road Network*. The audit also looked at whether reasonable steps have been taken to address the problems identified in that report and included an assessment of whether Main Roads has addressed the 10 recommendations I made.

I wish to acknowledge the staff at Main Roads Western Australia for their cooperation with this audit.

COLIN MURPHY
AUDITOR GENERAL
29 June 2016

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Auditor General's overview

My last audit of the maintenance of the state road network in 2009 highlighted a significant backlog of overdue maintenance and the need for Main Roads to improve key information to target repairs in a cost effective way and to take a long-term focus to managing the network.

Seven years later the backlog of overdue maintenance remains significant at $845 million, and Main Roads overall approach is still to do maintenance when it becomes critical. Critical maintenance is more complex and expensive, leaving less capacity to do the preventative maintenance which over time would reduce both the backlog and whole-of-life costs.

There have been improvements. Main Roads has invested in resurfacing to prolong the expected life of sections of the network, and it also has much better information to support targeting of maintenance funds.

My major concern is that Main Roads is yet to use its improved information to develop strategies to move from a largely reactive approach to investing in preventative maintenance. Without that strategy, Main Roads is likely to continue to struggle to reduce the maintenance backlog and improve long-term value for money. The transition will take time, and critical maintenance cannot simply stop, but the longer the transition takes the greater the risk to this critical asset.

Executive summary

Introduction

In 2009 the Auditor General tabled a report titled *Maintaining the State Road Network*. The audit examined whether Main Roads Western Australia's (Main Roads) management of road maintenance had been efficient and effective.

The report concluded that the condition of the network had deteriorated since Main Roads contracted out its maintenance function, with the average age of the road increasing and inadequate levels of planned maintenance. It also found that better information was needed to inform Main Roads' decisions about where, when and what type of maintenance was needed to ensure cost effectiveness and reduce the significant backlog of overdue maintenance.

This follow-on audit provides an assessment of whether the condition of the state road network has improved and whether reasonable steps have been taken to address the problems identified in the first report. It also includes an assessment of whether Main Roads has addressed the 10 recommendations of the 2009 report (Appendix 1).

Background

Road construction and maintenance in Western Australia is the responsibility of either the state or local governments. The state government is responsible for roads classified as highways or main roads – cumulatively referred to as the state road network. Main Roads plans, builds and maintains the state road network on behalf of the state government (Figure 1).

Source: Main Roads

Figure 1: The state road network

Since our 2009 audit Main Roads has replaced its contract model for maintenance, moving from Term Network Contracts (TNCs) to Integrated Service Arrangements (ISAs).

Under the ISA model, private sector partners (Integrated Service Providers – 'contractors') are brought in to work with Main Roads to deliver road operational asset management, network operations and maintenance services delivery. Contractors and Main Roads regional staff work closely to plan and deliver maintenance, with oversight by Main Roads head office in Perth.

Main Roads introduced the ISA model between 2010 and 2011 to address some of the shortcomings of the TNC model, which were identified in our 2009 report. A key focus was regaining influence and control over planning and management of the road asset, which diminished during the TNC period.

Main Roads intends to change its contract model again in 2017. The design of the new model aims to increase the in-house managed component of maintenance.

Funding for the maintenance of the state road network was valued at approximately $227 million in 2016-17. Works regarded as maintenance include road resurfacing, drainage and line-marking. By comparison, the building of a new road is as a capital works project. Some projects can have both maintenance and capital elements.

The context for maintaining the state road network changes over time:

- Since our last report the number of registered vehicles has increased by 18.5 per cent, which contributes to road wear and tear.
- The road network is growing. Since 2009, the size of the state road network has increased around 6% from 17,800 kilometres to 18,846 kilometres. Its value has grown by 31% over this period to more than $46 billion.

Other factors also impact the budget and delivery timeframes for maintenance. Projects such as capital upgrades can influence maintenance positively. For example, if a road with an identified resurfacing need is instead rebuilt, maintenance (resurfacing) is no longer required and the overall quality and lifespan of the asset improves. Projects can also impact maintenance negatively. For instance, road diversions needed to enable capital upgrades or maintenance on a specific section of road can cause increased wear and tear on other sections of road.

Audit conclusion

The backlog of overdue maintenance on the state road network remains at similar levels to 2009, with an estimated total cost of $845 million in 2016. The average age and the proportion of the road network past its design life has increased, with 46% of the network now over 40 years old compared with 32% in our 2009 report.

Overall, Main Roads' approach to maintenance is still reactive, doing maintenance as it becomes critical. Targeted early intervention to prevent roads from needing more costly and extensive maintenance is limited. As the complexity and cost of maintenance increases, less can be done within the available funding, and so the backlog increases.

There have been some improvements. Recent additional investment in resurfacing some parts of the network to prevent further deterioration has helped Main Roads to curb growth in the maintenance backlog. Main Roads has also improved its collection of information about the cost and delivery of road maintenance activities, which allows it to monitor contractor performance more effectively.

However, Main Roads has not yet used this better information to shift its strategy from reactive to preventative maintenance. While funding levels and the need to conduct critical repairs are key considerations, without a change in strategy, there is a significant risk that road condition will deteriorate and the maintenance backlog will rise.

Key findings

The backlog of overdue maintenance on the state road network remains at similar levels to 2009, with an estimated total cost of $845 million in 2016. Between 2010 and 2015, the maintenance backlog was around $1 billion, but Main Roads expect this to fall to $845 million in 2016 and then $630 million by June 2017. Much of the expected reduction will occur from:

- instances where there is no longer a requirement for maintenance works to be done because the need has been addressed as part of a minor construction works and capital works projects. This removes the original maintenance costs from the backlog. For instance, where minor construction works address road shoulder repairs that were going to be treated and funded as part of the maintenance program.
- decreasing the level of services provided for maintenance activities such as vegetation clearance and litter collection, which contributed to a drop of over $100 million in the past year.

In the 2009 report we found that 32% of main roads were older than the design life of 40 years. The proportion has now grown to 46%, with the average age of roads up from 33 years to 36 years. Main Roads also acknowledges that the estimated maintenance backlog does not include the full extent of road rehabilitation (rebuilding) needs. Main Roads regional offices do not comprehensively assess and report on the level of rehabilitation, as this need does not typically attract funding. Main Roads does not know the extent to which rehabilitation is underreported but estimates the gap between assessed need and actual need at approximately $100 million.

Most of the maintenance on the network is reactive, done when it becomes critical. The available budget of $227 million in 2016-17 was allocated to high priority needs, rather than balanced across lower priority needs to prevent them escalating and becoming more complex and expensive to fix. As complexity increases, so does cost resulting in less maintenance being done with the available funding. Main Roads is aware that preventative maintenance offers better value for money and prolongs the life of the network. However, it does not have a comprehensive strategy which balances the need to move to a preventative approach while still undertaking critical repairs.

Main Roads has made some progress towards a preventative approach by using additional funds to prioritise resurfacing which prevents further deterioration of the road. Between 2012 and 2016, Main Roads received additional funding of $236 million to address the maintenance backlog. The funding was used for overdue resurfacing as well as new resurfacing needs, reducing the overall backlog value by $78 million, and the average surface age by a year since 2010. Replacing the surface of a road in a timely way helps to improve the long-term performance of the road and extend the periods between major maintenance. However, Main Roads is yet to analyse the cost effectiveness of the focus on resurfacing and how this compares to other approaches.

Main Roads has improved its knowledge of the condition of the road network and the performance of its contractors. Corporate systems and tools introduced since our 2009 report provide Main Roads with information about the condition of the road asset, as well as maintenance costs and performance. In particular the Maintenance Management Information System (MMIS), implemented in 2014, brings road maintenance information into a single system and provides consistency for measuring and reviewing road condition and maintenance.

The current ISA model of contracting has improved Main Roads' levels of control over maintenance by involving staff directly in managing maintenance. This was not the case under the previous contract model (TNC). The ISA model also gives Main Roads a greater opportunity to monitor whether works are on time and budget, though the standardised performance indicators it uses to do this took almost 3 years to introduce. Main Roads is implementing a new contract model in 2017. Improvements made to monitoring under the ISAs need to be carried forward into the new model.

Recommendations

Main Roads should, by December 2016:

1. Formalise guidance to regions on assessing and prioritising maintenance needs.
2. Establish a consistent approach to calculating backlog to allow comparison over time.
3. Apply lessons learned from the Integrated Service Arrangements when developing and managing the new maintenance contracts,
4. Standardise the monitoring and evaluation of safety related maintenance tasks identified during crash investigations,
5. Identify the maintenance knowledge and skills needed by Main Roads and plan for how current and future gaps will be addressed.

Main Roads should, by July 2017:

6. Implement a comprehensive strategy to address maintenance backlog. The strategy should focus on minimising the whole-of-life costs of the network.

Response from Main Roads

Main Roads is pleased that the Audit has found that Main Roads has improved its knowledge of the condition of the road network and the performance of its contractors. In particular that the current integrated Service Arrangement (ISA) model of contracting has improved levels of control over maintenance through staff being directly involved in managing maintenance.

During 2017 Main Roads will begin introducing the next generation of contracting model. Main Roads will ensure that lessons learnt from the ISA's are carried forward and that recommendations from this Audit are implemented. These new contracts are expected to take advantage of the very competitive market for engineering services that currently exists in Western Australia. Through more competitive pricing and better performance from these contracts it is expected that more maintenance will be able to be done each year for the same amount of funding than previously. Combined with an expected return to historical funding levels for maintenance the backlog of overdue maintenance should be able to be reduced.

Main Roads accepts the six recommendations and the timeframes for their implementation. A comprehensive strategy to address the maintenance backlog focussing on whole of life cost will be implemented by July 2017. Structural changes have already been put in place so that capital and maintenance programming decisions are made in the one responsibility area. This will mean that maintenance funding decisions will not be made in isolation of planned future capital works projects.

Pavement age alone does not reflect the pavement performance and many roads are performing well beyond their nominal 40 year design life. The actual life of the pavement will be impacted by various factors including quality of the naturally occurring pavement material, geological and climatic conditions, traffic volumes and traffic composition (particularly heavy vehicles) and timely pavement repairs and resurfacing.

New technologies in asphalt are currently being used in other States and internationally that achieve cost savings, better pavement performance and shorter construction timeframes. The Minister for Transport approved in December 2015 a four year agreement with the Australian Road Research Board (ARRB) to research, develop and guide implementation of the latest advancements in pavement engineering from other States and overseas.

Audit focus and scope

The audit examined if the condition of the state road network has improved since 2009 and whether Main Roads has taken reasonable steps to address the problems identified in the 2009 audit report. The audit focused on 3 lines of inquiry:

1. Has Main Roads implemented the recommendations from the 2009 audit report?
2. Has the condition of the state road network improved since 2009?
3. Have the Integrated Services Arrangements resulted in improvements to road maintenance?

The audit approach included:

- examination of agency documents
- analysis of agency data
- interviews with key Main Roads staff and contractors
- interviews with industry stakeholders
- review of road maintenance research reports from other jurisdictions.

Consistent with the original audit we did not examine:

- any capital works
- roads owned and managed by local government
- awarding of the contracts for maintenance delivery
- the contract arrangements and management of electrical, bridge and tunnel maintenance.

This was a broad scope performance audit, conducted under section 18 of the *Auditor General Act 2006* and in accordance with Australian Auditing and Assurance Standards. Performance audits primarily focus on the effective management and operation of agency programs and activities. The approximate cost of tabling this report is $203,290.

Audit findings

At $845 million the backlog of overdue maintenance is almost the same as in 2009

The overdue maintenance backlog remains significant and the proportion of the network beyond its design life has increased since 2009. Overall, Main Roads' approach to maintenance is reactive, with the bulk of funding directed to critical maintenance, despite this being more complex and costing more than early intervention.

The maintenance backlog is still high and does not reflect the full extent of maintenance needs on the network

At $845 million, the estimated value of maintenance backlog has not substantially changed since our last report in 2009. However, the figure has been higher in the years between then and now, with estimates in excess of $1 billion between 2011 and 2015 (Figure 2).

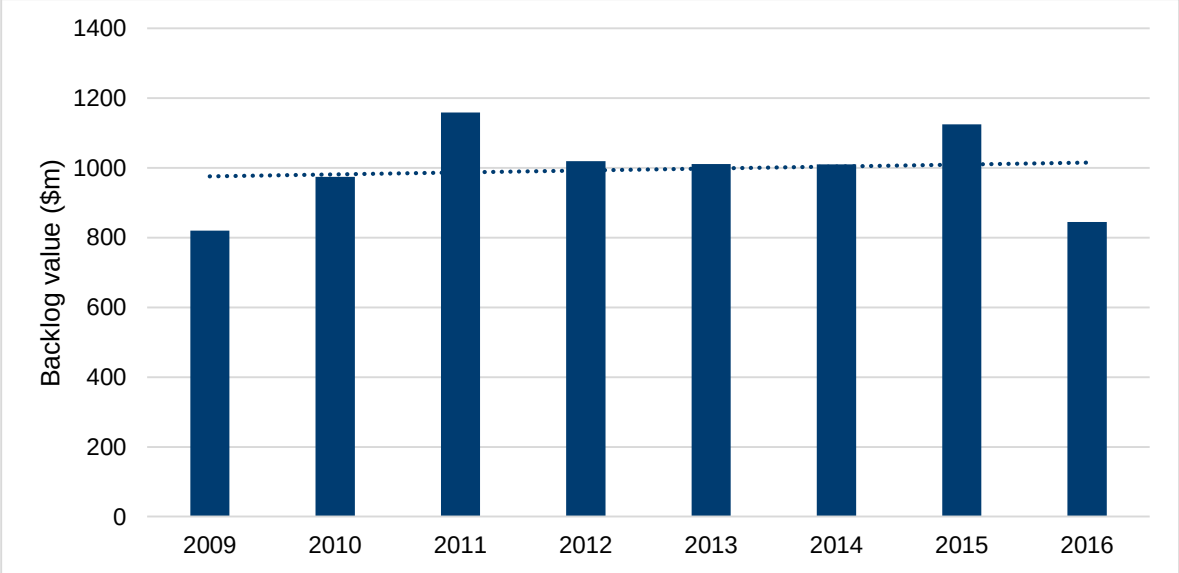


Figure 2: Estimates of maintenance backlog 2009 to 2016

The backlog reduced to $845 million in 2016 and is forecast to drop to $630 million by June 2017. These variations and reductions are not a result of increased activity to address overdue maintenance, but result from changes to what has been included in the backlog.

Main Roads advised that the reductions are largely due to:

- doing maintenance works as part of a minor construction works and capital works projects. This removes the original maintenance needs and costs from the backlog. For instance, where minor construction works address road shoulder repairs that would otherwise be treated and funded as part of the maintenance program.
- reducing the level of services provided for 'other maintenance' activities such as vegetation clearance and litter collection. The effect of reducing these activities is that the backlog in this area dropped from consistently above $350 million to $247 million in 2015-16.

However, the backlog estimates are likely to be understated. This is because the backlog does not reflect all road rehabilitation (rebuilding) needs as regional offices are not making full assessments of these needs.

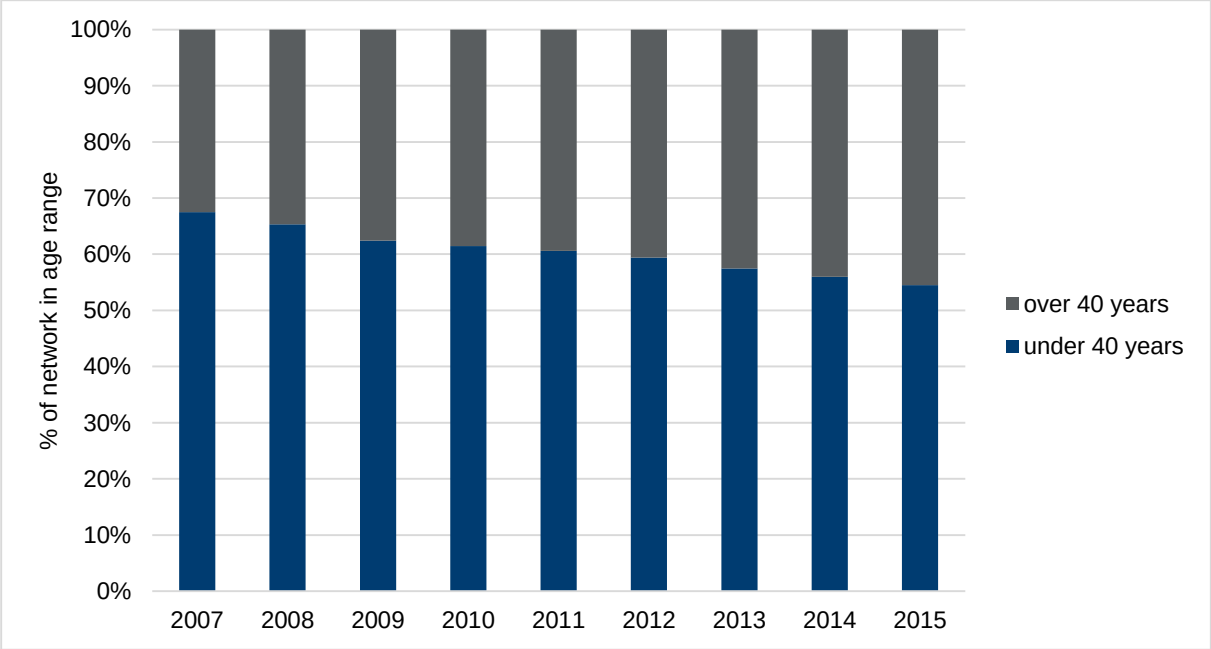
Regional offices do not believe non-critical maintenance will attract funding and therefore do not see the benefit in undertaking comprehensive assessments. As a result, Main Roads can only guess at the true value of required rehabilitation. This issue was starkly demonstrated in 2016 by regional information estimating total rehabilitation requirements at $140 million while Main Road's pavement modelling showed it at almost $240 million.

Between 2012 and 2016, Main Roads received additional funding of $236 million to address the maintenance backlog, with much of that going towards resurfacing.

Replacing the surface of a road in a timely way helps to improve the long-term performance of the road and extend the periods between major maintenance. The additional funding was used for overdue resurfacing as well as new resurfacing needs, reducing the overall backlog value by $78 million.

Nearly half of the network is beyond its design life, but rebuilding receives only a small proportion of total funding

In the 2009 report we found that nearly a third of main roads (32%) were older than the design life of 40 years, based on data from 2007. The proportion has now grown to 46% (Figure 3), with the average age of road up from 33 years to 36 years.



Source: Main Roads

Figure 3: Proportion of the Main Roads sealed network past the design life of 40 years 2007-15

Allowing roads to become older than the intended design life increases the risk that roads will fail, which can result in higher costs to replace the road. However, it is possible for the usable life to be longer than 40 years, depending on the climate, traffic volume, road composition and level of maintenance performed.

Main Roads does not prioritise rebuilding within its maintenance spending. Rehabilitation (rebuilding) accounts for just under 3% of the overall planned maintenance expenditure in 2016-17, despite estimates that this work will constitute approximately 40% of the maintenance backlog by 30 June 2017. Rehabilitation is more expensive than more short-term treatment options such as resurfacing, although by rebuilding the structure of the road it delivers a significant extension to its design life.

Almost all funding goes to critical maintenance needs rather than being targeted to minimise whole-of-life costs

Main Roads allocates the bulk of its maintenance funding to maintenance that has become critical (priority 1), despite the majority of maintenance backlog being low priority deferred maintenance (deferred priority 3). In 2016-17, the entire maintenance budget of $227 million is allocated to newly identified or deferred high priority needs (Figure 4). In the previous year, 99% of the $204 million in funding was allocated to high priority needs.

Allocating all funding to critical maintenance and none to preventative maintenance ultimately contributes to a higher backlog and as such, represents poor value for money. Preventative maintenance helps avoid road conditions deteriorating to the extent that it becomes critical and therefore complex and costly to repair. A substantial preventative program helps drive down the whole-of-life cost of the road network.

Main Roads advised that although it will allocate all its maintenance funding to high priority works in 2016-17, approximately $58 million of high priority maintenance is not funded. Where safety risks are involved, Main Roads will employ temporary solutions referred to as 'holding treatments'.

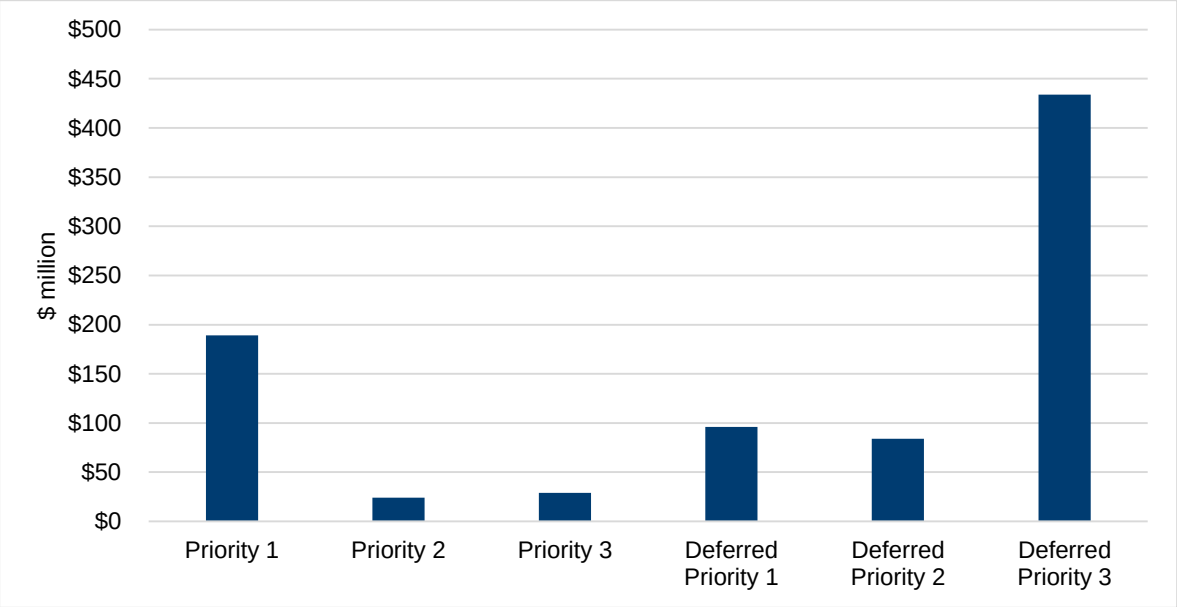


Figure 4: Assessments of maintenance backlog by priorities 2016-17

Better road information is now available but Main Roads needs to improve how it uses it

Main Roads has improved its knowledge of the condition of the road network and the performance of its contractors since our 2009 audit. However, this has not yet led to a strategic approach to maintenance or capacity to inform decision-making through modelling the costs of deferring maintenance or a capacity to provide strong and consistent planning advice to regional offices.

Main Roads now has systems to collect condition and performance data to inform prioritisation and monitoring

In 2009, we found that a lack of information on road condition and the delivery of maintenance limited the ability of Main Roads to monitor contractor performance and prioritise maintenance. We recommended that Main Roads integrate its systems with those of its contactors. Main Roads has made good progress in this area, with the introduction of new information systems and reports.

Main Roads' introduction of the Maintenance Management Information System (MMIS) in July 2014 was an important step. MMIS provides consistency in the storing, measurement and reviewing of road maintenance information. Regional field and office staff use MMIS to store information about inspections, defects, work orders and area wide treatment.

MMIS is used alongside other Main Roads corporate systems to report on the costs and performance of maintenance in each region. Main Roads has begun to develop reports, such as earned value analysis, to present this information. However is yet to use this information to its full capacity to inform overall maintenance management at Main Roads head office.

Despite better information, Main Roads lacks a long-term strategy to preserve the road network and reduce costs

Main Roads understands that doing maintenance only when it becomes critical offers poor value for money and that it increases the overdue maintenance backlog and allows the network to deteriorate. Targeting additional funding to resurfacing work between 2012 and 2016 was a limited step toward a more preventative approach that uses maintenance to extend asset life and reduce whole-of-life costs.

However, Main Roads has no corporate plan or strategy to achieve a more preventative approach to maintenance. An important aspect of any such plan would be recognition of the change in approach in the regional offices' 10-year network maintenance plans as these plans would need to reflect a balance between critical maintenance and the more cost effective preventative maintenance.

Main Roads has recognised the need to formalise strategies to guide maintenance planning and asset management and started to develop key guiding documents. However, until these are implemented, Main Roads delivers maintenance without a determined focus on preventative maintenance and cost efficiency. This means Main Roads has not progressed in this area since the original audit and does not have a solid strategic focus as it moves into the new contracting model.

Main Roads' focus on resurfacing is some evidence of it starting to take a strategic approach to road maintenance. However, there are significant elements of a strategy missing. For instance, Main Roads has not calculated either the cost benefits over time or the benefits of alternative maintenance approaches. Main Roads acknowledges that it does not yet have the capability to develop scenarios or other modelling to determine the cost implications of deferring maintenance.

The lack of strategic guidance, and operational advice to regional offices on how to implement it, also reduces the likelihood that prioritisation will be consistent across the network. Under the ISAs, regions (both contractors and Main Roads staff) are required to assess the condition of the roads, determine maintenance priorities in the region and deliver the maintenance based on the allocated funding.

Information on priorities and treatment options are contained within each region's 10-year network maintenance plan. The plan can record assessment of costs and risk associated with treating maintenance within the year it is identified, or deferring it. However, it requires manual input and is not a mandatory requirement. Main Roads implemented this planning tool in 2015, but recognise that it needs refining and staff training in how best to use it to plan and monitor maintenance.

Main Roads has provided some guidance on how to assess maintenance defects, but it acknowledges there is inconsistency across the network and is planning to address it.

A prioritisation process (Appendix 2) drives the determination of needs and treatment approaches. This process has only been in use since 2015, and Main Roads has not formalised it or issued the guidance it has drafted. Until it does, assessment of similar maintenance issues could be different from region to region. Given that priorities drive funding, the differences in how priorities are established can lead to inconsistent funding decisions, and differing outcomes for the network.

As mentioned earlier, regional offices are also reluctant to comprehensively assess and report on defects that do not typically attract funding. This means that defects, such as those relating to road rehabilitation are not captured in the 10-year plans. The result is incomplete and inaccurate information about the condition and performance of the network.

Monitoring of maintenance linked to 2 road safety factors has not improved

Our 2009 audit recommended that Main Roads improve its monitoring of 2 types of maintenance related to road safety:

- maintenance resulting from road crash assessments
- road surface friction.

Main Roads still does not have a process to monitor and evaluate road maintenance work recommended by crash investigators.

Checks on the status of this work only occur in response to a specific request. In the absence of a request, Main Roads will not automatically check that the maintenance is done, and if the safety of the road has improved. This is despite Main Roads investigating all serious and fatal crashes and having processes in place with the regions to decide on any maintenance required in response to investigation findings.

Poor surface friction is an identified factor contributing to road crashes. Our 2009 audit recommended that Main Roads develop and implement a comprehensive strategy to improve skid resistance (now known as surface friction) across the network. Main Roads has not implemented this recommendation.

In lieu of a strategy, Main Roads introduced a surface friction guideline. However, it is not comprehensive. It focuses mostly on the technical aspects of collecting data but does not include typical characteristics of a strategy, such as objectives for improvement or an implementation plan.

The guideline is also not used by all regional offices. Of the 2 regions we examined, the Metropolitan region had used the guideline during inspections and investigations, but had not acted on the results. The South-West region did not use it.

Main Roads has also not decided whether it should use road inspection data to identify and prioritise surface friction treatment. As a result, collection of surface friction data between 2011 and 2016 is limited, with nearly 90% of it collected in just 1 region – the Wheatbelt. Overall, 17 defects identified in this data are yet to be fixed.

It took 3 years to adequately monitor and improve contractor performance

Main Roads spends over $400 million per year across the 7 regions delivering maintenance and capital works through its ISAs (Appendix 3). Although ISAs were introduced between 2010 and 2011, it took Main Roads 3 years to implement standardised systems to monitor contractor performance, including against time, quality and budget targets.

Main Roads found it difficult to clearly measure performance under its original model. As there were 77 different performance indicators and inconsistent approaches to measuring them, Main Roads lacked the information to be confident that performance bonuses paid to contractors were warranted. Main Roads responded to this by introducing common performance indicators in July 2014. Subsequently, Main Roads found that contractor performance was lower than expected, though performance has since improved.

The growth in skill and knowledge of Main Roads staff from implementation of ISAs is not clear

Our 2009 report detailed the loss of technical knowledge and skills that occurred within Main Roads during the previous Term Network Contract (TNC). Main Roads believes the current ISA contract arrangements boost capability, but cannot show how.

Under the TNCs, many experienced technical staff left Main Roads to work for maintenance contractors. Main Roads also believes that the skills and knowledge of its remaining staff declined over time from having only limited involvement in maintenance decision-making.

The ISA model was designed to return Main Roads staff to the forefront of maintenance planning and delivery. Main Roads believes that it has achieved this aim.

However, we found that Main Roads is not managing its skills and knowledge gaps and development opportunities for technical staff have diminished. Main Roads does not have a workforce development or management plan to address skills and knowledge shortages and does not conduct capability assessments of the organisation or its staff. As such, it does not have a clear view of staff capability and organisational capacity, nor a plan to address any deficiencies.

Main Roads faces 2 factors which could further impact on its skills and knowledge base. The first of these is the loss of staff with skills in maintenance due to retirement, but no current corporate succession plan is in place. The second factor is a loss of skills and knowledge when the contracts change in 2017. We noted that a large proportion of staff working at the 2 regional offices we examined were contractors.

Appendix 1: Summary of performance against recommendations from Maintaining the State Road Network, OAG 2009

Recommendations that Main Roads should:	Progress	Implemented
1. Ensure effective management of its road asset through the identification, prioritisation and planning of maintenance work	Main Roads introduced processes and tools to drive the identification, prioritisation and planning of maintenance work, however implementation of these is not complete.	Partially
2. Accurately determine levels of overdue resurfacing and rebuilding maintenance, including a review of bridge maintenance estimates	Recently introduced processes which enable Main Roads to accurately estimate the level of resurfacing and bridge maintenance. However, these systems did not produce accurate information about the level of overdue rebuilding (rehabilitation), as needs were understated by the regions. Main Roads needs to use pavement information to derive a more realistic figure.	Partially
3. Improve and validate predictive modelling for future planned maintenance needs	Main Roads does not have predictive modelling for assessing future maintenance needs. It has used pavement modelling, however this is 1 component and use is ad-hoc.	Partially
4. Fully cost the value of actual levels of overdue maintenance, and construct a plan on how the work will be done	Main Roads' systems don't accurately capture all needs. Main Roads does not have an overarching plan for how maintenance will be prioritised and delivered. Regions are now using the 10-year plans but Main Roads has not yet provided adequate guidance or implemented moderation to ensure this is accurate.	Partially
5. Determine when to do planned maintenance to minimise costs over the life of the road network (the 'tipping point')	Main Roads is yet to develop a preventative maintenance approach, which minimises the maintenance costs and prolongs the life of the network. It has introduced the concept of whole-of-life low cost approach, however it is yet provide head office or regions with the guidance or tools to do this.	No
6. Improve and update technical knowledge and skills to enable better road management	Main Roads has been building its skills and knowledge gaps through the ISA arrangements, but has not formally identified these gaps, nor is it managing them.	Partially
7. Improve maintenance management systems and integrate them with contractors' systems	Main Roads has implemented the Maintenance Management Information System (MMIS) used by contractors and Main Roads to manage information on maintenance performance and road condition. The project to implement MMIS took 18 months longer than anticipated. Main Roads is working through user feedback to refine the system, and	Yes

	is aware that data quality still needs to be improved. Main Roads has not yet established systems for reviewing and acting on information at the head office level.	
8. Apply lessons learned when developing and managing the new contracts	The Integrated Service Arrangements (ISA) were developed to address the shortcomings of the Term Network Contracts (TNC). However, it has taken Main Roads a long time to implement adequate governance and monitoring structures. Main Roads is moving on to a new model in 2017. It should apply the lessons learned from implementing ISAs.	Yes
9. Develop and implement a comprehensive strategy to improve skid resistance across the network	Main Roads has not developed a strategy to improve skid resistance across the network. Guidelines for treating skid resistance (surface friction) concerns were issued, but have not been implemented. Collection of skid resistance data has been ad-hoc.	Partially
10. Standardise monitoring and evaluation of road maintenance work identified during fatal road crash investigations.	Although Main Roads can demonstrate that it has a process in place to investigate crashes and recommend maintenance, it does not follow up with regions to ensure road improvement work is completed.	No

Appendix 2: Prioritisation process

In 2014, Main Roads introduced a process to guide the distribution of annual maintenance funding to regions. It covers all asset categories and activities except for bridges, major culverts and electrical assets.

The process leverages information on funding needs and proposed treatments contained in the 10-year plans.

Other Main Roads corporate systems, processes and guidelines also inform funding allocation, such as the MMIS and financial management systems.

Funding allocations are made by top tier work code (such as pavement rehabilitation or network maintenance management).

Funding is spread across 3 priority areas to reflect the urgency of the needs (Table 1). Needs are assessed each year. This system identifies whether the need was identified in that year (P – priority) or in previous years (D – deferred).

When there is a shortfall between the funding request and allocation, it is the responsibility of the regions to make decisions on how to allocate funding across its needs.

Priority rating		Description	Examples
1	High	Activities that are critical and of high risk.	Shoulder reconditioning and fire prevention vegetation control.
2	Medium	Activities that if not undertaken would create a medium risk for the road users and/or Main Roads in terms of safety, loss of reputation and asset integrity and loss of asset value.	Surface repairs and preventative works.
3	Low	Activities that are required but not critical, and if not undertaken pose a low risk to Main Roads and/or the road users in terms of safety, loss of reputation and asset integrity and loss of asset value.	Sweeping and litter management.
• P1-3 denotes the need was identified in the current year. • D1-3 denotes the need was identified in previous years. The rating can change from year to year.			

Table 1: Main Roads maintenance need priorities

Appendix 3: Integrated Service Arrangements

Integrated Service Arrangements (ISAs) were introduced by Main Roads in 2010-11 to replace the Term Network Contract maintenance model. ISAs source people, systems and processes from an Integrated Service Provider ('contractors') and use these alongside Main Roads resources and approaches to manage operational assets and delivery road services.

Contractors receive reimbursement of their direct costs, plus a percentage of an agreed fee should the work meet or exceed agreed performance standards. If the work does not meet these standards, the contractor bears some of the costs associated with losses. Main Roads refers to this as gain and pain within a fee-modifier regime.

Until standardised performance indicators were introduced in 2014, regions (Main Roads and contractors) devised their own.

Main Roads currently had 8 ISAs operating to cover the needs of the 10 Main Roads regions. The contractors involved are DownerMouchel, Fulton Hogan, Ventia Optus, Ventia and Lend Lease Services Pty Ltd.

Main Roads outlines the following objectives and principles for the ISAs.

ISA objectives:

- as asset owner, Main Roads regaining influence and control over asset management decisions
- achieving 'best practice' in operational asset management
- achieving 'best practice' in network operations
- building and maintaining capability and capacity
- achieving innovation, ongoing improvement and outstanding performance
- achieving value for money through appropriate risk sharing.

ISA principles:

ISA are required to reflect the following principles:

- a 'best for network' approach, combining the best systems and people from both the public and private sectors
- a non-adversarial approach based on a culture of open communication and collaborative decision-making
- an open-book approach with transparency in pricing
- recognition of the opportunities for developing and retaining core knowledge and skills in the ISAs
- support for flexibility and investment in research and innovation
- shared decision-making.

Auditor General's Reports

Report No.	Reports 2016	Date Tabled
12	Regulation of Builders and Building Surveyors	22 June 2016
11	Information Systems Audit Report	22 June 2016
10	Opinions on Ministerial Notification	8 June 2016
9	Payment of Construction Subcontractors – Perth Children's Hospital	8 June 2016
8	Delivering Services Online	25 May 2016
7	Fitting and Maintaining Safety Devices in Public Housing – Follow-up	11 May 2016
6	Audit of Payroll and other Expenditure using Data Analytic Procedures	10 May 2016
5	Audit Results Report – Annual 2015 Financial Audits – Universities and state training providers – Other audits completed since 1 November 2015; and Opinion on Ministerial Notification	10 May 2016
4	Land Asset Sales Program	6 April 2016
3	Management of Government Concessions	16 March 2016
2	Consumable Stock Management in Hospitals	24 February 2016
1	Supplementary report Health Department's Procurement and Management of its Centralised Computing Services Contract	8 June 2016 17 February 2016

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