



Tasmanian
Audit Office

**Report of the Auditor-General
No. 6 of 2020-21**

Management of the State road network

19 November 2020

The Role of the Auditor-General

The Auditor-General's roles and responsibilities, and therefore of the Tasmanian Audit Office, are set out in the *Audit Act 2008* (Audit Act). The Auditor-General's role as Parliament's auditor is unique.

Our primary responsibility is to conduct financial or 'attest' audits of the annual financial reports of State entities. State entities are defined in the Interpretation section of the Audit Act. We also audit those elements of the Treasurer's Annual Financial Report reporting on financial transactions in the Public Account, the General Government Sector and the Total State Sector.

Audits of financial reports are designed to add credibility to assertions made by accountable authorities in preparing their financial reports, enhancing their value to end users. Following financial audits, we report findings and outcomes to Parliament.

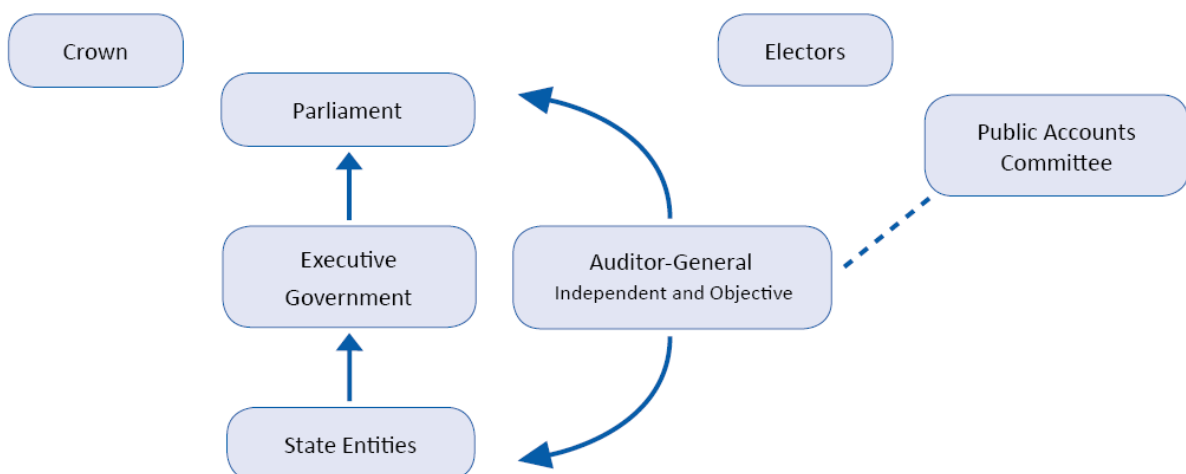
We also conduct performance audits and compliance audits. Performance audits examine whether a State entity is carrying out its activities effectively and doing so economically and efficiently. Audits may cover all or part of a State entity's operations, or consider particular issues across a number of State entities.

Compliance audits are aimed at ensuring compliance by State entities with directives, regulations and appropriate internal control procedures. Audits focus on selected systems (including information technology systems), account balances or projects.

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Where relevant, the Treasurer, a Minister or Ministers, other interested parties and accountable authorities are provided with opportunity to comment on any matters reported. Where they choose to do so, their responses, or summaries thereof, are detailed within the reports.

The Auditor-General's Relationship with the Parliament and State Entities





2020
PARLIAMENT OF TASMANIA

Report of the Auditor-General No. 6 of 2020-21
Management of the State road network

19 November 2020

Presented to both Houses of Parliament pursuant to
Section 23 of the *Audit Act 2008*

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Tasmanian Audit Office

GPO Box 851

Hobart

TASMANIA 7001

Phone: (03) 6173 0900, Fax (03) 6173 0999

Email: admin@audit.tas.gov.au

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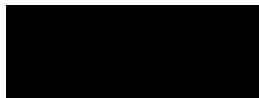
Mr President, Legislative Council
Madam Speaker, House of Assembly
Parliament House
HOBART TAS 7000

Dear Mr President, Madam Speaker

Report of the Auditor-General No. 6 of 2020-21: Management of the State road network

This report has been prepared consequent to examinations conducted under section 23 of the *Audit Act 2008*. The objective of the audit was to express a reasonable assurance opinion on whether the Department of State Growth was managing and maintaining the State road network effectively and efficiently.

Yours sincerely



Rod Whitehead
Auditor-General

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Independent assurance report

This independent assurance report is addressed to the President of the Legislative Council and the Speaker of the House of Assembly. It relates to my performance audit (audit) on the management of the State road network (Network) by the Department of State Growth (the Department).

Audit objective

The objective of the audit was to assess whether the Network was being managed and maintained effectively and efficiently.

The audit examined whether:

- planning for management of the Network was effective
- the Network was managed effectively and efficiently
- risks impacting the Network and stakeholder expectations were managed effectively.

Audit scope

The audit examined and analysed information relating to the performance of the State Roads Division (State Roads) within the Transport Services Group (TSG) of the Department, and specifically the maintenance and management of the Network.

The audit scope encompassed the five categories of roads within the Network for which State Roads is responsible. The audit scope did not include:

- management of bridges
- management of heavy vehicle access
- management of traffic operations and signals
- roads managed by other State entities including Hydro-Electric Corporation, Sustainable Timber Tasmania, Parks and Wildlife Service within the Department of Primary Industries, Parks, Water and the Environment and local government councils
- services and uses of the Network, or broader integrated transport strategies of which roads may form a part.

Audit approach

The audit was conducted in accordance with Australian Standard on Assurance Engagements ASAE 3500 *Performance Engagements*, issued by the Australian Auditing and Assurance Standards Board, for the purpose of expressing a reasonable assurance conclusion.

The audit used the elements of the international asset management industry's Global Forum on Maintenance and Asset Management¹ (GFMAM) as guidance, shown in Figure 1 below. The six elements are designed to cover all activities, across the entire asset lifecycle, for the effective management of any asset base. They are broken down into a further 39 subjects, which provide a detailed framework for assessment of effective asset management practices.

Figure 1: GFMAM asset management elements



















Source: TAO, adapted from GFMAM

¹ GFMAM is a not-for-profit organisation founded in 2010 to be a worldwide community, providing leadership for maintenance and asset management communities. Its mission is to promote and develop the maintenance and asset management professions by collaborating on knowledge, standards and practices. Publications and projects can be found at www.gfmam.org.

The audit evaluated the criteria and sub-criteria detailed in Table 1, with the alignment to the GFMAM asset management elements shown for reference.

Table 1: Audit criteria aligned to the GFMAM elements

Audit criteria		Asset management element
1. Was planning for management of the Network effective?		
1.1. Did the Department have clear objectives, key performance measures, policies and strategies for the management of the Network?	Strategy and Planning	
1.2. Did the Department manage future infrastructure demand through effective Network planning, demand analysis and infrastructure investment?	Strategy and Planning	
1.3. Did the Department take a lifecycle approach to develop cost-effective management strategies to meet the defined public policies and Levels of Service?	Strategy and Planning	
1.4. Did the Department have a long-term financial strategy that quantifies required expenditure to deliver defined Levels of Service within available funding sources?	Strategy and Planning	
2. Was the Network managed effectively and efficiently?		
2.1. Did the Department have appropriate information on which to make decisions regarding the long-term sustainability of the Network?	Asset Management and Decision Making	
2.2. Was there a process to identify roads in need of maintenance (condition assessments, complaints, maintaining registers of work required, prioritisation, asset registers, asset management plans and safety considerations)?	Asset Management and Decision Making	
2.3. Were roads renewed at the optimal time (for minimising life-cycle costing)?	Asset Management and Decision Making	
2.4. Did the level of available funding impact completion of all the road works planned each year?	Asset Management and Decision Making	

Audit criteria	Asset management element	
2.5. Did the Department deliver the road renewal and maintenance program effectively?	Lifecycle Delivery Activities	
2.6. Did tendering processes consider value for money in terms of time taken to complete road upgrades/ maintenance and the impact of public disruption on productivity?	Lifecycle Delivery Activities	
2.7. Was the performance of contractors effectively monitored, including quality of work, safety, cost variations and defect liability periods?	Lifecycle Delivery Activities	
2.8. Was corrective maintenance actively managed?	Lifecycle Delivery Activities	
2.9. Did the Department have appropriate asset information systems to collect, store, manage, process and analyse information on the Network?	Asset Knowledge Enablers	
3. Were risks impacting the Network and stakeholder expectations managed effectively?		
3.1. Did the Department identify, assess and appropriately control the Network's physical and financial risks?	Risk and Review	
3.2. Did the Department monitor and deliver the Levels of Service determined by the Government?	Road Users and Stakeholders	
3.3. Was communication with road users adequate?	Road Users and Stakeholders	

Responsibilities of management

The Department was responsible for managing and maintaining the Network in an effective and efficient manner.

Responsibilities of the Auditor-General

In the context of this audit, my responsibility was to express a reasonable assurance conclusion on whether the Department was managing and maintaining the Network effectively and efficiently.

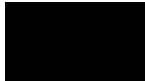
Independence and quality control

I have complied with the independence and other relevant ethical requirements relating to assurance engagements, and apply Auditing Standard ASQC 1 *Quality Control for Firms that*

Perform Audits and Reviews of Financial Reports and Other Financial Information, and Other Assurance Engagements in undertaking this audit.

Conclusion

It is my conclusion the management of the State road network, including planning for the management of the network and management of risks and stakeholder expectations, as measured against the audit criteria was, in all material respects, performed efficiently and effectively.



Rod Whitehead
Auditor-General

19 November 2020

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Executive summary

Summary of findings

A connected community and economy is a vital aspect of any healthy society. Roads provide a fundamental aspect of this connectedness. They facilitate commerce and enable the movement of goods, foster tourism and aid mobility that underpins many aspects of social life. As one of the biggest infrastructure assets in Tasmania, with a total value of just under \$6 billion, it is essential the Network is maintained effectively and efficiently. The Tasmanian Government's objective to strategically develop the State's infrastructure and transport systems to support industry and business growth, and the community, reflects this importance.

The Department has responsibility for achieving this objective through the activities of the TSG and more specifically the State Roads function. Our audit assessed how well the Department met this objective by evaluating whether there was strong governance, planning and appropriately focused operational activity to maintain the Network.

We assessed whether there was a strong approach to planning for the maintenance, renewal and upgrade of the Network. Government priorities and objectives were aligned and implemented through a number of policies and long-term plans that defined the scope, approach and objectives of delivering transport services in Tasmania. Supporting these policies and long-term plans was a strategic approach in planning for maintaining, remediating and upgrading the Network to set Levels of Service (LoS).

To ensure planning was effective there was a well-developed approach to gathering and using intelligence and information relating to the Network. This included good forecasting and Network performance information.

In order to focus resources and facilitate effective budgeting into areas that would support maintaining the Network at the required LoS, long-term planning was used, which was informed by a variety of information and tools. This included demand analysis of the Network and life-cycle driven strategies and principles in managing and operating the Network. This enabled State Roads to understand the future use and performance of the Network and decide what investments would achieve the best outcomes while delivering value for money. To complement this approach a strategic demand model and corridor strategies were prepared to develop a plan for specific geographic regions of the Network and provide solutions to further improve performance. These assisted in better managing transport infrastructure to maximise benefits for road users.

Despite this strong approach to planning and investment there was no formalised structure to reviewing strategies and plans to ensure they remained up to date and reflected changing priorities, thereby ensuring the Network was maintained in the most effective and efficient way.

To maintain the Network, corrective maintenance repairs were managed effectively in a timely way. We assessed improvement was possible where repairs were not being

efficiently undertaken due to not having a fully integrated and coordinated approach to maintenance. State Roads could also improve prioritisation of road works as well as Network planning through better use of the hierarchy of roads (criticality) information. Other information such as analysis of repeated defects or trends were also not used effectively, which would need to happen if the approach and resourcing for maintenance and renewal is to be better informed.

The current State Roads maintenance and renewal budget cannot sustain current road condition levels into the future. Despite increased funding in recent years the maintenance budget has a shortfall of around 15% to ensure the Network is maintained to the optimum level and meets prescribed LoS. While some increased capital funding by Government has enabled limited reprioritisation of maintenance and renewal work, maintenance legacy issues were not resolved. State Roads understands this issue and has identified a course of action to implement a number of initiatives to resolve the maintenance and renewal budget shortfall.

Maintenance contract management was strong with appropriate practices relating to monitoring, reporting and performance management, which drove value for money. A stewardship approach where the contractor has more autonomy over the work it undertakes was being piloted for one regional contract. If this approach is successful, State Roads will consider extending this contract model across the rest of the State to further support a strong approach to value for money in the way maintenance contracts are managed.

State Roads was not fully managing its risks as it had not integrated risk identification and mitigation as well as it could have. While State Roads followed industry standards with regards to the management, monitoring and control of asset risks there were gaps in the relationship between the road asset management risk register and the financial risk and project services risk registers.

An area of strength was State Roads effective management of contract risk, which enabled it to maintain strategic oversight over contractors' viability to supply services to the Network.

In order to track the performance of the Network, monitoring and reporting of Key Performance Indicators (KPIs) was undertaken regularly. State Roads had both a LoS framework and a performance management framework but the link between these frameworks was not strong. This meant reporting of the performance measures did not provide clear assurance the Network was delivering acceptable community LoS.

We would like to thank the staff at the Department for their help in completing this performance audit.

Recommendations

We have made five recommendations to assist the Department in further integrating its performance and risk information and to further enhance the quality of information used for prioritisation and investment decision making. The recommendations will also ensure State Roads policies and strategies remain current, and that it implements mitigating actions

and strategies to reduce the impact of a shortfall in its maintenance and renewal works program.

We recommend the Department:

1. Implement strategies and actions to reduce maintenance and renewal shortfall, including the improvement of the integration and quality of information used to prioritise investment in maintenance.
2. Review and update policies, plans and strategies that are out of date.
3. Integrate road asset performance, degradation factors and network performance management systems to better use and enhance the quality of information used for decision making.
4. Link level of service frameworks for customer and technical levels of service and performance measures to further improve the approach to performance management.
5. Integrate risk management systems and information to manage risks and focus resources more effectively.

Submissions and comments received

In accordance with Section 30(2) of the *Audit Act 2008* (Audit Act), a copy of this Report was provided to the Secretary of the Department of State Growth. A summary of findings or Report extract was provided to the Treasurer, the Minister for Infrastructure and Transport and other persons who, in my opinion, had a special interest in the Report, with a request for submissions or comments.

Submissions and comments we receive are not subject to the audit nor the evidentiary standards required in reaching an audit conclusion. Responsibility for the accuracy, fairness and balance of these comments rests solely with those who provided the response. However, views expressed by responders were considered in reaching the audit conclusions.

Section 30(3) of the Audit Act requires this Report include any submissions or comments made under section 30(2) or a fair summary of them. Submissions received are included in full below.

Minister for Infrastructure and Transport

I understand that the audit examined whether:

- Planning for the management of the network was effective
- The network was managed effectively and efficiently
- Risks impacting the network and stakeholder expectations were managed effectively.

I support these as being key aims in managing the State road network, which is a critical piece of infrastructure connecting Tasmanian communities and industry.

I accept the findings and recommendations of the audit, and note your conclusion that the management of the State road network, as measured against the audit criteria, was performed efficiently and effectively.

I understand from the Department of State Growth that State Roads has implemented an asset management framework and will continue to focus on improvements in line with this framework.

Your recommendations highlighted a number of key areas for the Department to focus their efforts on as part of making these improvements.

The Honourable Michael Ferguson MP

Minister for Infrastructure and Transport

Department of State Growth

I accept the findings and recommendations of the audit. I note your conclusion that the management of the State road network, as measured against the audit criteria, has performed efficiently and effectively.

I note that State Roads follows the Institute of Public Works Engineering Australasia asset management planning framework, which is aligned to ISO 55000 standards for asset management. State Roads will continue to work to improve its asset management approach in line with this framework.

I provide the following comments regarding the recommendations:

- Some strategies and actions are already in place to reduce the maintenance and renewal shortfall, however further investigations will be made to determine how to improve the integration and quality of information used to prioritise investment in maintenance.
- State Roads will develop a business process and workflow for asset management plans to align with other processes and to ensure that strategic planning documents are reviewed as scheduled.
- State Roads will develop more formal systems to integrate road asset performance, degradation factors and network performance management systems to better use and enhance the quality of information used for decision making.
- A review of levels of service and performance measures will be conducted to ensure greater alignment.
- Project management and other documents will be updated to ensure risks and the linkages between risks are captured at all levels.

Thank you for the effort that you and your staff have taken in completing this performance audit.

Kim Evans

Secretary

DM Roads

We will provide direct comments to each of your dot points (paragraphs) and then provide further general commentary thereafter.

Paragraph 3.36: The tender process may be new to the Department however similar ones have been used across the country by other agencies and one that DM Roads are very familiar with. The North West Maintenance Contract is a performance-based model that transfers risk for the outcome of the road asset to DM Roads. The KPI's used to measure our performance were determined in collaboration with the Department through a thorough tender process. These KPI's cover a significant range of outcomes, from cracking, rutting and road skid resistance to response times for emergency events and are some of the most stringent measures we see across the country.

Paragraph 3.37: The North West Maintenance Contract does hand over control, decision making and responsibility to DM Roads however there is a stringent performance and assurance regime that holds us accountable to outcomes and performance. This is measured monthly for the maintenance activities and every 3 years for the long term road pavement performance measures. There are significant synergies that can be realised by combining the maintenance, surfacing and minor capital work program into a single contract and providing the service provider control of decision making. For example, DM Roads have spent approximately \$3.0m in the first two years on the contract on preventative maintenance activities to minimise routine maintenance costs and lower the whole of life costs on the network. The contract model allows this long term asset management approach at the service providers risk and control. With traditional contract model such as the North East and Southern Contract, this risk and decision making process would be the responsibility of the Department.

Paragraph 3.38: This is a great opportunity for the Department to drive best practise and outcomes across the entire State and something we would fully endorse occurring. Setting the appropriate measures that are consistent and transferrable across all the regions will be critical to ensure the benchmarking is effective and relevant.

Paragraph 3.39: Correct – it took some time to ensure all stakeholders understood the intent, contract mechanisms and approach required to administer the North West Maintenance Contract. This was overcome with additional training and positive collaboration between DM Roads and the Department.

Paragraph 3.40: Agree and refer to comment above.

Paragraph 3.41: We don't agree with the above assessment that the incumbent has an unfair advantage when retendering the North West Maintenance Contract. There is no doubt we have an in-depth understanding of the road condition, resource requirements and processes needed to manage the network however this highlights the true cost associated with managing the network. For example, we have spent far above the budget allocated upon the commencement of the contract on many activities, knowing this information will only drive our price up at a future tender process. This is information that non incumbent providers would not know therefore not factor into their tender.

Please see further information regarding the benefits of the stewardship model that DM Roads and the Department have achieved:

- Infrastructure Sustainability Council of Australia interim rating for an Operation – the North West Maintenance Contract was the first of its kind in the country to achieve an interim operations rating in the first year of the contract. The rating recognises the economic, social and environmental approach DM Roads have taken to deliver services.
- ISO 55001: Asset Management Accreditation – the accreditation is the international standard for Asset Management systems and process designed to optimise the management and minimise the whole of life costs on complex asset portfolios. DM Roads achieved this accreditation for their management of the North West Road Network in partnership with the Department in August 2019.

These Tasmanian firsts would not have been possible without a collaborative stewardship contract model that challenges the Service Provider to improve network outcomes.

This contract model has resulted in Downer realising the importance of a state-based management structure where we must effectively integrate treatment selection with accountability for treatment performance. Therefore, we have decided to focus on Tasmania as a state based operation with me as General Manager accountable for the performance of our whole business. This fully integrated business structure will be the first time that Downer have operated in this way reflecting the forward looking approach adopted by State Roads. It is expected that this new innovative new approach will drive even better value to Tasmania.

Marcus Stephens

General Manager — Tasmania

1. Introduction

The State road network

1.1 Within Tasmania, public roads are managed by a number of Government entities, with the process, practices and procedures varying between them. These entities include:

- the Department
- Hydro-Electric Corporation
- Sustainable Timber Tasmania
- Parks and Wildlife Service within the Department of Primary Industries, Parks, Water and Environment
- local government councils.

Roads can be transferred between entities by agreement amongst themselves or by the Government, based on their strategic significance or importance.

1.2 The total road network in Tasmania is in excess of 36 000 kilometres (km), with approximately 3 700 km of these roads managed by the Department. This subset of the broader public road network, hereinafter referred to as the 'Network', is primarily dedicated to servicing the connection and movement functions of the road network at a State and regional level.

Government objectives for the Network

1.3 Responsibility for the management, construction and maintenance of the Network is directly vested in the Minister for Infrastructure (Minister) as the 'Road Authority' under the *Roads and Jetties Act 1935*.

1.4 Given the significance of the Network in supporting Tasmania's economy and communities it is vital the Network is managed sustainably and efficiently to ensure it continues to meet the expectations of Tasmanians well into the future.

1.5 The Minister's expectations and approach to management of the Network are articulated in the *State Roads Infrastructure Service Policy* and *State Roads Infrastructure Asset Management Policy*.

1.6 The *State Roads Infrastructure Service Policy* applies to the management of State road infrastructure assets and the associated services provided by TSG on behalf of the Minister. Under the policy objective, TSG is committed to providing efficient road infrastructure and services for customers and visitors that:

- are as safe as reasonably possible
- support economic growth through responsible investment
- enhance the travelling experience for road users.

The strategies implemented by TSG to achieve the policy objectives are outlined in Table 2.

Table 2: TSG strategies to achieve policy objectives

Objective	Strategies
Road infrastructure and services that are as safe as reasonably possible	<ul style="list-style-type: none"> Reducing the level of risk exposure for road users. Reducing the severity of consequences of driver errors. Supporting the implementation of the <i>Road Safety Strategy</i>.
Road infrastructure and services that support economic growth	<ul style="list-style-type: none"> Providing well defined freight vehicle access networks and policies that are responsive to the needs of industry customers. Maintaining high levels of travel time reliability and ride quality on major freight networks. Planning, designing and providing fit-for-purpose road infrastructure to meet LoS for all road users that the community can afford. Pursuing innovative opportunities to increase freight transport productivity while providing for any associated increase in infrastructure costs.
Road infrastructure and services that enhance the travelling experience	<ul style="list-style-type: none"> Providing a customer charter, including the LoS customers and visitors should expect. Making sure litter collection and vegetation management are maintained to a high standard on important visitor routes. Proactively providing road information to road users, including safety and directional signage. Making sure roadsides are kept free of distracting advertising material. Promoting and enabling access to significant points of interest for tourist visitors.

1.7 The *State Roads Infrastructure Asset Management Policy* outlines the Minister's approach to infrastructure asset management. It states the transport policy objectives of the Government will be optimally and sustainably delivered through the implementation of a whole-of-life infrastructure asset management system that recognises and reflects the needs of customers. The key elements of the policy's approach to infrastructure asset management are:

- implementing public policy and LoS determined by Executive Government and providing those service levels and monitoring performance
- managing future infrastructure demand through network planning, demand management and infrastructure investment

- taking a lifecycle approach to develop cost-effective management strategies to meet the defined public policies and LoS
- identifying, assessing and appropriately controlling physical and financial risks
- having a long-term financial strategy, which quantifies required expenditure to deliver defined levels of service and takes into account available funding sources.

1.8 Under the policy, the asset management system will:

- assist in ensuring road infrastructure investments and services provided to customers are at a level appropriate for current and future demand
- enable risk management practices and asset performance reporting to be used to inform prioritisation of investments
- include long-term capital and operational funding forecasts and a robust 10-year forward investment program.

Transport Services Group

1.9 TSG is tasked with meeting the Department's objective of strategically developing infrastructure and transport systems to support industry and business growth and the community. TSG's role is integral to the regulation, creation and maintenance of Tasmania's transport infrastructure systems, which encompasses:

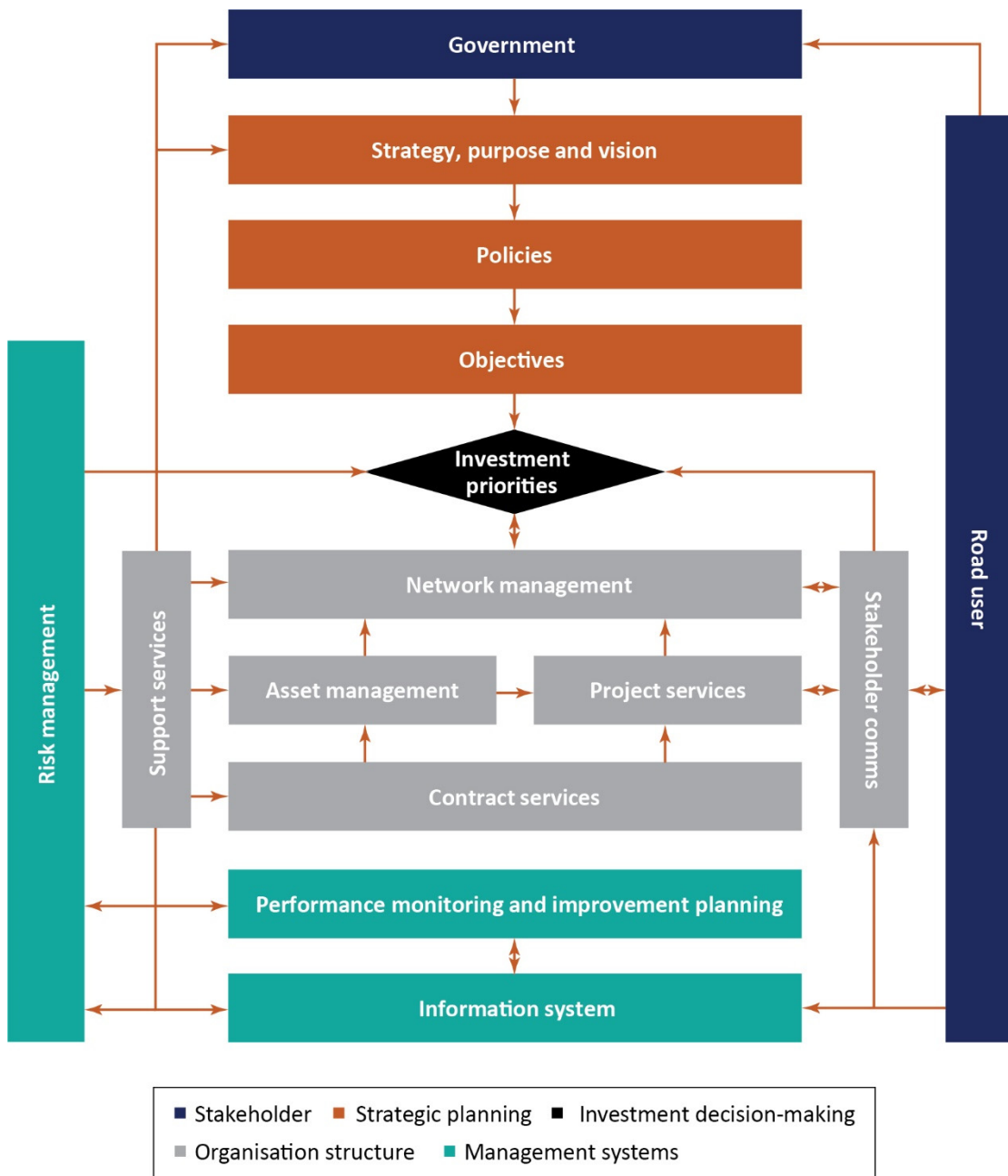
- passenger transport such as buses and taxis
- registration and licensing
- roads and bridge infrastructure
- road safety
- vehicle and traffic compliance
- walking and cycling.

1.10 The audit focused specifically on the Network road asset class (i.e. the audit did not include bridges, signals or other control and management elements of the Network). State Roads within TSG was responsible for managing the Network on behalf of the Minister. State Roads monitors the whole-of-life management of Tasmania's transport infrastructure, ensuring it can be used by the community safely and efficiently, as well as planning and delivering transport infrastructure projects to meet community needs.

State Roads

1.11 The operational framework for State Roads, which includes its stakeholders, strategic planning, decision-making, management systems and the different services delivered is depicted in Figure 2.

Figure 2: Operational framework for State Roads



Source: TAO

1.12 In 2014, State Roads developed the *Roads for our Future* program (the Program). The Program provided a long-term strategic approach to the delivery, maintenance and management of the Network, including assisting with decision-making and investments to support the future of the Network. The Program:

- continued using the existing *State Road Hierarchy*, a five-tier hierarchy for the classification of roads in the Network, which included the asset class and component used for asset planning and financial reporting and service-level hierarchy used for service planning and delivery. The five tiers within the road hierarchy are:

- Category 1 – Trunk Roads – the primary freight and passenger roads connecting Tasmania
 - Category 2 – Regional Freight Roads – the primary link between Category 1 roads and major production catchments
 - Category 3 – Regional Access Roads – main access roads to Tasmania’s regions, smaller regional resource bases, local commercial interactions
 - Category 4 – Feeder Roads – roads allowing travel between towns, major tourist destinations and industrial areas for passenger vehicle and tourist movement
 - Category 5 – Other Roads – remainder of the roads, including access roads for private properties
- influenced a review on the condition of the Network as at 1 July 2015, which provided information about the age and asset replacement profiles for roads and bridges managed by State Roads
 - facilitated development of the *State Roads Infrastructure Service Policy*
 - facilitated development of the *State Roads Infrastructure Asset Management Policy*.

1.13 The strategic and practical approach to the development and maintenance of the Network is also influenced by the:

- *Roads and Jetties Act 1935*
- *Toward Zero Tasmanian Road Safety Strategy 2017-2026*.

1.14 State Roads activities to support the achievement of the Minister’s policy objectives are summarised in Table 3.

Table 3: Summary of State Roads functions

State Roads functions	
Network management	<ul style="list-style-type: none"> • Network planning – planning, design, and approvals (environmental and development). • Network access management. • Network performance management – data and analysis, traffic engineering, traffic safety, traffic operations.
Asset management	<ul style="list-style-type: none"> • Management of land, bridge and road assets. • Delivery of road maintenance services in all regions, with contracted services provided by Downer Roads in the North West region and by Stornoway in the North East and Southern regions. • Delivery of traffic signals maintenance.

State Roads functions	
Project services	<ul style="list-style-type: none"> Capital works and minor works project delivery, management and contract administration.
Contract services	<ul style="list-style-type: none"> Procurement and contractual services for all building, construction, and commercial goods and services.
Stakeholder communications	<ul style="list-style-type: none"> Public and private communications and stakeholder engagement for all aspects of State Roads operations.
Support services	<ul style="list-style-type: none"> General office administrative, approvals, budget, business, and health and safety support.

1.15 Key activities State Roads undertake to provide roads at acceptable LoS include:

- operations and maintenance — to retain an asset as near as practicable to an appropriate service condition
- renewal — activities that return the service capability of an asset to original levels
- upgrade — activities to provide a higher level of service or a new service that did not exist previously.

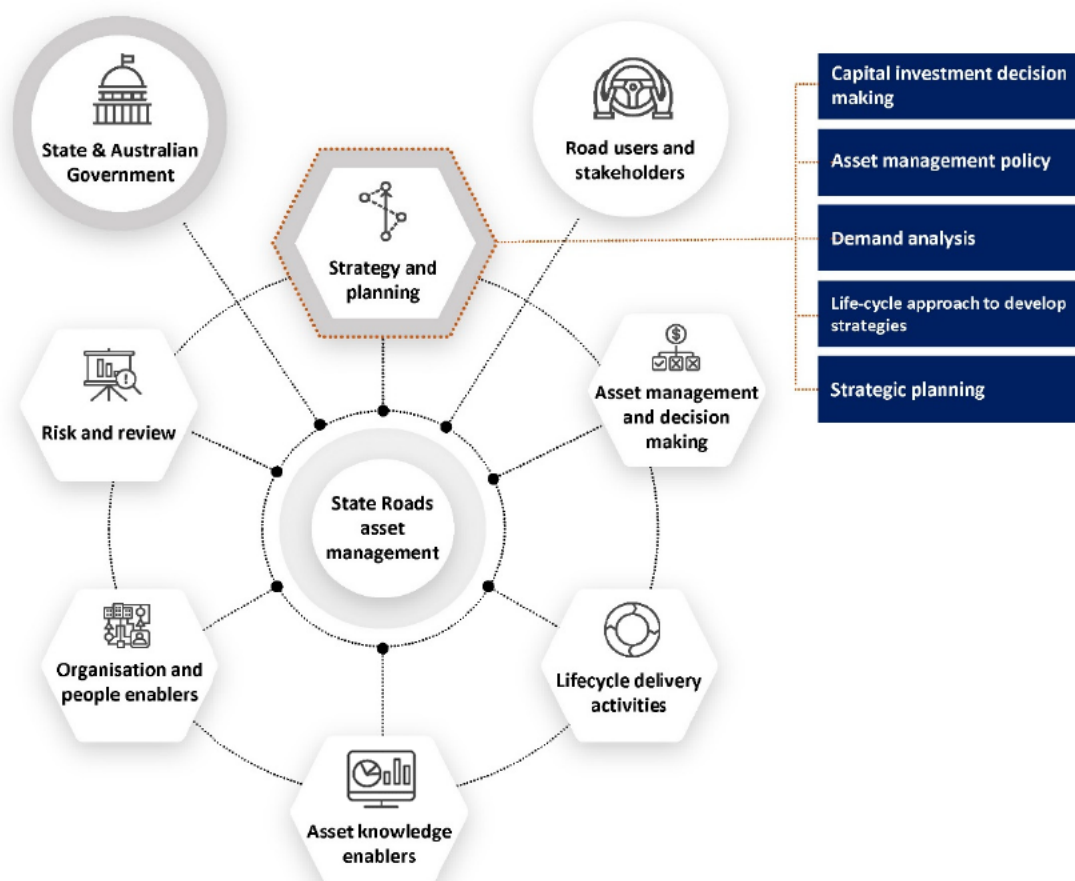
2. Was planning for management of the Network effective?

In this Chapter, we assess the strategic elements of State Roads approach to managing the Network. This covers:

- objectives, key performance measures, policies and strategies for management of the Network
- Network planning, demand analysis and infrastructure investment
- lifecycle approach to develop cost-effective management strategies to meet the defined public policies and LoS
- long-term financial strategy to quantify required expenditure to deliver defined LoS within available funding sources.

The focus areas for this Chapter are illustrated in Figure 3.

Figure 3: Chapter focus areas



Source: TAO

Chapter summary

Planning for the management of the Network was broadly effective. There were a number of areas that could be improved to further enhance State Roads approach to maintaining and renewing the Network that would ensure better use of available resources.

State Roads had a number of policies and long-term plans that defined the scope, approach and objectives of delivering transport services in Tasmania. These were strategically aligned with Government objectives. However, processes that triggered the periodic review of policies and plans were not disciplined enough to ensure documents remained up to date and relevant.

There was a strong strategic approach in planning for maintaining, remediating and upgrading the Network. This was supported by good forecasting and performance information. There were a number of areas that could be improved to further enhance State Roads performance and ensure delivery of agreed outcomes and objectives.

In order to effectively focus resources and budget into the right areas, State Roads used a variety of information and tools to conduct demand analysis of the Network. This enabled it to understand the future use and performance of roads and decide what investments achieved the best outcomes while delivering value for money. A strategic demand model was maintained for the Hobart region and was used to predict the future use of the Network in this higher density and geographically constrained area. To complement the strategic demand model, corridor strategies², which assist in better managing transport infrastructure to maximise benefits for road users, were undertaken to develop a plan for specific geographic regions of the Network and produce solutions to achieve improved performance.

State Roads applied lifecycle-driven strategies and principles in managing and operating the Network. State Roads could identify its critical assets and target and refine its investigative activities, maintenance plans and capital expenditure plans at the appropriate time.

State Roads use a long-term financial strategy to support the delivery of defined LoS. The use of a 10-year infrastructure investment plan, together with shorter supporting plans, assisted it with implementing its financial strategy. However, the 10-year plan has not been updated for several years.

State Roads had clear objectives, key performance measures, policies and strategies for the management of the Network

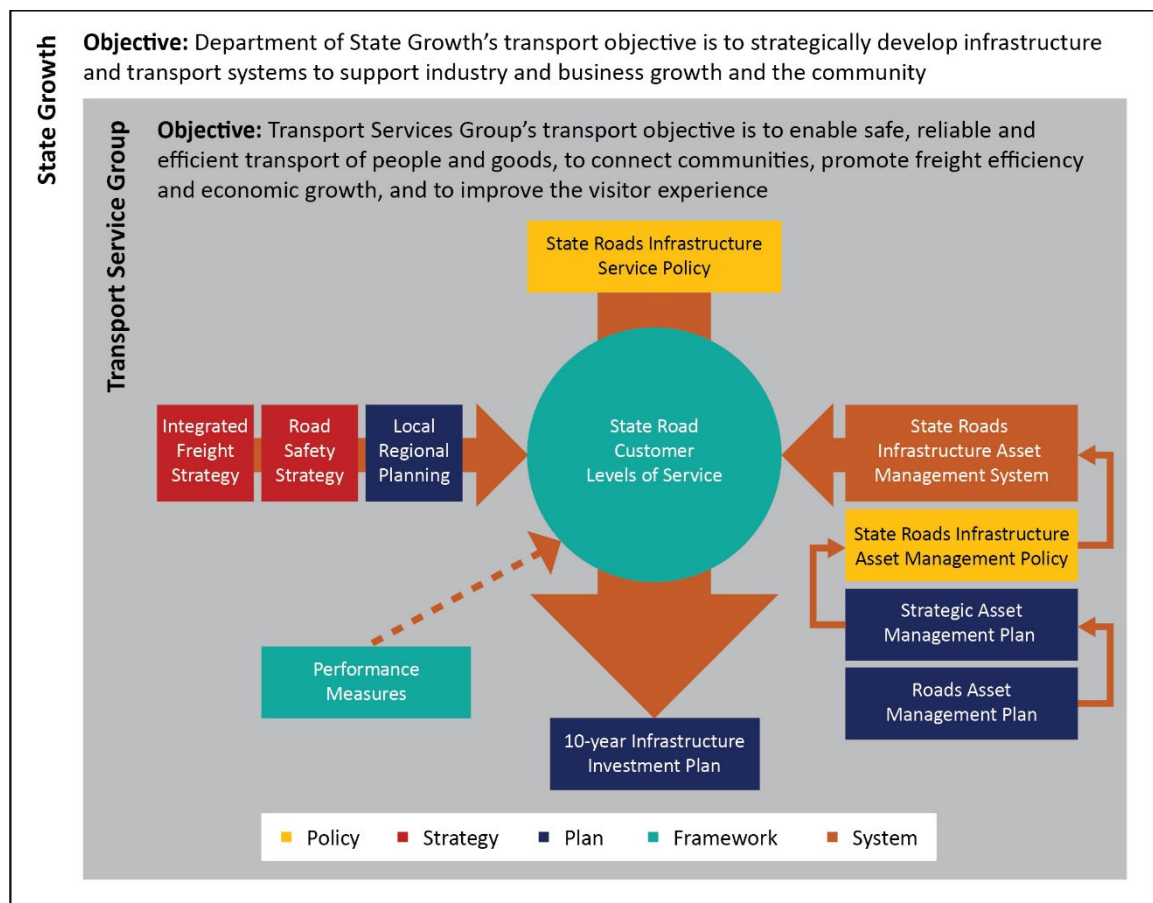
- 2.1 Appropriate overarching policies, strategies and plans were required to ensure there was a line of sight between overarching Government objectives and how these were supported by road maintenance, renewal and upgrade activities. Without a clear

² Are developed by the Department to identify current levels of service for transport corridors and to also develop acceptable future required levels of service for that corridor.

alignment to the objectives, asset management activities may not align to deliver the required service levels to meet future demand.

- 2.2 There were clear links between State Roads strategies and plans and their contribution to supporting LoS and the provision of good customer service. The relationship between the *State Roads Infrastructure Service Policy* and the *State Roads Infrastructure Asset Management Policy* and the organisational objectives of State Roads, including their translation into more granular plans and measures, is illustrated in Figure 4. It describes how plans, policies and strategies support and link with each other to enable State Roads to strategically plan for the management and development of the Network.

Figure 4: State Roads planning framework



Source: Department of State Growth and TAO

- 2.3 Government objectives regarding integrated transport that impact significantly on the operations of the Department and State Roads were incorporated into Departmental policies and strategies. Relevant Government objectives and strategies and how these were addressed by State Roads is detailed in Appendix 1.
- 2.4 State Roads translated the intent of its *Infrastructure Service Policy* and *Infrastructure Asset Management Policy* into strategies to help manage the Network. The strategies were frameworks developed to assist and guide the building of asset management and transport plans, linked to Government objectives.

- 2.5 State Roads created asset management and transport plans, which assisted with the implementation of its policies and strategies. The transport plans developed processes and methods to identify and respond to current and future transport and Network challenges. The 2018 Road Asset Management Plan (Road AMP) specified the activities State Roads intended to conduct on the Network to achieve the asset management objectives. The plan detailed the approach to managing the Network by asset type and was important in ensuring asset management activities were designed to realise maximum value from the assets
- 2.6 The Road AMP incorporated the LoS framework and provided information about infrastructure assets including actions required to provide an agreed LoS in the most cost effective manner. The Road AMP described the services to be provided, current status of the services, how the services were provided and what funds were required in the short and long-term to provide the services.
- 2.7 The LoS framework provided State Roads with a measureable framework and benchmark to determine whether its engineering and asset management activities and thresholds were achieving acceptable LoS for the community. LoS was generally defined in two terms: 'community' LoS and 'technical' LoS. Community LoS sets out what 'level' the community receives in terms of services offered by State Roads. The term 'customer' was used when describing the services provided, as distinct from the technical LoS that uses technical language and technical quantifiers. The Community LoS influenced State Roads to determine acceptable technical limits when planning, designing, constructing and maintaining assets. The LoS framework guides State Roads in understanding whether its asset management activities were focused in the right areas and could achieve departmental objectives.
- 2.8 Published in 2016, the current version of the LoS provides high-level customer service outputs and targets for each category of road managed by State Roads. It includes a description of how these might be assessed. State Roads LoS framework was split into four customer outcome categories; function, safety, capacity and condition. At a high level the LoS framework was aligned with Government objectives. For example, it incorporated the customer outcome of safety, which was linked to the Towards Zero Tasmanian Road Safety Strategy.
- 2.9 An output of the State Roads planning framework was the 2015 10-Year Infrastructure Investment Plan. This plan outlined the projects to be undertaken to manage and address the challenges facing the Network. These projects encompassed:
- replacement of road pavements at the end of their economic life
 - a road width and shoulder widening program
 - upgrading the Midlands and Bass highways to provide further freight efficiency improvements.

Projects identified in the 10-Year Infrastructure Investment Plan have received funding in subsequent State Budgets.

Policies and strategies for the management of the Network were not subject to periodic review

- 2.10 Although, State Roads had developed asset management policies, strategies and plans to help define its planning approach for the Network, there were no procedural requirements outlining responsibilities and review timeframes. Without periodic review, there was no assurance these documents remained relevant or aligned to achieving Government objectives. For example, we identified the Strategic Asset Management Plan (Strategic AMP) was developed in 2005 and had not been amended or updated. Since 2005, a number of transport strategies and plans had been developed that now superseded the content of the Strategic AMP. State Roads was aware its Strategic AMP was outdated, attributing the delay in its review to resourcing issues. However, a review of the Strategic AMP had now commenced, but had not been completed at the completion of our fieldwork. State Roads noted the new Strategic AMP would be aligned with the Road AMP, which was also being revised. Without a current Strategic AMP, State Roads may lack a relevant tactical approach to managing the Network and as such its asset management activities may no longer be fit for purpose.
- 2.11 Many of the strategic planning documents used by State Roads that we reviewed needed to be updated. Table 4 lists the strategic planning documents used by State Roads, detailing when they were published and whether any amendments or reviews had been recorded together with our assessment of the currency of the document.

Table 4: State Roads strategic planning documents with date published and amendments

Document	Published	Evidence of last review	Assessment of currency
State Roads Infrastructure Service Policy	2014	2014	Outdated
State Roads Asset Management Policy	2014	2014	Outdated
10 Year Infrastructure Investment Plan	2015	2018	Current
Towards Zero Tasmanian Road Safety Strategy 2017-2026	2017	2017	Current
Tasmanian Walking and Cycling for Active Transport Strategy	2010	2010	Outdated
Tasmanian Integrated Freight Strategy	2016	2016	Current

Document	Published	Evidence of last review	Assessment of currency
Strategic Asset Management Plan	2005	2005	Outdated
Roads Asset Management Plan	2017	2018	Outdated
Southern Integrated Transport Plan	2010	2010	Outdated
Northern Integrated Transport Plan	2013	2013	Outdated

Source: TAO

- 2.12 As shown in Table 4, seven of the 10 strategic planning documents listed were out of date, meaning much of the information contained in these strategies was dated and may not reflect State Roads current position. State Roads indicated to us, it intended to develop a business process and workflow for asset management plans to align with other processes and to ensure its strategic planning documents are reviewed as scheduled. By keeping its planning documents up to date, State Roads ensures it is not missing out on broader industry learnings, new insights into the understanding of the roads and alignment with organisational and Government objectives. It could also affect the efficacy of State Roads asset management and potentially lead to a misalignment of resource and objectives, alongside an inability to meet departmental KPIs.

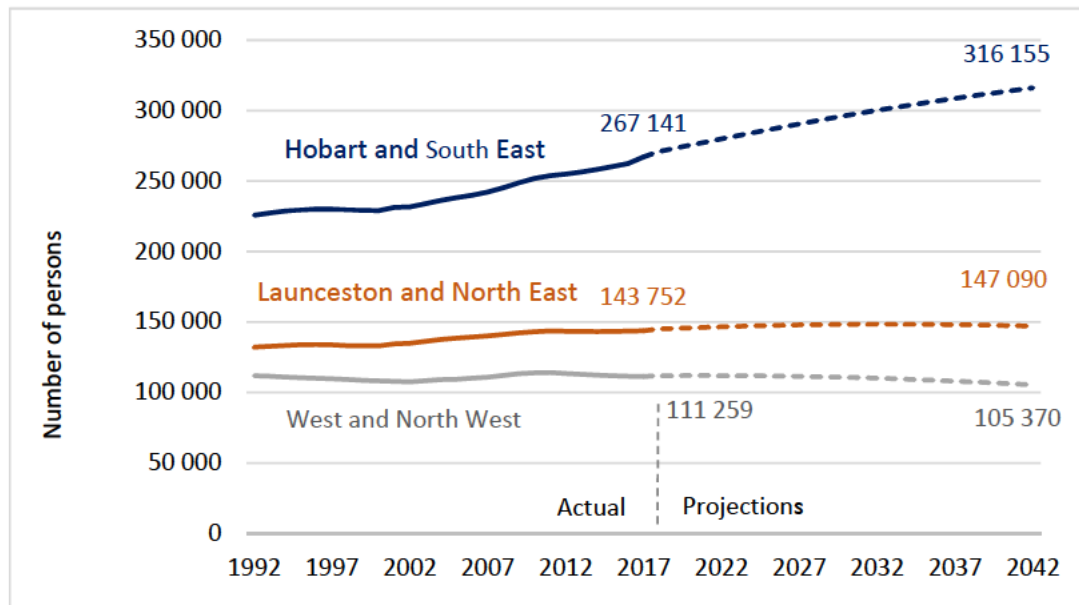
State Roads undertook detailed and appropriate demand analysis of the Network to support its planning

- 2.13 State Roads used a pragmatic approach by using its resources to best effect while optimising its strategic plans by providing insightful information on the Network.
- 2.14 The main goal of transportation demand analysis was to develop accurate and reliable models to provide various information to planners, traffic engineers, and other decision makers. Effective demand analysis is important to ensure planned projects and works will support future demand and LoS. State Roads employed various tools to help understand future demand for the Network, including:
- population growth statistics
 - modelling
 - annual traffic growth forecasts
 - corridor strategies.

These tools provided State Roads with a robust understanding of demand and allowed it to plan and respond to the changing Network needs across all timescales.

- 2.15 State Roads identified the main priority for future demand planning was the Hobart region. Population in the Hobart and South-East region increased by 1.5% in 2017-18, more than double the rate of growth of Tasmania's other regions. Figure 5 further illustrates this growth.

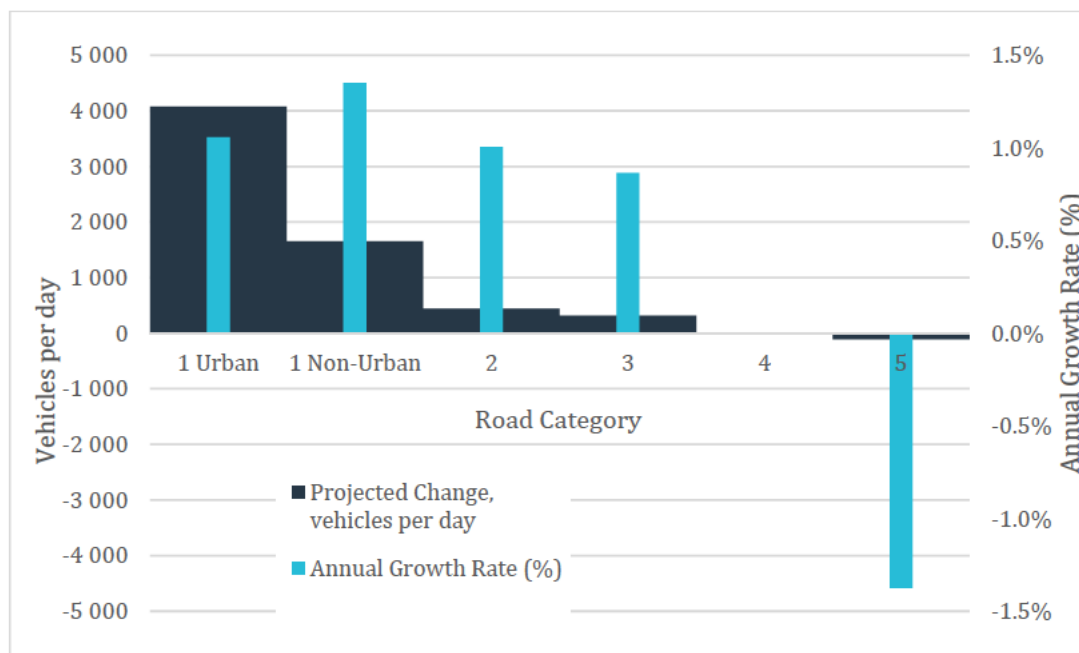
Figure 5: Regional population growth 1992 to 2042, actuals and medium series projections



Source: Department of Treasury and Finance

- 2.16 The projected increase in Network demand by road hierarchy from 2015 until 2030 is shown in Figure 6.

Figure 6: Projected demand for the Network by road Category 2015 to 2030



Source: Department of State Growth

As shown in Figure 6, annual demand growth rates were generally low, less than 1.5% per year, however, the absolute growth in demand on urban arterial commuter routes (Category 1 urban) of 4 000 vehicles per day by 2030 is significant for future peak commuter demand capacity. The projected absolute increase for Category 1 urban roads was more than double Category 1 non-urban, which in combination with the population statistics above, supports the view that future strategic demand modelling be focused on the greater Hobart region.

- 2.17 State Roads demand modelling was calibrated using regularly updated usage data. The data provided information on vehicle travel times, travel reliability and origin/destination pairs. The data collected was then to be used to undertake analysis of the Network and confirm correlation of the above model.
- 2.18 To facilitate this approach, State Roads used a gravity-based strategic model³ with the Hobart CBD at the centre of its analysis. State Roads staff indicated to us the model had been recalibrated by confirming traffic flows with survey data collected from the public that could be compared with the model's output. The model also looked at land release and transport-mode choice for the greater Hobart area. The model was used by State Roads to understand the impact of traffic demand on the greater Hobart area. The model could also be used to predict demand and capacity constraints into the future, based on various growth scenarios within the city.
- 2.19 Independently collected demand data, sourced triennially, was used to provide information to support Network planning and investment. This data enabled State Roads to understand the performance and utilisation of the Network and helped inform key investment areas and maintenance needs. For example, a 2017 origin-destination report, using 2016 traffic movement data, showed that between two thirds and three quarters of Hobart's traffic flow was either into Hobart's CBD or originated from there. This information provided insight into traffic congestion in Hobart and helped State Roads better inform its future congestion management strategies.
- 2.20 To support capital investment programs, corridor strategies were prepared by State Roads for geographical areas where the Government was committed to constructing capital projects. Transport corridors or arterial routes are linear areas defined by one or more modes of transportation, like roads and railways. They are commonly used to better integrate transport networks between ports and population centres. Tasmania's premier transport corridor is the corridor between Burnie and Hobart, which carries 65% of Tasmania's land freight with this volume expected to continue to grow. These strategies were being progressively prepared as capital funding was received.

³ The gravity model, which is based on the pull on traffic movements, is the most popular of all the trip distribution models. It allows the effect of differing physical planning strategies, travel costs and transportation systems to be taken into account. Within it, existing data is analysed in order to obtain a relationship between trip volumes and the generation.

- 2.21 Corridor strategies were also undertaken to develop a plan for geographic regions of the Network. They identify potential solutions to achieve improved performance, reliability and safety of the corridor. The final output of the corridor strategies was a high-level plan for implementation of identified corridor improvements. In order to analyse and evaluate solutions, corridor studies used daily traffic volumes, road safety and future needs analysis to inform and provide options and solutions as to how improvement projects should be completed. Options were developed based on an assessment of the benefits. These options were prioritised based on a comparison of the benefits to the cost and difficulty of implementation. For example, eight improvement projects were identified for the *2019 Bass Highway Corridor Improvement Plan*, with four of them being high priority.
- 2.22 Due to funding constraints, State Roads could not undertake widespread corridor strategies across the State. While there is a small annual network planning budget used to develop corridor strategies, this was also supplemented by approved budget for new projects allocated in the capital investment program. For example, Australian Government funding was used to develop a corridor strategy for the Bass Highway between Cooeee and Wynyard.

State Roads took a lifecycle approach to develop cost-effective management strategies to maintain the Network

- 2.23 Our assessment of State Roads approach to applying lifecycle-driven strategies and principles in managing and operating the Network was that it fulfils the Government's policy objective.
- 2.24 One of the key components of the Government's policy objective for infrastructure asset management was taking a lifecycle approach to develop cost-effective management strategies to meet the defined public policies and LoS. In following this approach to manage Network assets, State Roads adopted a lifecycle management plan that included:
- a road asset hierarchy to provide a framework for structuring data in an information system to assist in collection of data, reporting information and making decisions
 - the identification of critical assets, being those assets with a high consequence in an event of failure, but not necessarily a high likelihood of failure
 - the establishment of standards and specifications to ensure road operations and maintenance work was carried out in accordance with the Department's technical specifications
 - the gathering of data on a periodic basis relating to the condition of both the road surface and the road pavement

- use of a road maintenance forecasting tool, RoadWise, to predict road function and capacity through condition indices and forecast pavement and surfacing renewals.

2.25 A road hierarchy structure provides a framework used to direct investment resources to maximise economic benefits. The economic and social benefits provided by roads is linked to their function and use. In addition, the hierarchy enables choices to be made regarding the relative function and priority given to other routes, to ensure major traffic flows are directed to the most effective routes. The road hierarchy, as illustrated in Figure 7, is based primarily on the need to provide connectivity at a State level for key corridors between cities, major towns, rural catchments and key port, air and transport hubs.

Figure 7: State road hierarchy



Source: Department of State Growth

2.26 State Roads was able to target and refine investigative activities, maintenance plans and capital expenditure plans in a timely way. This was achieved by identifying critical

assets and critical failure modes, enabling operations and proactive maintenance activities to be targeted to mitigate critical assets failure and maintain service levels. These activities included increased inspection frequency and timely maintenance intervention.

- 2.27 State Roads conducted regular full condition audits of the Network, with information collected on the condition of the Network's surface and pavement provided through an external contractor. Information on pavement roughness, rutting, cracking, surface texture, defect repairs and pavement age was collected every three years and skid resistance every two years. This data informed the road condition grading, as shown in Table 5.

Table 5: Condition Grading Model

Condition Grading	Description of condition
1	Very Good: only planned maintenance required when necessary
2	Good: minor routine maintenance required plus planned maintenance
3	Fair: significant routine maintenance required
4	Poor: significant renewal/rehabilitation required
5	Very Poor: physically unsound and/or beyond rehabilitation

An assessment of the road network pavement structural strength by Traffic Speed Deflectometer⁴ undertaken in late 2017⁵ further enhanced data relating to the pavement structural condition.

- 2.28 Further evaluation of the robustness of information to inform State Roads understanding of the condition of the Network is included in Chapter 3 of this Report.

State Roads had a long-term financial strategy that supported the delivery of defined Levels of Service from available funding

- 2.29 State Roads implemented a long-term financial strategy to assist in identifying expenditure required to continue delivering defined LoS. A key component of the strategy was the 10-year Infrastructure Investment Plan, with key inputs into this Plan

⁴ A deflectometer is a testing device used by civil engineers to evaluate the physical properties of a road pavement.

⁵ The next inspection of the Network was due sometime during 2020 but this may be delayed due to COVID-19.

illustrated in Figure 4 above. Additional inputs into the development of the Plan included crash data, traffic volumes, freight efficiencies and maintenance and community engagement. The Plan contained actual expenditure for 2015-16, forward estimates from the Tasmanian Budget Papers for 2016-17 to 2019-20 and estimates for future years to 2025-26. The Plan was last updated in 2018 and State Roads acknowledged the need to update the Plan to support effective forward planning.

- 2.30 The 10-year Infrastructure Investment Plan informs Budget submissions made by the Department which, if successful, were incorporated into the 5-year Capital Investment Program that identifies budget and projected expenditure for new, upgraded and renewed roads and maintenance. This Program tracks appropriations and forward estimates of Tasmanian and Australian Government funding at an output and project level. This provides a high level of correlation between projects announced by the Tasmanian and Australian Governments through their respective budget processes and State Roads' planning processes. Individual projects were also monitored through monthly project cost breakdown reports that feed into monthly actual against budget reports. A five-year Infrastructure Maintenance Investment Plan also projects future infrastructure maintenance at a project level.
- 2.31 The five year plans were updated at regular intervals and informed annual planning processes. They also informed the preparation of Budget submissions to obtain additional funding to meet variations from original budgets for capital projects.

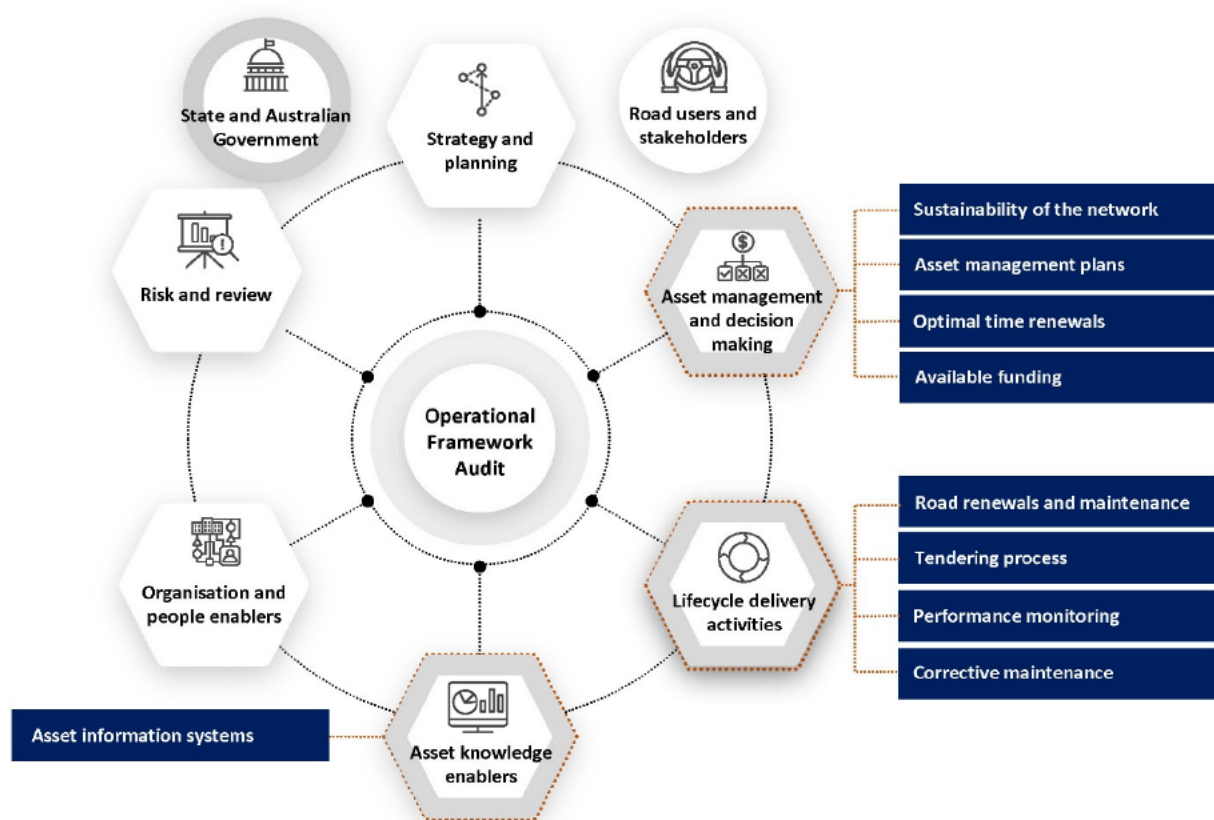
3. Was the Network managed effectively and efficiently?

In this Chapter, we assess the day-to-day management of the Network covering:

- use of information to inform knowledge on the condition of the Network
- investment in Network maintenance and upgrade prioritisation
- optimal renewal of the Network
- level of maintenance and renewal funding and its impact on the condition of the Network
- project management for program works and reporting of completed projects
- impact of new contract maintenance models in delivering greater value for money
- managing contracts in accordance with construction industry norms
- active management of corrective maintenance
- integration of asset management information.

The focus areas of this Chapter are illustrated in Figure 8 below.

Figure 8: Chapter focus areas



Source: TAO

Chapter summary

Overall, State Roads was undertaking effective management of the Network with some further improvements to efficiency identified that could enhance its performance.

State Roads used robust and appropriate information to determine the condition of the Network. This data was used by State Roads to develop condition forecasts to inform its investment decisions.

Corrective maintenance on the Network was effectively managed in a timely way. However, maintenance could have been undertaken more efficiently through better linking of criticality to information contained in the defect management system. State Roads could also improve prioritisation of maintenance as well as Network planning through better use of road criticality information, which was limited to Category 1 roads. Other information systems were also not integrated effectively which will need to happen if the approach and resourcing for maintenance and renewal is to be better informed.

The current State Roads maintenance budget cannot sustain current road condition levels into the future. This issue has been partially resolved through an uplift in capital funding, which has allowed State Roads to re-allocate funding within its renewal program. Whilst State Roads was taking steps to address the issue, we were unable to fully assess the impact of these measures and whether they would reduce the maintenance budget shortfall.

The decision by State Roads to use a stewardship model for one of its three maintenance contracts could potentially enable it to improve outcomes from its contracts. The outcome of this approach was to be evaluated against the other two maintenance contracts but this has yet to occur.

Contract management adhered to construction industry norms and the contract management practices in place provided State Roads with effective oversight and performance management of the contractors. Adequate and regular reporting was undertaken to ensure contractors were delivering services to the required quality.

State Roads did not have fully integrated management information systems. Further integration would allow improved decision making and better prioritisation using the best available information.

State Roads used robust information to inform its understanding of the condition of the Network

- 3.1 The information collected by State Roads provided it with a robust understanding of the condition of the Network. The information was used to forecast and support the strategic plan for the Network.
- 3.2 Road condition data (see 2.27) was provided as condition indices and directly fed into spreadsheets which were used for input into RoadWise. Effective analysis was then undertaken by the Road Assets Team in order to understand the long-term sustainability of assets. RoadWise was used to predict the deterioration of pavement

and surfacing enabling prioritisation of maintenance to meet a defined LoS. RoadWise allowed in-depth analysis of the deterioration of condition for each defined pavement section and forecasted multi-year mitigation measures to ensure long-term sustainability of the Network.

- 3.3 The analysis from RoadWise provided an effective forecast of required works activity and budget to deliver a defined maintenance, rehabilitation, or upgrade outcomes. Planning through the RoadWise tool was only as effective as the data fed into the database and was linked to the condition survey frequency. We assessed the quality of this data to be good. Between survey years, data was extrapolated to form a base-level understanding of the asset condition and assist with forecasting. Physical verification of the planned works program occurred to ensure greatest value was delivered.
- 3.4 One deficiency in RoadWise acknowledged by State Roads, was corrective maintenance activities were not integrated within the forecasting tool assessments. The lack of integration could result in prioritisation of pavement reconstruction or resurfacing in areas where corrective maintenance was otherwise undertaken, duplicating the work undertaken and costs for this activity. From the review of evidence, greater integration and interaction between the Maintenance Services Team and Road Network Planning Team would have assisted in optimising planning for Network maintenance, remediation and upgrade.
- 3.5 Condition data was also used by the Maintenance Services Team to verify if contractors responsible for maintenance were meeting defined performance KPIs. This data also allowed planning and maintenance teams to effectively plan ongoing maintenance and remediation delivery, ensuring delivery was targeting critical locations or parts of the Network to maintain required LoS. This also helped ensure funding was prioritised to where it could have the most impact.
- 3.6 The condition of the Network determined by State Roads as at 1 January 2017 is illustrated in Figure 9. In line with the condition survey frequency of three years, this is the most current snapshot of road condition.

Figure 9: Condition data of the Network



Source: Department of State Growth.

Figure 9 shows most of the roads were in good condition with roads in poor condition evenly spread out across the Network.

A formalised approach for investment in Network maintenance may improve value for money

- 3.7 There is a need to prudently prioritise expenditure to ensure an optimal outcome is delivered to the Network. This means having both a means to prioritise and justify maintenance decisions taken.
- 3.8 There were weaknesses in the existing process used by State Roads to prioritise Network maintenance in the Elective Investment Program (EIP). The EIP requires departmental teams to bid on maintenance projects to deliver against the 10-year infrastructure investment plan. Three areas were identified that would improve the use of the EIP for prioritising maintenance projects: a stronger link from objective measures through to the LoS; better documented outcomes; and consideration of risk within the process.

- 3.9 State Roads had performance targets and measures that did not assist decision making on maintenance expenditure. We noted there were performance targets and measures within the EIP, such as routine maintenance contract KPIs, co-ordinated traffic signals or workplace health and safety directions from Work Safe Tasmania that did not assist in making decisions on maintenance expenditure. Decision-making could be improved if State Roads used a prioritisation framework and took into consideration stakeholder expectations in defining value.
- 3.10 To develop a framework to improve decision making, State Roads participated in a case study, as part of an AustRoads⁶ investment prioritisation project, to trial a process at the portfolio level to improve investment prioritisation.
- 3.11 EIP was poorly documented, though it did have an agreed weighting framework that provided criteria on how the investment objectives were achieved for each maintenance project. However, the weighting outcome was not documented against the project, which would allow for a fuller and more defensible justification of decisions reached and would add robustness to the EIP process.
- 3.12 Without clear criteria to link the expected improvements from proposed projects to established KPIs and LoS, allocation of funds may not deliver the defined benefits or provide value for money. As discussed in the next Chapter, a stronger LoS framework would enable this link to be more robustly drawn.
- 3.13 There was not a strong integration of risk management as a part of the investment prioritisation process. The assessment of risk and risk mitigation benefits of projects in this process would enhance the justification and selection of projects for approval.

Integration of information on prioritisation of maintenance and the upgrade of road assets was not strong

- 3.14 State Roads only identified Category 1 roads as critical. Anything below Category 1 was assessed as less critical with Category 5 being the least critical. The identification of criticality was based on the State Road hierarchy, where Category 1 roads were described as the arterial roads of the Network.
- 3.15 There was a clear rationale for asset criticality, which was defined in the Road AMP (see 2.24). Within the asset or Network management plans there was no documentation identifying criticality at a Network level. Criticality should be used more widely in State Roads documented plans to allow a better understanding and prioritisation of risk mitigations and maintenance works.

⁶ Austroads is an Australian Government funded apex organisation of road transport and traffic agencies in Australia and New Zealand. It publishes guidelines, codes of practice and research reports promoting best practice for road management organisations in Australasia.

- 3.16 Prioritising maintenance was supported by linking the category of road to criticality. This approach to criticality was consistent across maintenance activities within the Maintenance Services Team. Deferred reactive road maintenance was recorded and stored within the defect management system. The system assessed the defect and automatically applied a priority rating and response timeline based on the information entered and the defined road category criteria set by State Roads. There were four priority levels⁷ defined in the system, which identified responsiveness to defects. Priority one identified the discovered defect must be rectified immediately while a priority four was a minor defect that did not require immediate rectification. This prioritisation provided State Roads with the ability to defer any maintenance that did not require immediate action.
- 3.17 A more sophisticated assessment, linked to the road information management system and the criticality of the asset in the context of its impact on the Network would enable improved prioritisation of elective and reactive works as well as Network planning. Additionally, if coupled with other measures such as incident rates, better risk mitigation and prioritisation could also be realised.

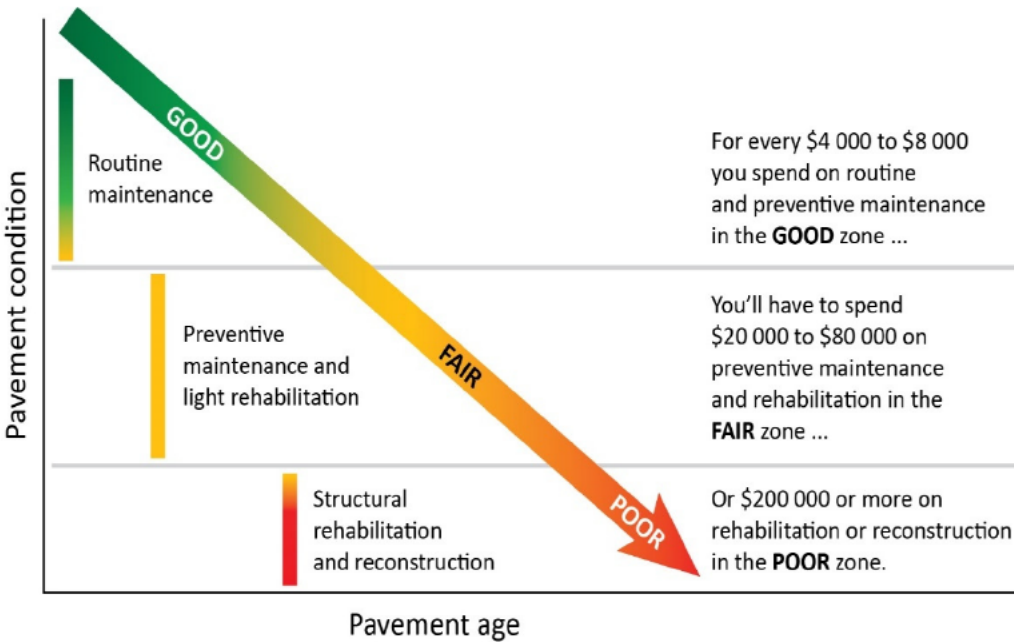
Long-term plans were in place to optimally renew the Network

- 3.18 There were challenges to funding the maintenance and renewal of the Network. The cost of maintenance increases as the age and size of the Network increases. Between 1998 and 2015, the Network expanded from 7 800 km of lane length⁸ to 8 500 km of lane length, a 9% increase in the length of the Network. New road assets and upgrades come with ongoing maintenance and ownership costs typically in the order of five times the cost of construction over the life of the road, which is normally between 40 and 60 years. Sustainable maintenance, which focusses on the cost of maintaining and replacing the Network, also increases with age. Typical deterioration of pavements with respective stages of recommended treatment (maintenance, rehabilitation, and reconstruction/renewal) is illustrated in Figure 10:

⁷ Priority ratings ranged from 1 to 4 with 1: fix immediately, 2: fix to prevent becoming a Priority 1, 3: define long-term plans to incorporate these, 4: minor issue not requiring immediate resolution.

⁸ Lane length is based on a standard single lane width, which in Australia and New Zealand is 3.5m.

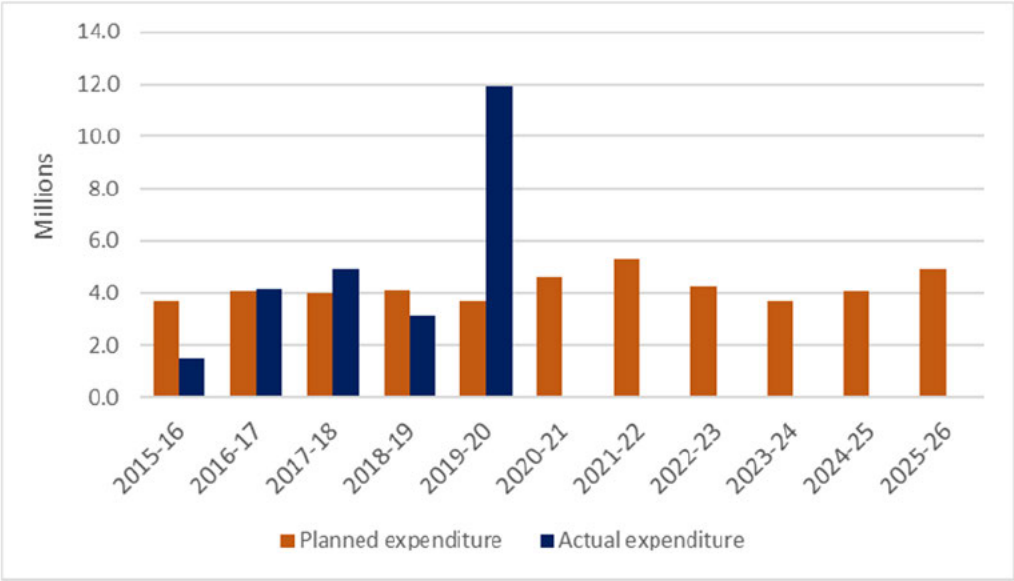
Figure 10: Pavement deterioration and maintenance



Source: Department of State Growth

- 3.19 As indicated by Figure 10, pavement renewals should occur at the optimum time, otherwise maintenance costs rise and average asset condition, safety and functionality reduces.
- 3.20 State Roads actual spend on pavement renewals for the period 2015-16 to 2019-20, together with its planned expenditure for the period 2015-16 to 2025-26, is shown in Figure 11.

Figure 11: Average annual road renewal spend actual 2015-16 to 2019-20 planned expenditure 2015-16 to 2025-26



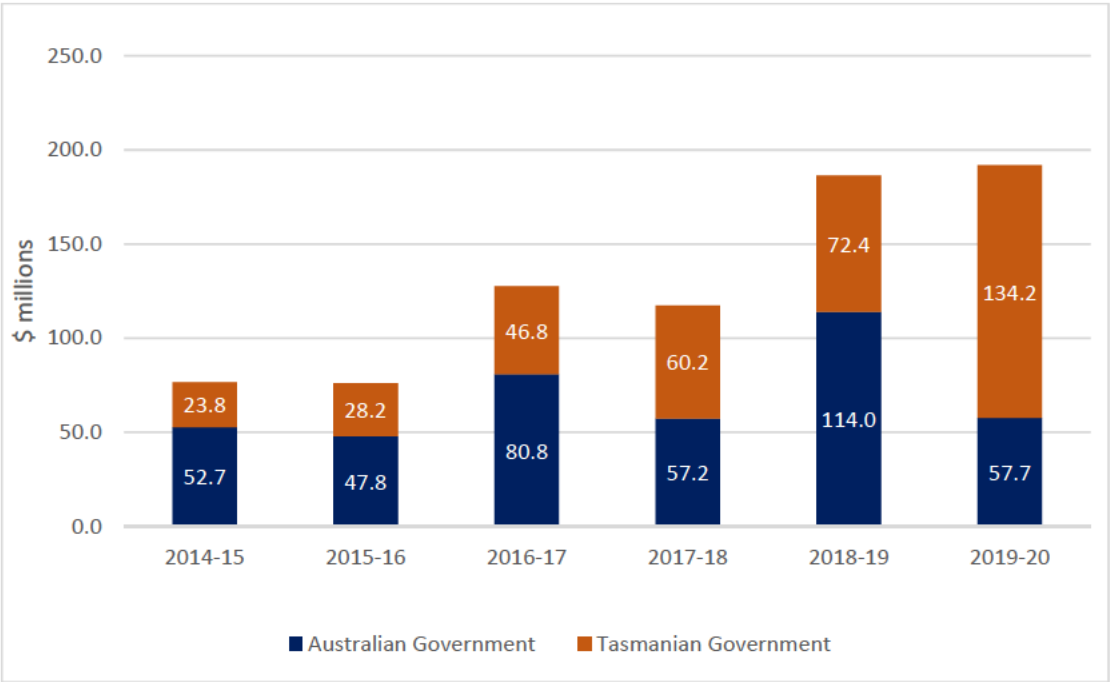
Source: Department of State Growth

State Roads spent an average of \$5.1m annually on road renewals between 2015-16 and 2019-20, although this average was impacted by the increased renewal spend in 2019-20 in response to identified pavement rehabilitation work. The 10-year infrastructure investment plan has budgeted an average spend on road renewals of \$4.2m, which was lower than the average spend for the five years to 2019-20. This could indicate a shortfall in renewal funding when compared to recent actual spend.

Measures were being implemented to mitigate a shortfall in funding maintenance and renewal of the Network

3.21 Although funding for new and upgraded roads has experienced a steady increase from 2014-15 to 2019-20, as shown in Figure 12, funding for maintenance and renewals remains a challenge for State Roads.

Figure 12: Upgrade and new road expenditure 2014-15 to 2019-20



Source: Department of State Growth

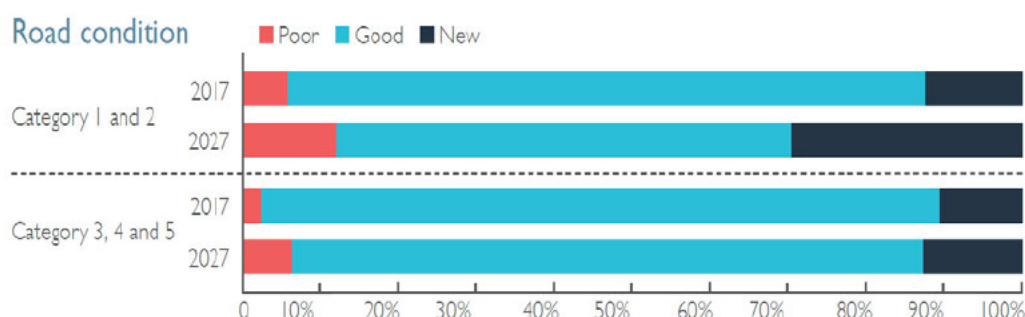
3.22 In the 2018 Road AMP, State Roads projected the amount of available funding would not support sustainable maintenance of the Network. State Roads predicted, when combined with road asset renewals gained through road improvement projects, funding levels equated to approximately 85% of the funding required to maintain customer LoS (Asset Funding Ratio)⁹ as defined by the Department. This indicated

⁹ Asset Renewal Funding Ratio - Future (planned) asset replacement expenditure divided by future asset replacement expenditure (actual) required. Measures the capacity to fund asset replacement requirements. Inability to fund future requirements will affect revenue, expenses, debt or service levels.

the Network's condition would decline over time from these defined LoS targets.

3.23 The 2017 *State of our Roads Report* shows the projected deterioration of the condition of the Network from 2017 to 2027, as shown in Figure 13.

Figure 13: State Roads road condition forecast¹⁰



Source: Department of State Growth.

The report quantified 13% of Category 1 and 2 roads will be considered in 'poor' road condition in 2027 in comparison to 6% in 2017. In its 2018 Road AMP, State Roads noted maintenance and renewal work to the full extent required to maintain the current condition of the Network may not be able to be completed. In addition, the Road AMP noted State Roads projected 10-year average Asset Renewal Funding Ratio to 2027 would be 88.6%, below the minimum sustainable level of 100%.

3.24 The longer term impact of not managing the maintenance shortfall is a reduction in both customer and technical LoS. For the Network, this could include a reduced maintenance response, 'sweating' assets beyond their useful life or delaying works that could impact on the condition, capacity, function and safety.

3.25 State Roads has attempted to manage maintenance and renewals within known budget constraints. State Roads in its 2018 Road AMP identified that in order to resolve the funding shortfall a number of actions would be implemented. While it is too early to assess the impact of all these measures, they included:

- improving its asset knowledge
- improving practices and gaining efficiencies
- better identifying and managing risks

¹⁰ Typical interventions, visual condition, and implications of road condition (Austroads Guide to Asset Management, State Roads Asset Management Plan, Institute of Public Works Engineering Australasia Condition Assessment and Asset Performance Guidelines):

- New – Only planned maintenance when necessary required. Safe and comfortable travel for road users.
- Good – Minor routine maintenance required as additional to planned maintenance. Minor cracking, rutting, isolated potholes, increasing roughness and loss of surface aggregate. Minor road safety and road user comfort concerns.
- Poor – Significant renewal/rehabilitation required. Major patching, potholes, crocodile cracking, rutting, and surface aggregate loss. Significant road safety and road user comfort concerns.

- making trade-offs between service levels and costs
- identifying assets for disposal
- consulting with the community to ensure road infrastructure met community needs and was affordable
- seeking additional funding from Government.

3.26 We were also informed of other activities State Roads was undertaking to manage the budget shortfall, which included:

- seeking targeted funding from the Department of Treasury and Finance to address the pavement renewal shortfall
- using EIP for better prioritisation of individual maintenance projects
- prioritising the allocation of funding to safety and preventative maintenance using asset data collected by RoadWise.

3.27 State Roads has undertaken steps to further mitigate its maintenance funding shortfall by enhancing its understanding of the Network's asset data, enabling it to more efficiently manage its assets. To achieve this State Roads:

- completed updating RoadWise using 2018 data with a further updated analysis to be contained in the 2020 Road AMP
- will incorporate predictive modelling outputs from RoadWise into the 2020 Road AMP update, including bituminous surfacing age, for the three maintenance regions
- progressed the development and implementation of its pavement marking maintenance assessment
- developed and implemented assessment procedures, including defect rating and recording methodology.

Project management was strong for the program of works

3.28 Clear, defined processes enabled consistent and effective management and delivery of projects across the program of works. To allow for consistent management and processes across the capital investment program, State Roads developed an overarching project management framework. The framework was integrated within Project Services and provided for flow of information and review of costs and risks throughout the lifecycle delivery of a project.

3.29 The project management framework provided a clear process for both Tasmanian and Australian Government funded projects — as each had varying reporting requirements. The framework established the processes that must be followed from project initiation until project completion, providing consistent management across

the program of works. The framework resides on the State Roads intranet and was evident throughout project management activities.

- 3.30 To deliver a project within time and cost, project managers reported and documented progress through a project cost breakdown. The project cost breakdown reports included reporting on the progress of a project and its associated costs, documenting all relevant project financial information. The project cost breakdown also identified the relevant milestone due date and whether or not a revised completion date was required.
- 3.31 Project cost breakdowns were reported at monthly project status meetings with State Roads senior management. The monthly meetings determined how projects were tracking and any project associated risks. The project cost breakdowns were active operational documents across the program of works, including maintenance and minor works. From evidence reviewed, the reports were satisfactorily monitored and actioned, ensuring project delivery was actively monitored and managed.

More consistent reporting of completed projects was needed

- 3.32 While review and reporting of a completed project occurred, State Roads acknowledged project reviews were not regular, limiting its portfolio understanding of successful delivery.
- 3.33 Project reviews provided an overview and understanding of how effectively the project was delivered, including information related to financial performance, project management, timeframes, technical and design specifications and contract administration. There were two types of project review reports produced within State Roads, depending on the type of project completed.
- 3.34 For large Tasmanian Government and Australian Government funded projects a post completion report was required. Payment for Australian Government funded projects was contingent on the report being completed. For large Tasmanian Government funded projects a post completion report was only encouraged and therefore not regularly produced. By not regularly reviewing the completion of a project, State Roads did not maximise its ability to learn or improve from past projects, which could result in repetition of mistakes and ineffective project management.
- 3.35 For smaller Tasmanian Government funded projects, the project review included an average rating out of five, with 5 being excellent and 1 being poor, for each of the specified categories, providing State Roads with benchmarking indicators. By establishing a comparative system, benchmarking indicators could be used by State Roads to gain a clearer understanding of project delivery across the entire capital investment program. Comparing projects at a program level would assist with understanding systemic issues across projects and providing a better strategic view of project delivery.

State Roads had implemented new contract models to drive value for money

- 3.36 Network maintenance contracts are separated into three regions, North East, North West and South. South and North East contracts followed a more traditional model where the contracts were for a five-year period that could be extended by another five years.
- 3.37 For the North West maintenance contract procurement, State Roads followed a non-standard tendering process to try and produce better outcomes for the Network. The process involved extensive industry consultations, resulting in alternative collaborative tender assessment procedures and contract model. The approach to assessing tenders provided the tenderer with the ability to set out its own criteria for KPIs, performance measures and a demerit point system. The contract term under this stewardship model was four years with a review every three years, at which time the contract could be extended for another three years for a maximum period of 10 years.
- 3.38 The stewardship model hands over significantly more control, decision making and responsibility to the contractor in regards to Network management and maintenance of the North West portion of the Network. This differs from the traditional contract model, which focuses more on maintenance work with minor capital works being separately contracted out. This stewardship model was deemed to be a more collaborative model that fostered a long term relationship, allowing more autonomy for the contractor to complete its maintenance requirements.
- 3.39 The stewardship model provided State Roads with the ability to compare short-term maintenance and trade off rehabilitation and resealing works. This enabled State Roads to understand and monitor benefits to ensure the best possible value was provided to the Network by comparing the traditional contract maintenance model with the stewardship model.
- 3.40 Due to the varied contract arrangements for the maintenance contracts, State Roads previously had difficulty in driving benefits from the contractual provisions contained in each of the contracts. To rectify this, State Roads identified training was needed for the initial external North West contract administrators to better understand the provisions contained within the various contracts. State Roads noted this was an area of concern in relation to the new North West maintenance contract, which used the stewardship model. It identified that the contract administrators were administering the North West contract similarly to the Southern and North East contracts and not in line with the stewardship model's intent. Improved direction and training for the North West administrators, enabled State Roads to ensure the North West maintenance contract was administered as intended.
- 3.41 As the North West contract had only been in effect since June 2018, with the contract not due for renewal until mid-2022, State Roads was not yet able to review and compare the two different maintenance contract models. The review process will be an important tool in understanding the success of the new contract model. As such,

State Roads should regularly monitor and assess the models as information becomes available, such as through condition audits conducted on the Network.

- 3.42 The new contract model is not without risk. The risk relates to transition at the end of the contract and whether the tender process will be competitive or whether the incumbent will receive an advantage. For a stewardship type of contract, where more autonomy and information is held by the contractor, the incumbent's bid could potentially be better informed on the risks to the operation of the Network and allow the incumbent to more accurately price risk. Consequently, this could potentially result in the incumbent having an unfair advantage when tendering for a new contract. State Roads needs to consider how to mitigate this risk when developing a tender process for any future use of the stewardship model.

Value for money was embedded in tendering processes

- 3.43 State Roads tendering templates and processes incorporated Value for Money (VFM) as a metric for evaluating tender submissions in addition to the price. Including a VFM metric for tender evaluation required tenderers to consider how best to drive value through their responses and subsequently contract delivery.
- 3.44 The review of a sample of recent Requests for Tender showed the weighting of the metric of VFM ranged from 20% to 50%. The Department of Treasury and Finance procurement guidelines suggest that VFM should be weighted so that a substantial price difference is not overshadowed by non-price criteria. The evaluation criteria stated tenderers would be assessed on innovative methods proposed to achieve the end results or procedures that would directly deliver VFM outcomes. For example, included within the VFM assessment is how tenderers would minimise the time taken to complete upgrades and minimise public disruption. Depending on the scope of the tender, State Roads required information to be included on how the contractor would manage traffic and a plan outlining how the works would be undertaken to optimise travel.
- 3.45 In addition, request for tenders or proposals stipulated the evaluation process would be undertaken with the aim to rank proposals according to VFM. The design and weighting of the evaluation criteria enabled State Roads to ensure contracts were awarded using qualitative criteria that were not solely awarded on the basis of lowest cost.
- 3.46 Beyond procurement evaluation of VFM, State Roads established a standing offer contract¹¹ for minor work orders for road repairs and line marking. Standing offer

¹¹ Standing offer contracts are contractors who are pre-selected onto a panel. This allows State Roads to go to the panel for the services for a number of work orders. Contractors on the panel can respond quickly and provide competitive prices for the required works orders. A contract is formed under a standing offer each time State Roads purchases services under the panel arrangement.

contracts allowed services to be ordered from time-to-time as required from pre-qualified contractors. Standing offers also provided State Roads a right of refusal if the prices provided by the suppliers did not offer value for the given works order. The standing offer contract arrangement provided quicker response times and more competitive rates and assurance around volumes of work for suppliers with a standing offer contract.

3.47 State Roads monitors two key indicators pertaining to the awarding and processing of tender responses. These are shown below for the 2018 calendar year with their target and status in parentheses:

- Percentage response to tenderer's questions in the form of supplementary notices or advices within five working days of receipt. Target: 90-95% (100%)
- Percentage of contracts awarded that receive no complaints. Target: 90% (100%)

Both measures were exceeded suggesting a fair and efficient process.

3.48 Continuous improvement activities are important to ensure tendering processes are competitive and value driven. State Roads advised its intent to start auditing past tenders and projects to analyse the contract information obtained. This activity, if undertaken, would enable State Roads to implement beneficial continuous improvement initiatives and drive further value from its contracts.

Contracts were managed in accordance with construction industry norms

3.49 State Roads contract management is in line with industry practice through the use of a typical construction project organisational hierarchy and Austroad's national prequalification system. This ensured a contractor's expectations were met and provided State Roads with the ability to benchmark contract management against other road agencies across Australia.

3.50 Appropriate management of contracts is important to ensure realisation of value and successful delivery of projects and maintenance. State Roads contracts were managed through a typical construction project organisational hierarchy covering:

- Principal
- Superintendents
- Superintendent representatives
- Project managers
- Contract administrators.

In addition, State Roads implemented the national prequalification system developed by Austroads, which involved assessing contractors based on expertise, financial capacity and past performance.

- 3.51 State Roads employed a range of tools and mechanisms to monitor and manage contractors including KPIs, monthly reports, monthly meetings and performance reports to ensure maintenance and construction contractors were complying effectively with their contracts. The superintendent and their representatives were responsible for ensuring compliance with the contract and adequate and appropriate contractor performance and quality of services were provided.
- 3.52 To ensure monitoring of performance, maintenance contractors were required to comply with their KPIs as stipulated in the contract. To assess and verify compliance, State Roads used data collected in the information management system, feedback from inspections conducted and contractor self-reporting on the status of KPIs. All information obtained from the assessments and verifications of compliance were aggregated and reported within the monthly contractor report, communicating whether the contractor was providing quality services.
- 3.53 The reports were provided on a monthly basis alongside payment claims to the superintendent and based on information that demonstrated the contractor was conforming to the specified provisions in the contracts. Monthly reporting resulted in State Roads being informed of the progress and performance of contractors across the Network. A review of a sample of monthly reports for one maintenance contractor identified the contractor met all KPIs apart from data management where the contractor was only slightly below target, achieving 99.8% instead of 100%, indicating a satisfactory result.
- 3.54 On a monthly basis, State Roads superintendents and the contractors met to review performance against the contract. The meetings discussed and reviewed the works undertaken by the contractor including, but not limited to, minor works, workplace health and safety and monthly progress. At the completion of the meeting a register was developed, which detailed any requests for action on behalf of the contractor or State Roads outlining the status, due date and responsibility. The action point register, alongside KPIs, monthly reports and meetings provided State Roads with effective controls and assurance over contract management and performance. The monthly reports and meetings were an appropriate review period relative to the length of the maintenance contracts and typical for maintenance contracts in the transport industry.
- 3.55 To ensure the safety of contractors, audits on workplace health and safety are completed by an independent auditor on both maintenance and construction contracts. The scope of the audits include topics such as risk management, roles and responsibilities, traffic management, incident management and emergency management. The audits identify areas of non-compliance and improved opportunities for compliance. The audits also validate the contractor's performance pertaining to workplace health and safety KPIs. For one selected audit, while four non-compliance issues were identified, none were considered serious. The contract services team received and reviewed the audit and was to take action accordingly, but

we were not provided with any evidence as to whether the identified items were remedied.

- 3.56 In addition to managing safety, State Roads managed contract cost variations through the superintendent. The superintendent received variations to the contract when submitted by the contractor. If deemed appropriate by the superintendent following assessment, the cost variation would be accepted. To manage and deal with cost variations State Roads made a strategic decision to shift from a schedule of rates to lump sum payments. By shifting to lump sum payments, State Roads had better control over contract costs. This resulted in improved budget control as contractors needed to make a claim and be approved for unforeseen costs due to elements such as delays, loss of profit, or property acquisitions.
- 3.57 TSG's 2018 performance indicators included the following items with their target and status in parentheses that assessed managing contractor response times and work efficiency:
- Percentage reported emergency incidents on the Network responded to within prescribed timeframes. Target: 100% (93%).
 - Average time to clear road obstructions (excluding asset damage) after initial incident response. Target: 4 hours (1.45 hours).
 - Percentage of roadworks sites over advertised delay time. Target 0% (0%).
 - Number of safety complaints caused by maintenance activities on the Network Target: 0 (0).

While emergency response times were 7% below target, the other measures related to construction efficiency, showed good performance in more controlled environments. Closing the gap on emergency response times would likely be addressed through more flexible standby/on-call resource allocation, rather than more efficient execution at the site.

- 3.58 End of contract performance reporting was an important aspect of construction contract management to ensure the desired value and services were adequately managed and realised. At the completion of a contract, a performance report was generated in collaboration between State Roads and the contractor. The report assessed the contractor against a set of criteria and for each a score was derived based on the contractor's performance. The performance report could be used to evaluate future tenders, penalising or rewarding past performance in the awarding of new works. From reviewed evidence, we identified performance history was used as an evaluation criteria with the previous project manager being referenced to attest to performance.
- 3.59 Defect liability periods were enforced for completed contractor works, and rectification was managed through State Roads defect management system. This facilitated ongoing understanding for State Roads of the locations where defects were encountered, who was responsible and timelines for rectification. From the interviews undertaken for this audit, analysis of common defects and their locations was not

undertaken comprehensively by State Roads due to a lack of resources, capability, clear analysis procedure or process. By undertaking more comprehensive analysis of defect information, State Roads would become proactive in addressing Network defect issues through preventative actions taken by or in conjunction with contractors.

Corrective maintenance was actively managed

- 3.60 State Roads and its contractors actioned and managed defects through its defect management system effectively. This was done using a database maintained by State Roads. Corrective maintenance needs were identified and logged in the defect management system from:
- defects from maintenance contractor weekly inspections – these were logged by the observer, and could be completed in real-time while on site
 - road-user complaints (either through email or the Department's call centre) – these were logged and reviewed by State Roads prior to being raised as an incident for resolution.
- 3.61 Defects or complaints logged into the defect management system remained active until actioned and closed by the contractor. A representative from State Roads would then review the incident and verify completion.
- 3.62 State Roads was responsible for determining which defects or issues required immediate response and prioritised corrective maintenance and minor works with the contractors. State Roads identified defects and hazards through regular maintenance inspections undertaken in accordance with contractor obligations under the contracts. The contracts for the North East and South required the contractor to undertake either weekly or bi-weekly inspections based on the road categorisation. The contract for the North West region required inspection of high profile sites (Category 1 and 2) at least twice per week, and Category 3, 4 and 5 roads inspected once per week. Contractors were also required to undertake detailed night inspections twice every financial year.
- 3.63 State Roads maintenance team established a dashboard to monitor complaints, contractor resolution of defects and closeout of regular inspections. The dashboard also directly referenced contractor KPIs to allow for performance tracking. Contractor completion of inspections was reviewed at State Roads monthly maintenance meetings through a review of the dashboard with issues identified for resolution.
- 3.64 The level of reporting and frequency of interaction demonstrated effective oversight of the maintenance contract performance as it related to corrective maintenance. However, there was an opportunity to further improve efficiency through better insight driven from collected information in both the selection of treatments and intervention with contractors to fully meet performance targets.

Management of asset information was not fully integrated

- 3.65 A number of separate asset information systems were used to collect, store, manage, process and analyse information relating to the Network. An ideal asset information model would include an integrated asset register and interaction with other information systems to provide for effective planning and operational activities. This has not been fully developed by State Roads and therefore decision making was not based on a fully integrated management information system. State Roads advised it plans to procure or develop an Asset Management Information System and associated data management framework, systems and processes.
- 3.66 By having complete asset information, organisations are able to make informed decisions, provide stronger performance management of contractors and use more robust models for past, present and future forecasting.
- 3.67 State Roads used three primary systems to manage and inform asset data and analysis:
- Road Information Management System (RIMS)
 - Defects and complaints management system (Reflect)
 - Road maintenance forecasting tool (RoadWise).
- RIMS was the principal information repository for road data. It contained information on a number of Network elements, such as road categorisation, condition data and road speeds.
- 3.68 Reflect was a well-developed defect and remediation database into which maintenance contractor and road user defects were logged and tracked to repair. The defect management system provided State Roads and contractors with the ability to react and manage Network defects and complaints. In addition, this system was used to track contractor inspection programs, develop minor works requirements and monitor defects within the liability period for new projects.
- 3.69 As discussed previously, to forecast and plan for the future condition and work of the Network, State Roads employed RoadWise as a strategic road optimisation and forecasting tool. Using this custom software, preventative works (pavement and resurfacing) were forecasted over a defined timeframe based on a number of asset condition indices.

3.70 Information systems, their linkages and future possible links are shown in Table 6.

Table 6: State Roads Systems and Asset Data Summary

	RIMS	Reflect	RoadWise
Description	Information management system is where all data on roads is stored and maintained.	The system through which the Department managed road defects and complaints and deliver automated maintenance workflow.	A strategic forecasting tool developed by the Department to predict road function and capacity through condition indices and forecast pavement and surfacing renewals.
Contents	Road Asset Data Including: <ul style="list-style-type: none"> • Roads and bridges. • Bus Route Manager. • Crash Data Manager. • Traffic Statistics (redundant). • Environmental Module (redundant). • Forward Programs Module. 	Defects (Road and Asset): <ul style="list-style-type: none"> • Complaints (Requests). • Periodic inspection requirements. • Planned maintenance Works. • Work orders (Minor Works). • Data exporting tools. 	Asset condition index data <ul style="list-style-type: none"> • Input and prioritisation of budgets. • Prioritisation of assets (selectable) • Element/asset condition detail. • Annual pavement and surface works forecasting.
Key Uses	Storage of roads asset data. Bespoke Module development to service varied road needs. Exporting data for forecasting, planning and assessment against operational needs.	Automated reporting, management and closeout of defects and complaints. Ensuring attestation to contractual inspection requirements. Minor works for further planning.	Prioritisation of pavement rehabilitation and resurfacing. Forecasting of annual pavement and surfacing works. Detailed analysis of asset condition against various indices.

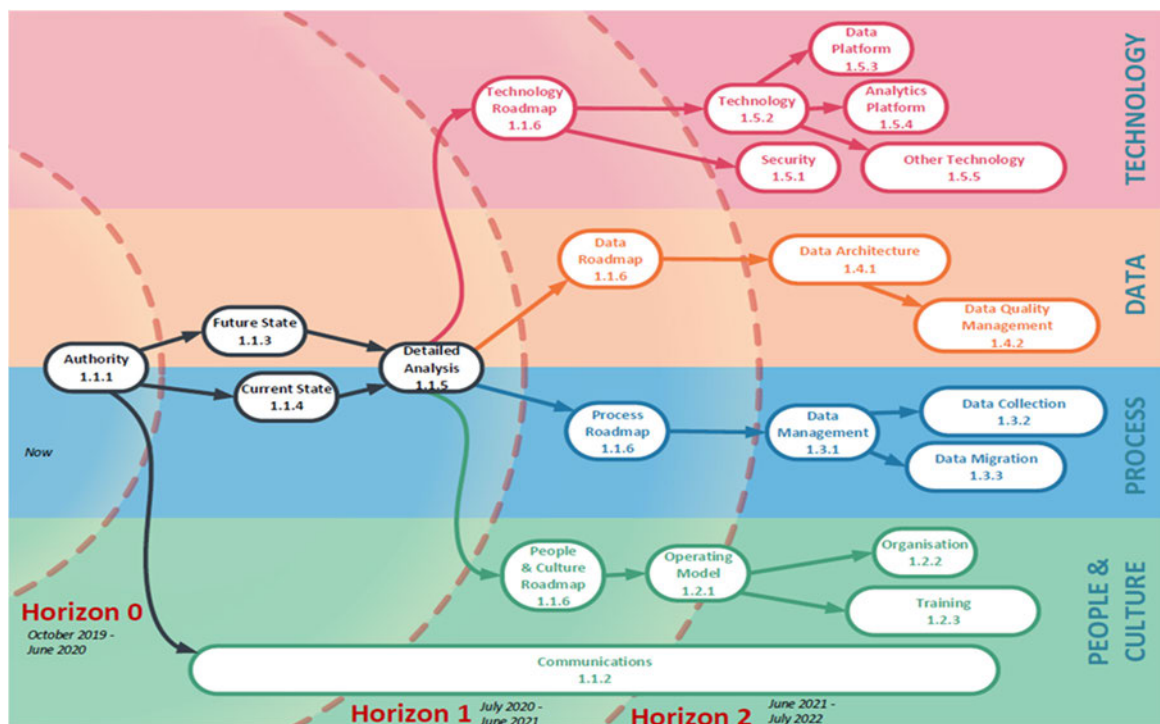
	RIMS	Reflect	RoadWise
Key Deficiencies	<p>Information Management System only.</p> <p>Representations and analysis of data external to system.</p> <p>Data reliability and currency.</p> <p>Data analysis capability.</p>	<p>Exporting to alternative system required for analysis against KPIs.</p> <p>Onerous inspection requirements to validate claims.</p> <p>Data not used to inform RoadWise forecasts.</p> <p>Manual Complaint Management Process.</p>	<p>Road pavement and surface analysis and forecast only.</p> <p>Reliant on three-yearly ARRB data.</p> <p>Periodic and Routine Maintenance works are not included regularly.</p> <p>Extensive field validation.</p> <p>Local knowledge based treatment criteria and intervention levels.</p>
Links to Systems/ Processes (Existing and possible)	<p><u>Existing</u> – storage database for data generated in other systems. Condition data receipt and delivery.</p> <p><u>Possible</u> – Visualisation/analysis tool for data — Geographic Information System, Asset Management System, artificial intelligence and insights. Further Network attributes held and linked.</p>	<p><u>Existing</u> – Power BI dashboard for analysis against KPIs. Contractor systems for maintenance response. EIP input.</p> <p><u>Possible</u> – Linkage to RoadWise for improved forecasts. Smart forecasting system to improve Network planning.</p>	<p><u>Existing</u> – Insights in Asset Management Plans. Elective Investment Prioritisation input.</p> <p><u>Possible</u> – Periodic/ routine maintenance program data input. Validation exercise could be combined with inspection program. Wider asset planning.</p>

Source: Department of State Growth, TAO

- 3.71 Each of these data management systems delivered the above functions and had been procured to service a particular need. There was an opportunity for more value to be realised from the data held through greater integration between the systems. For example, validation of results from the road forecasting tool was required between years where road condition surveys were undertaken. Instead, this could be combined with the annual road inspection program logged in the defect management system to avoid duplication of tasks and improved efficiency for State Roads. EIP was also used to ensure there was no duplication across spending. In addition, as RIMS was purely used for information storage any insights to be gained from this data necessitated exporting to an external system for specific analysis.

- 3.72 Further, as the defect management system was not linked to the historical road information, it did not deliver an understanding of repeated defects against a specific asset. Incidents were raised on the Network in isolation and only linked to a particular length of road. As a result, some assets suffered from repeated failures and preventative maintenance only occurred when a member of the Maintenance Services Team noticed a trend of repeated failure. This meant preventative intervention works may not have been targeted appropriately to manage repeated failures and costs may have been duplicated to respond to issues that were symptoms of some other problem such as damaged drainage. State Roads had a KPI target of no overdue items per month. Off target remediation measures noted for this KPI were to continue manual monitoring of, and initiate actions in response to, trends identified. A more integrated and automated process would likely help in this remediation through more efficient selection of intervention level and informed contractor management.
- 3.73 State Roads acknowledged the need for a more integrated and managed approach to the use of information. We noted State Roads did not have a data governance strategy in place to set parameters around management of data such as data collection, quality, use and storage. State Roads acknowledged this and recognised better data and information governance was required. Like many organisations, State Roads data management had grown organically over time and data was often siloed and did not provide for integration between systems and branches. In October 2019, State Roads commenced a data governance project to improve its data policies and processes. The project was to determine best practice in effectively collecting, storing, maintaining and sharing data. The project is to run over two to three years and is intended to shift State Roads to a data driven agency, where decisions were backed by data and supported by a governance structure to ensure the integrity of the information. The scope of the governance project is illustrated in Figure 14.

Figure 14: State Roads data governance project high level roadmap



Source: Department of State Growth

- 3.74 Figure 14 shows how the project will be delivered across four streams; technology, data, process and people and culture. The project was in the first stage (Horizon 0) where it was to identify the current and future state and undertake detailed analysis. In all, three horizons were developed, with Horizon 0 running from October 2019 until June 2020, Horizon 1 from July 2020 to June 2021 and Horizon 2 from June 2021 until July 2022.
- 3.75 Upon completion of all of the activities identified above, State Roads expects to become a more data driven organisation, enabling it to continually leverage data to inform its decisions, leading to better outcomes.
- 3.76 The lack of interconnectedness across State Roads systems meant decisions regarding the Network were made without the benefit of a fully integrated information management system. Interactions between preventative, corrective maintenance and capital project delivery was also insufficient to ensure there was no overlap in effort. There was the risk State Roads was not adequately prioritising or selecting assets which required maintenance or development, and inefficiently spending additional limited funds on unnecessary responses. Methods to mitigate this were manual through program review and inspections, the need for which would be significantly reduced if system integration was improved, resulting in improved efficiencies across the division and better allocation and prioritisation of work. It is important for State Roads to continue with the data governance project to improve data management and integration between systems.

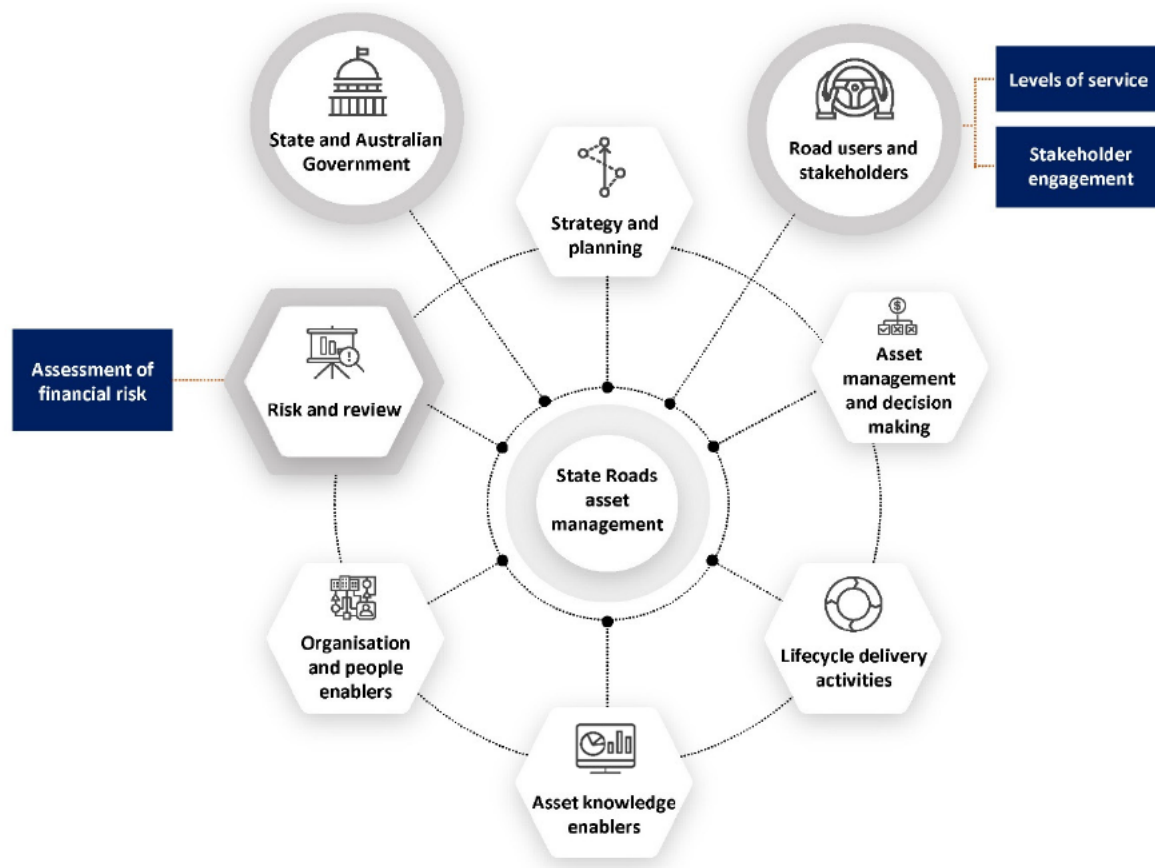
4. Were risks impacting the Network and stakeholder expectations managed effectively?

In this Chapter, we assess how State Roads:

- identifies, assesses and controls the Network's physical and financial risks
- monitors, understands and delivers the LoS determined by the Government
- engages with stakeholders.

The focus areas of this Chapter are illustrated in Figure 15 below.

Figure 15: Chapter focus areas



Source: TAO

Chapter summary

State Roads was not fully managing its risks as it had not integrated risk identification and mitigation as well as it could have. It was improving its understanding of risks to LoS across the Network, which was supported by effective stakeholder engagement.

While State Roads followed industry standards with regards to the implementation, management, monitoring and control of asset risks there were gaps in the relationship between the road asset management risk register and financial risk and project services risk registers. These gaps, or missing links, were related to the strategic overview, management and mitigation of identified risks. However, State Roads effective management of contract risk enabled it to maintain strategic oversight over contractors' viability to supply services to the Network.

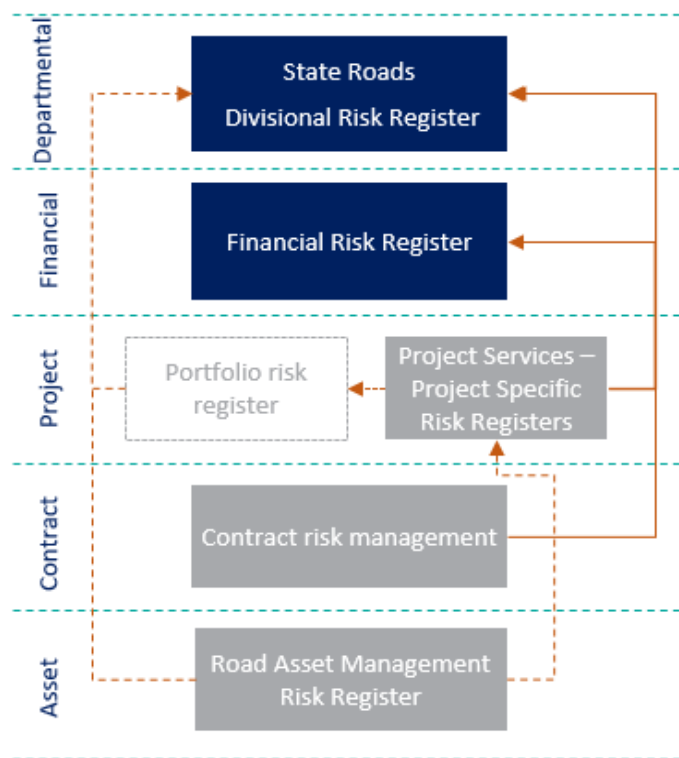
In order to track the performance of the Network, monitoring and reporting of KPIs was undertaken regularly. State Roads had both a LoS framework and a performance management framework but the link between these frameworks was not strong. This meant reporting of performance measures did not provide clear assurance the Network was delivering acceptable community LoS.

State Roads used a variety of tools to engage with key stakeholders including online platforms, call centres and engagement plans. The use of online platforms allowed State Roads to regularly update road users on planned road disruptions. We identified stakeholder engagement as being reasonably effective.

State Roads risk management processes required better integration

- 4.1 State Roads adopted the appropriate Australian Standard for its risk management approach but there was not a strong alignment between the different risk registers, which prevented effective oversight of risk across State Roads. GFMAM defines risk assessment and management as one of the key components within asset management. It defines a clear process for risk management that includes: policy development, procedure development, process execution, and crucially, alignment of risks across strategic, tactical, and operational registers. State Roads executed this to varying degrees but it was too siloed with many of the risk registers not adequately connected. It also failed to ensure the different risk components were reviewed at a strategic level to gain a complete picture of risk across all of State Roads.
- 4.2 The departmental risk register, which outlined a number of high-level risks including strategy and resource misalignment, stakeholder management and fraud was not linked to State Roads operational risk registers. This meant systemic project risks that may have been managed and controlled at the project level were not addressed at the departmental level. Figure 16 shows the relationship between all risks managed and monitored throughout State Roads with areas of potential improvement.

Figure 16: Summary of risk across State Roads and links between risks



Source: TAO

- 4.3 The dotted lines in Figure 16 show where the links between each area of risk were lacking and could be improved, particularly relating to links between the road asset management risk register and the financial, project services and divisional risk registers. Alignment from operational to strategic risks was seen at the project, contract and financial level. Project and contract risks were translated up into the departmental risk register, as represented by the solid lines in Figure 16. This translation of risks demonstrated State Roads aligned project specific risks into high-level risks such as program delivery or contractor management. Additionally, operational project risks were rolled up into the financial risk register to ensure there was oversight over individual project delivery.
- 4.4 To manage financial risks, State Roads maintained a budget register which was reported to the Department's Executive on a monthly basis. We reviewed the financial data for each project to assess cash flow for the project portfolio. This provided State Roads with oversight of budget risks in relation to the capital investment program and allowed it to flag any areas that required extra contingency.

Asset specific risks were identified and monitored but the evaluation of risks and frequency of review could be improved

- 4.5 Asset specific risk registers were produced by State Roads as part of the AMP development. High-level risks were raised during the development workshops for specific AMPs and were recorded within the risk registers. Risk registers had been created for road infrastructure, traffic signals, emergency and major structures. This ensured risks were delineated based on the asset and asset specific risks could be identified and monitored.
- 4.6 Within the risk registers, risk controls included a definition of preventative, preparation, response and recovery controls. This categorisation was typical of emergency and disaster risk management procedures. However, within an engineering or asset context, organisations would typically use a different hierarchy of control, being: elimination, substitution, engineering, administrative, and personal protective equipment. In some circumstances, the asset and engineering hierarchy of control could allow for more specific definition of controls and management of risk and allow for some risks to be progressively eliminated by State Roads, reducing its risk burden.
- 4.7 There was no formal policy within State Roads requiring management to undertake an annual review of the asset specific risk registers. Asset specific risk registers were proposed to be reviewed and updated annually in accordance with the AMPs but there was no evidence this was being done. Consequently, these risks may not be regularly reviewed or mitigations actively controlled, resulting in reactive management increasing the potential exposure to risks.
- 4.8 Evaluation of risks was not clear. The risk register in the State Roads AMP provided a high-level overview of identified asset risks. However, it did not have an assessment of consequences arising from those risks. For example, clearer action plans could eliminate and control risks and ensure better responsiveness when risks were realised. While not in the scope of this audit, we noted major structures followed an alternative procedure of condition assessment and failure rating assessment. Improving the commonality of approach between asset types would benefit State Roads risk management approach.
- 4.9 The Australian Standard AS/NZ ISO31000 *Risk Management Principles and Guidelines* (ISO31000) notes regular review is critical to understanding whether controls are effective in design and operation and risks are responsive to changing contexts and lessons learned. Risk treatment plans did not link clearly to performance measures. Risks associated with asset classes should be reviewed on a consistent basis, at least annually, to ensure State Roads is proactively responsive to risks.

Contract risks were managed effectively by State Roads

- 4.10 Active and operational contract risk management was important in ensuring the awarded contractor delivered required services with minimal impact to road users. Contract risk was managed and monitored through the national prequalification system and audits of the financial viability of contractors. Annually, an independent advisor undertook financial audits on State Roads list of prequalified contractors assessing revenue and profitability and key financial indicators.
- 4.11 Subsequent to financial audits, State Roads mitigated financial risk through review meetings with contractors, who were required to provide formal statements and supporting documentation to the Principal to demonstrate financial viability.
- 4.12 Contract financial risk management enabled State Roads to have strategic oversight over whether contractors were still able to supply services to the Network.

State Roads actively managed project risks, but could strengthen its risk review across the portfolio of projects

- 4.13 The project risk management framework developed in 2014, was based on ISO31000 and operated to provide a clear process of managing and mitigating risks associated with the capital investment program.
- 4.14 Project risks were identified, assessed and controlled through risk registers. Project managers were responsible for the management of risks associated with project delivery. From a review of a sample of project risk registers, we noted they were specific to the project and were regularly reviewed and monitored to ensure an adequate mitigation of risk. Identified risks had project specific treatment plans based on the inherent risk with controls to achieve the residual risk. The project risk registers were completed and reviewed by project managers on a continual basis within the project lifecycle, with risks being classified as either resolved or ongoing.
- 4.15 While project risk registers were actively managed and some key project risks identified, operational documented risks were generally not reviewed across the capital investment program. This meant systemic project risks were managed and controlled by a number of individuals at the project level instead of being addressed at a departmental level. A lack of review of project risks at the portfolio level may result in State Roads limiting its ability to effectively plan and address consistent project risks across its capital investment program.

State Roads monitored performance of the Network, however the measures used did not adequately link to Levels of Service

- 4.16 The misalignment between the performance and LoS frameworks limited the ability of State Roads to demonstrate value to stakeholders and to align and prioritise efforts. Subsequently, State Roads limited its ability to continuously improve, or decisively react to issues that may have a bearing on achievement of its targets and efficiency.
- 4.17 Service-level specifications and performance measures were an important tool in monitoring the performance of the Network. State Roads monitored Network performance through the performance management framework, which had five key focus areas:
- customer service
 - road safety
 - transport access
 - transport efficiency
 - visitor experience.
- 4.18 The performance management framework contained 71 measures that were monitored and reported against. Considering the breadth of State Roads responsibility, we consider the number of measures not to be excessive but we did observe certain areas were over-represented relative to others (e.g. social media seemed overweight compared to others). In 2018, State Roads undertook its first assessment of these performance indicators. In several areas State Roads was not yet achieving its intended targets. Advice from State Roads was that the targets set were designed to be ambitious but achievable in the medium to long-term. We acknowledge this was the first report on the performance measure framework and State Roads should continue with this improvement initiative through targeted remediation programs to address shortfalls, as well as adjusting targets from aspirational to achievable. By undertaking reports on the performance management framework, State Roads will be able to benchmark against other road agencies and support continuous improvement in its service delivery.
- 4.19 While there were some obvious implicit links from the LoS to the performance management framework, such as safety, in all cases the link was not explicit. As discussed earlier, State Roads had developed its LoS framework, which covered four key areas: function, safety, capacity and condition. Without a link from State Roads performance measures to either the technical or customer measures in the LoS it will remain objectively uncertain if the desired LoS was being achieved. Similarly the programs, projects and effort put towards meeting LoS, regardless of target, remain comparatively unmeasurable and indefensible. State Roads recognised a clear link from the customer LoS, to technical LoS, to KPIs was not well articulated.

State Roads was improving its understanding of Levels of Service

- 4.20 To ensure LoS provide a demonstrable link between community expectations and technical measures, State Roads engaged a consultant to run a pilot program for review and update of its LoS framework. The pilot scope focused on the customer service outcome of safety. The performance measures developed within the pilot showed strategic alignment to the Government's *Towards Zero* strategy. The key directions outlined within the strategy had been translated into performance measures within the LoS framework. For example, for safe speeds, a technical performance measure developed was the percentage of the Network assessed for safe and appropriate speeds, demonstrating clear alignment between Government objectives and comparative performance measures. By improving and establishing new technical and community performance measures, State Roads had the ability to benchmark and determine whether the Network was delivering acceptable LoS within criteria important to the community. The pilot provided better differentiation between customer and technical LoS to enable additional monitoring of more appropriate performance measures. Further, aligning LoS to Government objectives gave State Roads the capability to monitor and ensure activities were directed towards achieving objectives and were providing acceptable LoS.
- 4.21 It will be important for State Roads to build on this pilot and we acknowledge all the customer services outcomes were yet to be completed. As such, we could not assess function, capacity and condition, but similar improvements as seen with safety, discussed earlier, should be expected.
- 4.22 The review of the LoS framework will provide State Roads with better use and integration of performance measures and help provide assurance across the Network that it is delivering appropriate LoS. In addition, by having aligned performance measures, State Roads will improve metrics to quantify its investment prioritisation. This would provide State Roads with standard metrics to be implemented throughout its asset management activities. A well-articulated and defined LoS that has been created through community consultation, and is regularly reviewed, could also ensure levels are appropriately set and justify the size of investment and effort allocated to achieve them.

State Roads adequately engaged with stakeholders

- 4.23 Stakeholder engagement is an important process to ensure State Roads manages the Network effectively and reliably. State Roads engaged a number of stakeholders including the community, road users and transport bodies.
- 4.24 State Roads engaged with the community and road users through three different interfaces:
- Round-up of current roadwork's located on the Department's website

- call centre for the community to call about defects and any issues with the Network
 - social media.
- 4.25 The three different interfaces ensured there was clear articulation of the current projects and works currently being undertaken on the Network. Additionally, having three different platforms provided State Roads with the ability to communicate with a range of differing demographics and gave it the ability to receive and resolve complaints or issues received from the community. A significant portion of the State Roads performance framework related to communication, with seven measures directly measuring the speed, level and satisfaction with communication to road users, the community and government.
- 4.26 Based on the stakeholder engagement undertaken during this audit, the relevant individuals interviewed felt they had adequate engagement with State Roads. Stakeholders were asked about the frequency of interaction, the types of interaction, the level of engagement and their satisfaction. The feedback was that State Roads actively engaged and communicated with transport bodies by holding periodic meetings throughout the year. Prior to community consultations, officers from State Roads ensured they engaged and communicated with the relevant transport body. For larger projects or immediate Network issues, State Roads would engage more frequently with the relevant transport body to ensure the relevant bodies remained informed and across all consultations.
- 4.27 The Hobart City Council, a key stakeholder that had two of its major thoroughfares, Davey and Macquarie streets, transferred to the Department's control during 2018-19, was satisfied with the level of engagement undertaken in comparison with other State agencies. Staff from the Council held regular consultations with both the Road Network Planning team and the Deputy Secretary Transport Services. These discussions focused on the Network, Hobart City Council's own road network and other important State projects and developments.
- 4.28 For stakeholders involved or affected by a project, State Roads followed a defined stakeholder engagement framework. This framework outlined the processes required to be followed to ensure relevant stakeholders within a project were informed and engaged early. The community and stakeholder engagement plan detailed the background to the project, how engagement would be managed, outlined the key stakeholders and activities to be undertaken and any issues associated with those stakeholders. The process provided for consistent and coordinated activities across projects and State Roads.
- 4.29 While State Roads communicated to relevant stakeholders, it acknowledged there was an intention to improve communication. From the review of the Road AMP, State Roads noted consultation with the community had yet to be conducted on customer service levels, in particular relating to expectations and service level satisfaction. Improving consultation with stakeholders would enable better identification and integration of stakeholder priorities and expectations into strategic planning and LoS.

- 4.30 Social media was used by State Roads to instantaneously communicate with road users. It provided State Roads with a platform to continually update the public on information such as where there were road closures or works being undertaken. Discussions with stakeholders from transport organisations supported the view State Roads was undertaking satisfactory engagement with relevant stakeholders.

Acronyms and abbreviations

AMP	Asset Management Plan
Audit Act	<i>Audit Act 2008</i>
Department	Department of State Growth
EIP	Elective Investment Program
GFMAM	Global Forum on Maintenance and Asset Management
ISO31000	Australian Standard AS/NZ ISO31000:2009 Risk management principles and guidelines
km	Kilometres
KPI	Key Performance Indicator
LoS	Level of Service
Minister	Minister for Infrastructure and Transport
Network	State road network, managed by the Department of State Growth
Program	<i>Roads for our future</i> program
Road AMP	Road Asset Management Plan (2018)
Road AMP (2020)	Updated 2018 Road AMP – yet to be released
Strategic AMP	Strategic Asset Management Plan
State Roads	State Road Division within the Transport Services Group of the Department of State Growth
TSG	Transport Services Group
VFM	Value for Money

Appendix 1: Alignment of Government objectives and strategies to State Roads functions and activities

Objective	Strategies	State Roads functions/activities
Infrastructure Service Policy		
Road infrastructure and services that are as safe as reasonably possible	<ul style="list-style-type: none"> Reducing the level of risk exposure for road users. Reducing the severity of consequences of driver errors. Supporting the implementation of the <i>Road Safety Strategy</i>. 	<ul style="list-style-type: none"> Applying Safe System approach to the road network in road upgrade projects.
Road infrastructure and services that support economic growth	<ul style="list-style-type: none"> Providing well defined freight vehicle access networks and policies that are responsive to the needs of industry customers. Maintaining high levels of travel time reliability and ride quality on major freight networks. Planning, designing and providing fit-for-purpose road infrastructure to meet levels of service for all road users that the community can afford. Pursuing innovative opportunities to increase freight transport productivity while providing for any associated increase in infrastructure costs. 	<ul style="list-style-type: none"> Network Access team works with Asset Manager in identifying and removing network constraints. Regular audits of ride quality measures (condition) on the network and appropriate prioritisation of funding. Considering options for cost sharing in new freight routes, which may then provide broader economic development potential for the community. Considering options for monitoring rather than upgrades unless necessary.

Objective	Strategies	State Roads functions/activities
Road infrastructure and services that enhance the travelling experience	<ul style="list-style-type: none"> • Providing a customer charter, including the levels of service customers and visitors should expect. • Making sure litter collection and vegetation management are maintained to a high standard on important visitor routes. • Proactively providing road information to road users, including safety and directional signage. • Making sure roadsides are kept free of distracting advertising material. • Promoting and enabling access to significant points of interest for tourist visitors. 	<ul style="list-style-type: none"> • Reflected in maintenance contracts, associated KPIs and maintenance database. • Reflected in maintenance contracts, associated KPIs and maintenance database. • Dedicated stakeholder engagement team and framework. • Maintenance contractors undertake regular sweeps of the Network to remove signs.
Infrastructure Asset Management Policy		
Strong governance and accountability	<ul style="list-style-type: none"> • Demonstrating to owners, customers and stakeholders that services are being delivered effectively and efficiently. • Providing a transparent and auditable basis for making service/risk/price trade-off decisions. • Improving accountability for use of resources through performance and financial indicators. • Providing the ability to benchmark results against similar organisations. 	<ul style="list-style-type: none"> • Customer service framework • Preparation of asset management plans using a suite of templates and plans that incorporate appropriate international standards (ISO55000). • Use of KPIs. • Measurement of cost to deliver services through asset management plans and other reporting (<i>State of Our Roads</i>).

Objective	Strategies	State Roads functions/activities
More sustainable decisions	<ul style="list-style-type: none"> Considering all viable options (including demand management) and all aspects of decisions. Ensuring all lifecycle costs are included in decision processes so that the emphasis is on sustainable efficiencies not unsustainable short-term gains. 	<ul style="list-style-type: none"> Option analysis is undertaken as well as strategic cost benefit assessments in solution planning. Incorporating lifecycle costs into project development.
Enhanced customer service	<ul style="list-style-type: none"> Improved understanding of service requirements and options Improved performance and control of service delivery to the required standards. 	<ul style="list-style-type: none"> Customer feedback. Stakeholder engagement in project planning development and delivery. Use of service-level framework.
Effective risk management	<ul style="list-style-type: none"> Understanding the risks related to asset management and service delivery and applying a framework to prioritise risk management. Applying business continuity practices. Addressing the inter-relationships between different networks. 	<ul style="list-style-type: none"> Risk management built into contracts, contract meetings to regularly check in and monitor. Business continuity planning as part of emergency management as well as agency business continuity planning – this is regularly reviewed and updated as things change e.g. potential for shortages of qualified personnel/physical resources within the state during COVID-19. Regular contact with councils and other entities, particularly through heavy vehicle network contacts.

Objective	Strategies	State Roads functions/activities
Improved financial efficiency	<ul style="list-style-type: none"> • Improved decision making based on costs and benefits of alternatives. • Prioritisation of investments, interventions and asset care activities. • Justification for forward works program and funding requirements • Recognition of all costs of owning/operating assets over the lifecycle of the assets. • Selecting the most effective procurement method. • Benchmarking condition and performance to promote innovation and efficiency. 	<ul style="list-style-type: none"> • Consideration of a variety of treatment options for periodic maintenance. • Candidate projects developed using data on condition and performance. • Information provided for Elective Investment Program and Project Proposal Reports which details reasons works are required and the implications of not doing works. • Programing and delivery includes procurement strategy development. • Asset condition is reported and recorded – looking at ways to improve the efficiency of this e.g. using technology to record line marking condition to assist with developing prioritised program.

Source: Department of State Growth

Audit mandate and standards applied

Mandate

Section 23 of the *Audit Act 2008* states that:

- (1) The Auditor-General may at any time carry out an examination or investigation for one or more of the following purposes:
 - (a) examining the accounting and financial management information systems of the Treasurer, a State entity or a subsidiary of a State entity to determine their effectiveness in achieving or monitoring program results;
 - (b) investigating any matter relating to the accounts of the Treasurer, a State entity or a subsidiary of a State entity;
 - (c) investigating any matter relating to public money or other money, or to public property or other property;
 - (d) examining the compliance of a State entity or a subsidiary of a State entity with written laws or its own internal policies;
 - (e) examining the efficiency, effectiveness and economy of a State entity, a number of State entities, a part of a State entity or a subsidiary of a State entity;
 - (f) examining the efficiency, effectiveness and economy with which a related entity of a State entity performs functions –
 - (i) on behalf of the State entity; or
 - (ii) in partnership or jointly with the State entity; or
 - (iii) as the delegate or agent of the State entity;
 - (g) examining the performance and exercise of the Employer's functions and powers under the *State Service Act 2000*.
- (2) Any examination or investigation carried out by the Auditor-General under subsection (1) is to be carried out in accordance with the powers of this Act

Standards Applied

Section 31 specifies that:

'The Auditor-General is to perform the audits required by this or any other Act in such a manner as the Auditor-General thinks fit having regard to -

- (a) the character and effectiveness of the internal control and internal audit of the relevant State entity or audited subsidiary of a State entity; and
- (b) the Australian Auditing and Assurance Standards.'

The auditing standards referred to are Australian Auditing Standards as issued by the Australian Auditing and Assurance Standards Board.



Phone (03) 6173 0900
Fax (03) 6173 0999
Email admin@audit.tas.gov.au

Launceston Office

Phone (03) 6173 0971
Web www.audit.tas.gov.au

*Front cover image: Bass Highway near Burnie.
Courtesy of State Roads*

Address Level 8, 144 Macquarie Street
Hobart, 7000
Postal GPO Box 851, Hobart 7001

Address 4th Floor, Henty House
1 Civic Square, Launceston