
NZ Transport Agency

State Highway Safe

Network Activity Manual



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State Highway Safe Network Activity Manual– SP/M/002

PURPOSE

The purpose of the State Highway State Highway Safe Network Activity Manual is to provide advice and best practice guidance to network safety managers and road safety practitioners working on New Zealand Roads in terms of road safety. This Manual systematically takes into account road safety issues in the management and operation of the State Highway Network and can be used as a reference guide for other Road Control Authorities. The Manual references key activities for road safety, references for the Network Outcomes Contract, the NZ Transport Agency’s safety team deliverables and description of activities, policies, standards, guidelines, specifications and standard contract documents that the user can refer to and the benefits of undertaking those activities.

Note, this Manual is a guide for best practice, however it contains information on whether you are legally required (whether by legislation or contract) to do an activity in terms of road safety. These legal requirements contain the phrases ‘must’, ‘shall’ or ‘will’. The documents that provide additional information on those legal requirements are noted.

The key users of the guide are likely to be:

- Transport Agency Safety Staff
- Transport Agency Network Performance team
- Road Controlling Authorities
- Network Maintenance Contractors and Consultants

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Manual Sponsor	Manager Network Operations

AMENDMENT AND REVIEW STRATEGY

All correction action or improvement requests will be acknowledged by the Manual owner and reviewed on an annual basis for consideration.

DISTRIBUTION

Copies of this Manual can be found at www.nzta.govt.nz

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GLOSSARY

AA	Automobile Association
ACC	Accident Compensation Corporation
AO	Approved Organisation
Austrroads	National Association of Australian Road Authorities
Barrier	An obstruction placed to prevent vehicle access into a particular area
CAS	The New Zealand Transport Agency’s Crash Analysis System
CIMS	Co-ordinated Incident Management System
Contractor	Both contractor and consultant in terms of the Network Outcomes Contract
CoPTTM	Code of Practice for Temporary Traffic Management
HNO	The NZ Transport Agency’s Highway and Network Operations Group
HRIG	The NZ Transport Agency’s High Risk Intersection Guide
HRRRG	The NZ Transport Agency’s High Risk Rural Roads Guide
KAT	The NZ Transport Agency’s KiwiRAP Assessment Tool
KiwiRAP	The New Zealand joint agency Road Assessment Programme
may	Can do
MMP	The NZ Transport Agency’s Network Outcomes Contract Maintenance Management Plan
MoT	Ministry of Transport
must	Legally required (whether under contract or law) to do something – same meaning as ‘shall’ and ‘will’
Network Outcomes Contract	Network Outcomes Contracts are a new approach to maintenance and operations to ensure improved efficiency and effectiveness through better asset management and service delivery. These contracts are awarded to primary suppliers and are performance-based.
NZTA	New Zealand Transport Agency
OPM’s	Operational Performance Measures
RAMM	Road Asset Maintenance and Management system
RMP	The NZ Transport Agency’s Network Outcomes Contract Risk Management Plan
RP & P	Regional Partnerships and Programmes
RTA	Road Transport Association
SafetyNET	SafetyNET ¹ is an online interactive road safety tool that assists in identifying those high risk parts of the State Highway network and help to target investigations and investments to risk
Safe System	A safe system endeavours to minimise errors and to reduce the severity of crashes when errors occur.
SCRIM	Sideway-force Coefficient Routine Investigation Machine
shall	Legally required (whether under contract or law) to do something – same meaning as ‘must’ and ‘will’
SHAMM	The NZ Transport Agency’s State Highway Asset Management Manual
SHAMP	State Highway Asset Management Plan

¹ Developed by Abley Consultants for the New Zealand Transport Agency

SHCM	The NZ Transport Agency’s State Highway Control Manual
SHGDM	The NZ Transport Agency’s State Highway Geometric Design Manual
should	Indicates best practice guidance
SMP	The NZ Transport Agency’s Safety Management Plan
TA	Territorial Authority
The Principal	The Principal is <i>The NZ Transport Agency (NZTA)</i> , a Crown entity, established on 1 August 2008 by Section 93 of the Land Transport Management Act 2003
The Transport Agency	New Zealand Transport Agency
TMP	Temporary Traffic Management Plan
Vulnerable road users	Includes motorcyclists, pedestrians, cyclists, mopeds, wheel chairs
will	Legally required (whether under contract or law) to do something same meaning as ‘must’ and ‘shall’

DRAFT

1 Introduction

This Manual, the *State Highway Safe Network Activity Manual* supersedes the *Transit State Highway Safety Management System Manual Edition 4 – March 2007*.

1.1 Scope and key components

The State Highway State Highway Safe Network Activity Manual:

- Describes how the New Zealand Transport Agency (the Transport Agency) systematically takes into account road safety issues in the management and operation of the State Highway network;
- Will provide information on a number of activities and includes any requirements and associated references within the Network Outcomes Contract (NOC), a higher level of detail, detailing a description of the activity and references to legislation, standards and guidelines specifications and standard contract documents that the user can refer to;
- Will not provide detailed operational specifications. This information can be found within the Transport Agency’s NOC’s and other specifications and a developed road safety plan; and
- Allows the network managers to produce a safety management plan which is a requirement of the NOC (Section 2.5 of this document).

The key components of the State Highway Safe Network Activity Manual comprises operation and delivery, management and evaluation, review and improvements that aims to achieve the vision of the Government Safer Journeys Strategy 2020 by delivering the key outcomes as illustrated in figure 1-1.

Figure 1-1: Safe Network Activity Management Manual Components



The information provided in this Manual is influenced by, and influences other documents and planning supporting the Transport Agency's objective to build, maintain and operate the State Highway system.

1.2 Key Users

The key users of this guide are likely to be:

- Transport Agency Safety Staff
- Transport Agency Network Performance team
- Road Controlling Authorities
- Network Maintenance Contractors and Consultants.

1.3 Benefits

The benefits from using the State Highway State Highway Safe Network Activity Manual will include:

- Providing an auditable framework for achieving the Transport Agency's safety objectives and measuring safety performance
- Providing a repository of road safety knowledge and expertise
- Improving consistency in the implementation of road safety procedures; thereby enabling review, audit, and development of road safety procedures and policies
- Providing an induction training aid for new contracts and staff
- Providing a useful communication aid
- Helping to provide improved safety for all road users.

1.4 Legal Requirements

Note, this Manual is a guide for best practice, however it contains information on whether you are legally required (whether by legislation or contract) to do an activity in terms of road safety. These legal requirements contain the phrases 'must', 'shall' or 'will'. The documents that provide additional information on those legal requirements are noted.

1.5 Engineering judgement

The information included in this Manual is based on numerous references, information on contractual obligations, and the application of activities and responsibilities of various road safety partners. The user of this document still needs to apply sound engineering judgement in the application of any activities or countermeasures considered. If necessary, seek professional advice from other practitioners specialising in road safety engineering.

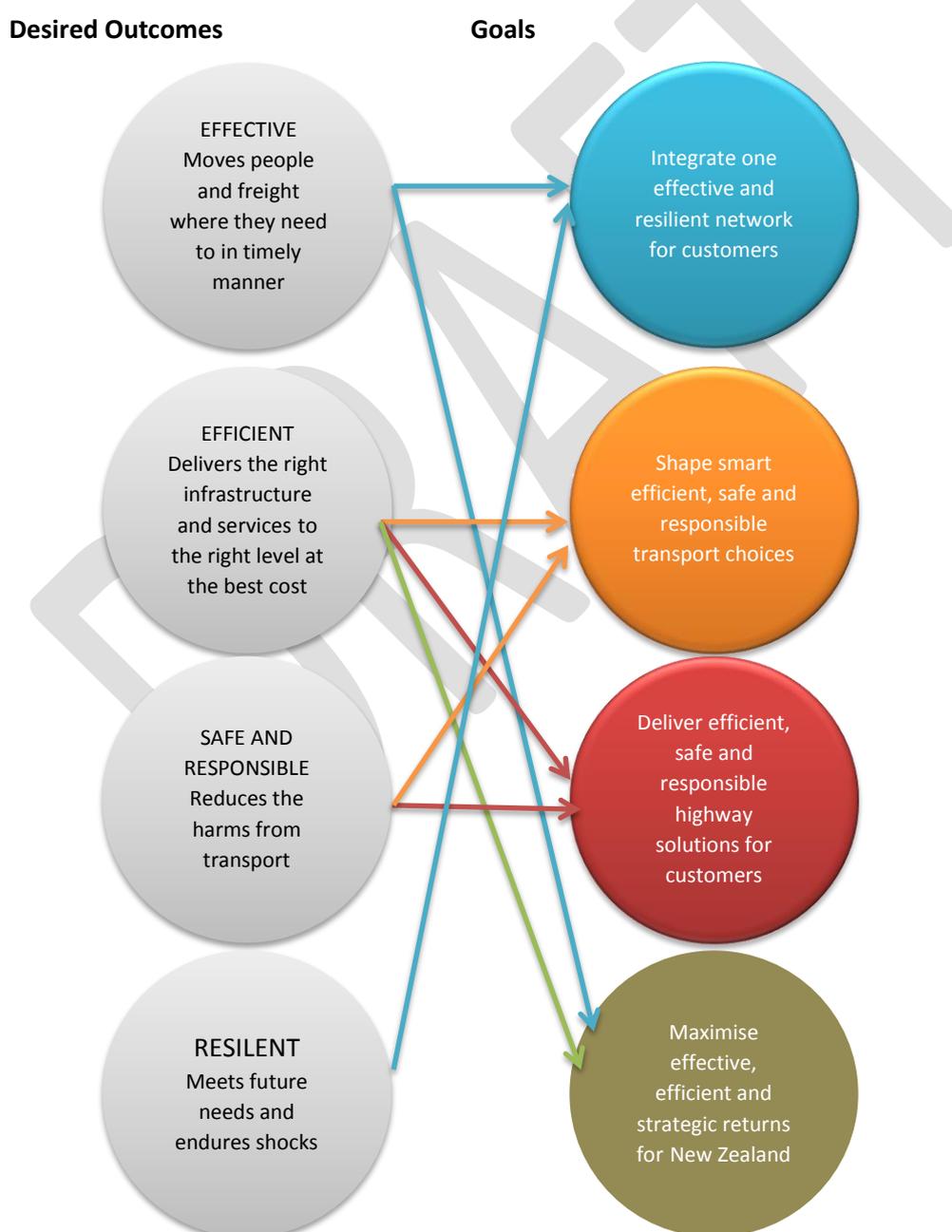
2 Context

2.1 The Transport Agency

2.1.1 Role

The Transport Agency’s role is in improving New Zealand’s land transport system. It extends from planning and investment activities, supporting public transport, building the networks that connect communities, to ensuring that people and vehicles that use the system are safe to do so. A number of desired outcomes and long term goals as identified within the Transport Agency’s Statement of Intent (SOI) are illustrated in figure 2-1.

Figure 2-1: The Transport Agency's Desired Outcomes and Long Term Goals



In terms of this document, the Transport Agency’s role is to operate and maintain the State highway network and their key focus and the basis for this manual relates to the desired outcome of being ‘SAFE AND RESPONSIBLE’ as shown in Figure 2-1. The State Highway network operations group (HNO) works along-side other groups within the Transport Agency to assist in meeting the key objectives of this manual. The other functions are shown in Figure 2-2.

Figure 2-2: Groups of the Transport Agency



2.1.2 Responsibility

2.1.2.1 Legislation

Under legislation - the Land Transport Management Act – The Transport Agency has the following responsibilities:

- Contribute to an effective, efficient and safe land transport system in the public interest
- Investigate and review crashes and incidents involving transport on land
- Manage the State Highway system, including planning, funding, design, supervision, construction and maintenance operations
- Manage funding of the land transport system, including auditing the performance of organisations receiving land transport funding
- Manage regulatory requirements for land transport
- Cooperate with, provide advice and assist any government agency or local government agency at the Minister’ request
- Provide the Minister with advice on our functions
- Carry out any other land transport functions as directed by the Minister under the Crown Entities Act
- Carry out the functions required by the Land Transport Management Act or under any other Act.

2.1.2.2 State Highway Safe Network Activity Manual

Within this Manual, the delivery of the key activities and outcomes are the responsibility of:

- The contractors/consultants
- Those contract management teams who review and audit compliance with operational and key results areas within the NOC's.
- Regional and national NZ Transport Agency safety teams.

2.1.3 The Vision

This vision for this Manual is consistent with the Government's Safer Journeys Strategy vision:

'A safe road system increasingly free of deaths and serious injury'

To achieve this vision a Safe System approach will be adopted.

2.1.4 Safe System

2.1.4.1 Safe System Approach

The Safe System approach aims for a more forgiving road system that takes human fallibility and vulnerability into account. To achieve this it takes a safe system approach looking across the entire road system by creating safer roads and road sides, safer speeds, safer vehicles and safer road use.

We accept that:

- People make mistakes - we need to recognise that people make mistakes and some crashes are inevitable
- People are vulnerable - our bodies have a limited ability to withstand crash forces without being seriously injured or killed
- We need to share responsibility - those who design the road system and those who use the roads must all share responsibility for creating a road system where crash forces don't result in death or serious injury
- We need to strengthen all parts of the system - roads and roadsides, speeds, vehicles, and road use so that if one part fails, other parts will still protect the people involved.

2.1.4.2 What does a Safe System look like?

As we move towards a safe road system, everyone will expect a very low road toll and serious injuries will be increasingly rare. All parts of the system will be much safer than they are now. For example:

- Roads and roadsides will be safer because transport and urban planning, and road design will accommodate errors; surfaces will be improved and roadside hazards removed or barriers installed
- Speed will be managed to safe levels through more appropriate limits, and there will be smarter, more predictable, self-explaining roads and roadsides that show people what safe speeds mean
- Vehicles will increasingly have advanced safety features, including electronic stability control, front and side curtain airbags and head restraints, collision avoidance systems and better maintenance of tyres and brakes

- Road users will be alert and aware of the risks and drive or ride to the conditions; there will be more in-vehicle technologies to give drivers safety feedback ensure alertness and reinforce compliance with the road rules.

Reference	Web address
Safer Journeys	http://www.saferjourneys.govt.nz/about-safer-journeys/the-safe-system-approach/

2.1.4.3 Safe System Designers

As system designers who influence road safety, we need to identify what we can do in our jobs to make our road system more forgiving. We should do everything we can to make sure simple mistakes don't turn into tragedies. System designers include planners, engineers, parents, policy makers, educators, enforcement officers, vehicle importers, suppliers, employers, utility providers, insurers, asset managers, the media, fleet managers, etc.

Under the Safe System approach, all system designers must share the responsibility for road safety outcomes. Each of us should know the part of the system we can influence to be safer. It is helpful to think about who else we need to share information with and work more closely with, or how we need to work differently to create a safe road system.

Some of the key changes to the way we analyse how safe our roads are and questions to ask are changing as illustrated below:

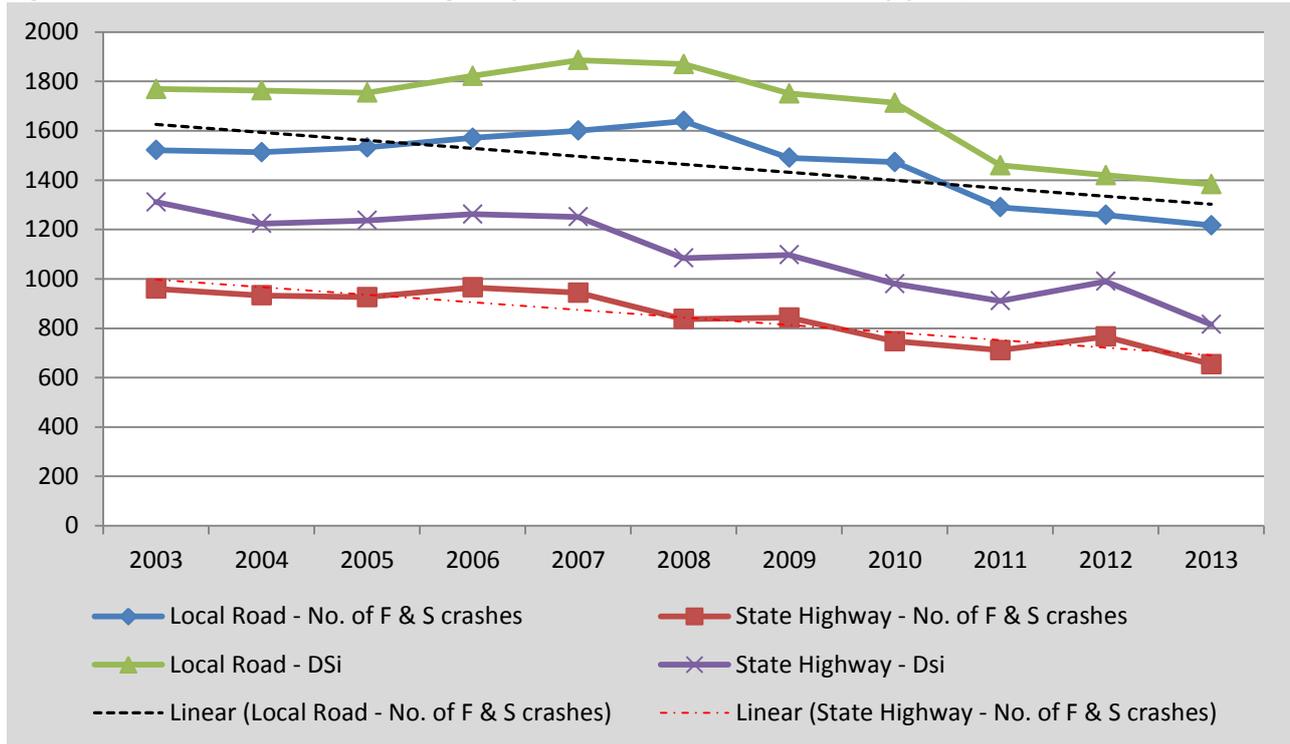
From	To
Aiming to reduce crashes	Aiming to reduce deaths and serious injuries
Asking: why did that person crash?	Asking: why was that person so seriously injured in that crash?
Blaming the driver for the cause and severity of a crash	Recognising road or vehicle design plays a part in some crashes, and that good design minimises their severity
Reacting to crashes or incidents	Proactively identifying highest risks and working across the whole system to reduce them

Reference	Web address
the Transport Agency	http://www.nzta.govt.nz/about/who-and-what/what-we-do/safer-journeys/system-designers.html

2.2 Safety on the State Highways

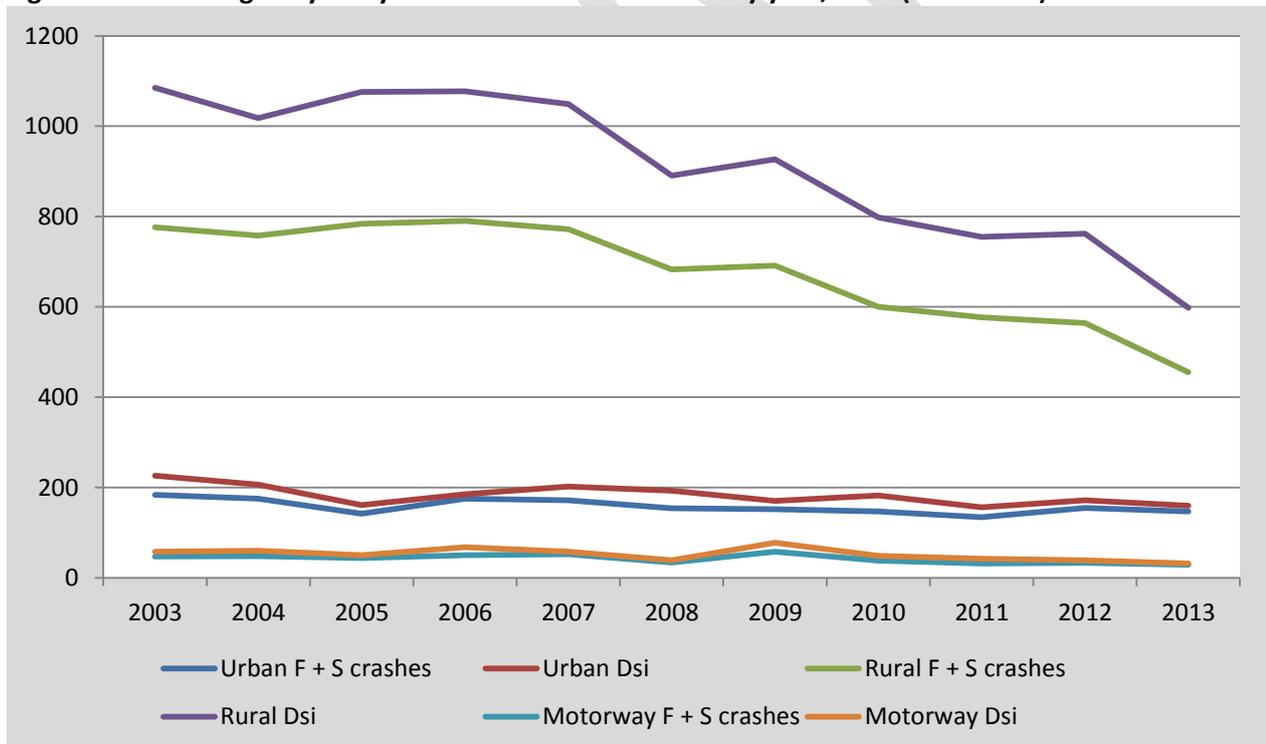
Comparing State Highways to local authority roads, over a full five year period (2008-2012), fatal and serious crashes on the State Highway network accounted for 35% of all fatal and serious crashes. Deaths and serious injuries (DSi) on State Highways accounted for 38% of all fatal and serious crashes. In rural areas 57% of all DSi's occurred on State Highways. Since 2003 there has been a downward trend in both the number and severity of injuries on State Highways and local roads. Although this is encouraging, it is not acceptable that so many lives are lost and serious injuries sustained. The Transport Agency is committed to reducing casualties to contribute to the Governments Safer Journeys Strategy of *'a safe road system increasingly free of death and serious injury'* as illustrated by Figures 2-3 and 2-4.

Figure 2-3: Local Roads and State Highways: Fatal and Serious Crashes by year, DSI's (2003-2013)



Source: CAS

Figure 2-4: State Highways only: Fatal and Serious Crashes by year, DSI's (2003-2013)



Source: CAS

2.3 Needs of other interested parties

In achieving the Safer Journeys vision of a ‘safe road system increasingly free of death and serious injury’ we must take into consideration a Safe System approach. It is essential that we work with our key partners across all elements of the system, including:

- Safe Roads and Roadsides
- Safe Speeds
- Safe Road Use
- Safe Vehicles

The key stakeholders are shown in Table 2-1 along with their role in implementing a Safe System approach with the Transport Agency.

Table 2-1: Roles of the Transport Agency and Key Stakeholders

	Safe Roads & Roadsides	Safe Speeds	Safe Road Use	Safe vehicles
The Transport Agency	✓	✓	✓	✓
Road Controlling Authorities	✓	✓	✓	
NZ Police		✓	✓	✓
Contractors and Consultants	✓	✓		✓ ²
Road Safety Coordinators		✓	✓	
Automobile Association		✓	✓	
Industry Groups (RTA/Bus etc.)		✓	✓	✓
ACC			✓	
Regional Council	✓	✓	✓	
Community Representatives	✓	✓	✓	✓

2.4 System, Strategy and Plan structure and definitions

It is important to define each of the different safety systems, strategies and plans in relation to this Manual and how they relate to each other. Table 2-2 shows how the State Highway Safe Network Activity Manual, Safety Strategy and Safety Plan all interrelate.

A Safety Management Plan should be developed for any Network Outcomes Contract (NOC). It is important that these plans are developed with the help of the NZ Transport Agency’s regional safety teams to ensure that they are fit for purpose.

² Contractors and Consultants are required to have 5 star vehicles under the Network Outcomes Contract

Table 2-2: Definitions – State Highway Safe Network Activity Manual, Safety Strategy and a Safety Management Plan

Document	Definition	Responsibility
State Highway Safe Network Activity Manual	This Manual describes a system for safety management. It takes into account the road safety issues to be considered for the effective and consistent management and safe operation of the State Highway Network.	NZ Transport Agency to develop (National Office)
 Safety Strategy	A strategy is a document (developed by NZ Transport Agency safety engineer) that reflects the information provided in the System, is still a high level document, however it provides more detail on: <ul style="list-style-type: none"> • What is it you want to achieve (i.e. a vision) • What are the key outcomes (Section 8.1.1) • How outcomes will be measured? (Section 8.1.1) • Who is responsible for achieving the outcomes (Section 8.1.2) 	NZ Transport Agency to develop (Regional Office)
 Safety Management Plan (For each network)	A Safety Plan is a document that reflects the information provided within the strategy and provides details on how Contractors and Consultants will deliver the vision of the strategy. It should include: What specific measures and standards, specifications and timeframes are going to be used to help deliver the key safety outcomes How the outcomes and the effectiveness of those outcomes are measured and monitored	Contractor to develop

Typical content for a Safety Management Plan in provided in Appendix A.

NOTE: Examples of a Safety Strategy will be developed for the next version of this document

2.5 Relevance with Network Outcomes Contract

This document, whilst providing the key activities that should be considered when undertaking any safety related work on State Highways, also provides associated references and summarises requirements with respect to similar deliverables within the NOC.

Associated references and requirements are listed within each of the activities and a summary of the comparison between this Manual and the NOC is provided for in Appendix Table 1

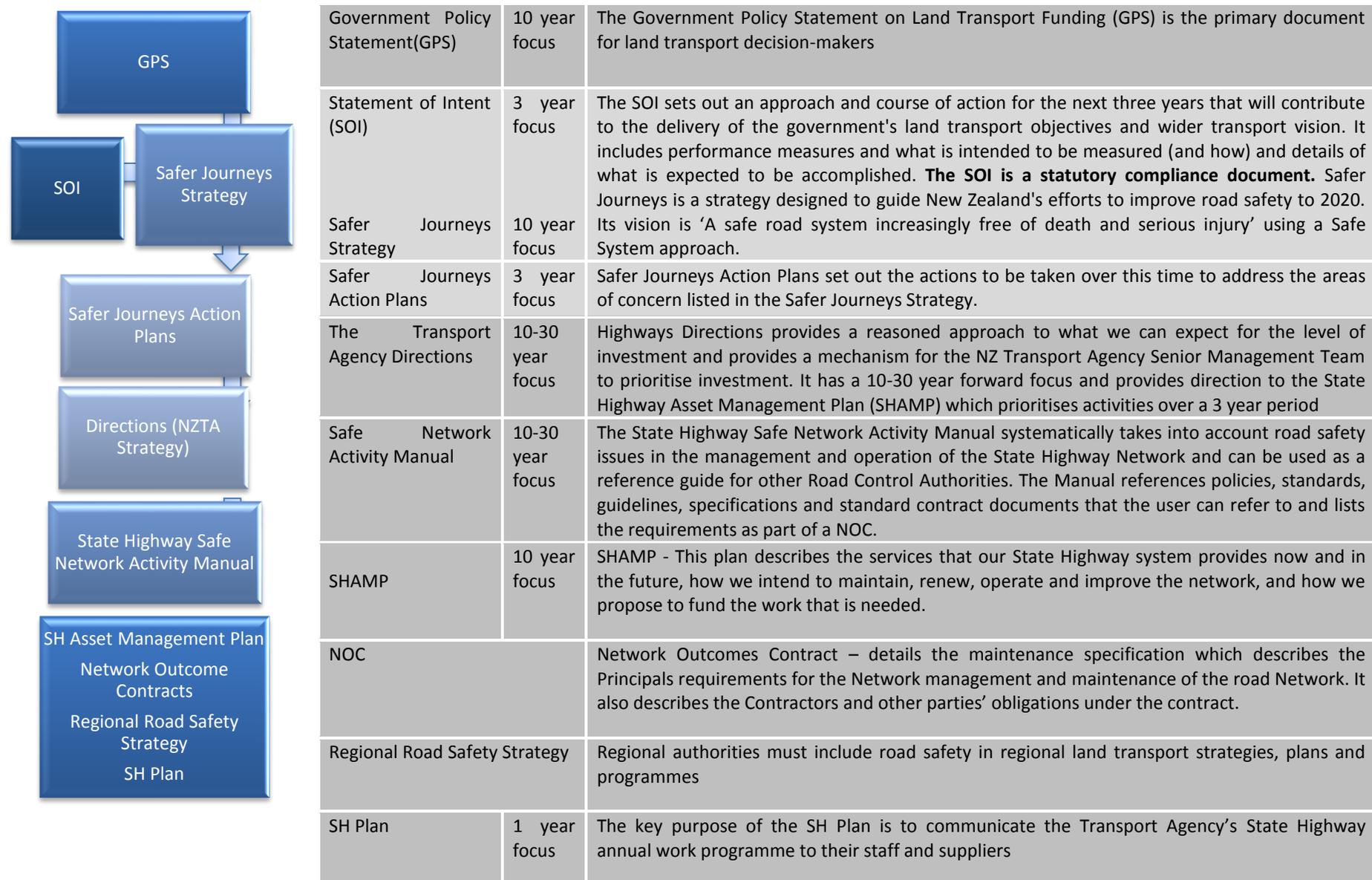


Figure 2-5: Inter-relationship of various Government documents

3 Direction and Strategy

3.1 The Transport Agency Safety Goals, Objectives and performance factors

The Safer Journeys vision is of ‘A safe road system increasingly free of deaths or serious injury’ on New Zealand’s roads. Specific targets for deaths and hospitalisations are fewer than 95 deaths on State Highways and 80 on local roads and no more than 2000 hospitalisations across the network for 2020.

In addition, the goals and objectives are to provide a system wide approach using the Safe System approach and to provide fewer and more specific priorities (Road Safety Action Plans – Section 5.4) for where road safety efforts should be focussed.

The Transport Agency’s SOI lists the Transport Agency’s long, medium and short term goals, objectives and priorities for a safe and responsible network. This is illustrated in Figure 3-6.

Figure 3-6: Inter-relationship of the NZTA’s long, medium and short term goals



For a full list of all the priorities that encompasses the four desired outcomes of effective, efficient, safe and responsible and resilient networks, refer to the SOI reference below.

Reference	Web address
NZ Government	http://www.saferjourneys.govt.nz/
the Transport Agency - SOI	http://www.nzta.govt.nz/resources/statement-of-intent/docs/SOI-2014-18-web.pdf

3.1.1 Outcomes, Performance Indicators and Actions

In addition to the desired outcomes and goals identified by the SOI (Section 3.1) it is important that further outcomes (Section 3.1.1.1) and performance indicators (Section 3.1.1.2) are identified and evaluated to determine whether a Safe System is being achieved.

3.1.1.1 Outcomes

An outcome is defined as a desired result as described within the Transport Agency’s High Risk Guides, there are two types of outcomes:

- Primary outcome - the reduction in the number of people killed or seriously injured as a result of road trauma; and
- Secondary outcomes - such as reductions in the collective and personal risk (actual or predicted). They are measured in terms of reported crash numbers, crash rates, level of safety service and patterns of crash types and factors. For Safer Roads and Roadside issues, reductions in predictive collective and personal risk scores are most useful. The measures can also be expressed in terms of the amount of traffic/people exposed to specified high-risk situations.

3.1.1.2 Lead and secondary performance indicators

Performance indicators provide a number of targets/benchmarks that will assist in achieving the specific outcomes (Section 3.1.1.1). These include:

Lead performance indicators to encourage a Safe System approach in all activities undertaken on the network. They describe the improvements to the road, road environment, speed or other features that have a known impact on road safety. These output measures are known to directly impact safety outcomes.

Secondary performance indicators – other measures of performance which may not be directly linked to crash outcomes but improve the overall delivery of the system and customer satisfaction of the Transport Agency

3.1.1.3 Actions

Actions are those items that have been listed within the Safer Journeys action plans to help achieve those key outcomes and performance indicators.

A summary of the types of lead indicators and outcomes from the high-risk guides³, those defined by the SOI, and list of those measures detailed within the Safer Journeys Action plans for Safe Speeds and Safe Roads and Roadsides are provided in Table 3-1. Note that:

- Whilst this list is substantial it does not imply that all of the indicators should be used.
- It is important that when developing the Safety Strategy and Plan (Section 2.4) the types of indicators reflect the network the plans/ strategies are being developed for.
- The primary outcome of ‘reduction in deaths and serious injuries’ should however be included in all safety strategies and plans.

³ Transport Agency’s High Risk Rural Roads Guide (2011) and High Risk Intersection Guide (2012)

Table 3-1: Types of key Outcomes, Performance Indicators and Actions

Outcome Type	Outcome	Outcome Source	Key NZ Indicators ⁴
Primary outcome	Reduction in deaths and serious injuries	Safer Journeys Vision	✓
Secondary outcomes	<ul style="list-style-type: none"> Number and severity of run-off-road crashes Number and severity of head-on crashes Number and severity of intersection crashes Number and proportion of crashes on wet roads Number and proportion of crashes in darkness Injuries to road user groups such as cyclists and pedestrians Reductions predictive personal and collective risk scores for main crash types Traffic (VKT) exposed to risk scores above a threshold The length of route (through realignment) 	HRRRG HRRRG HRRRG HRRRG HRRRG HRRRG HRRRG HRRRG HRRRG	✓ ✓ ✓
Performance indicator Type	Indicator	Performance Indicator Source	
Lead performance indicators	<ul style="list-style-type: none"> Increase in star rating Proportion of road (or travel on roads) over 12,000 vehicles per day with median barriers Proportion of road (or travel on roads) with roadside barriers or hazard reduction Proportion of road (or travel on roads) with lane widths of at least 3.5m. It could also include a measure of the width deficiency for each length Proportion of road (or travel on road) with sealed shoulder widths of at least 1m The number or percentage increase in roundabouts The length of routes subject to speed zoning below the default limit or under active speed management The change in network mean and/or 85th percentile speed (measured by the MoT) % changes of modified centreline (wide) or edge line (wide/ATP) % of travel on network above skid threshold % of rutting >20mm over the state highway network 	HRRRG HRRRG HRRRG HRRRG HRRRG HRRRG HRRRG HRRRG HRRRG	
Secondary performance indicators	<ul style="list-style-type: none"> % of activities that are delivered to agreed standards and timeframes % customer satisfaction 	SOI SOI	
Action Type	Action	Action Source	
Actions	<ul style="list-style-type: none"> Development of safer speeds programme Enhance automated enforcement Speed Enforcement including fixed cameras Advertising, education and training programmes Improve high-risk intersections Improve high-risk rural roads Extend risk-targeting Reduce risk on high-risk motorcycling routes Ensure optimal road safety benefits by prioritising investment in operations and maintenance 	Safer Journeys Action Plan	

⁴ As shown within the NZ Transport Agency’s Road Safety Strategy on a page

More specific measures of different types of outcomes for specific issues can be found within the Transport Agency’s High Risk guides. Once the key outcomes and performance indicators have been developed, a process for measuring these should be undertaken. The process for monitoring and evaluation of these outcomes and performance indicators and how they are progressing towards achieving the Safe System is provided for in Section 8.1.

Further information on minimum data outputs for the network safety trend and monitoring reporting as part of the maintenance specification within the Network Outcomes Contract is provided within section 5.6.2 of this Manual. Data outputs to assist with safety performance of the networks are also provided by the NZ Transport Agency head office to the Regions.

3.1.2 Responsibility for achieving Outcomes and Performance Indicators

The overall responsibility for ensuring these high level outcomes and performance indicators are completed and evaluated and provision of supporting information to meet the goals and objectives are with the Ministry of Transport. The Ministry of Transport monitors the national trends in primary outcomes; specifically the number of people killed or seriously injured. However, the network contract managers, should also be monitoring these primary outcomes (Network Outcomes Contract section 5.5.3) with respect to the network they are responsible for. In addition with any new projects or programmes the national and regional Transport Agency safety engineers should also be developing and monitoring these outcomes in conjunction with the project teams and key stakeholders.

3.2 Confirming and updating treatment philosophies

The contractor and/or consultant along with the Transport Agency’s regional safety engineers should confirm the actions using the Safe System treatment philosophies using KiwiRAP, SafetyNET, the Transport Agency high-risk guides tools, consultation with key partners and public feedback as a basis (see Section 6.2 – tools and resources) for the network. These philosophies should be updated on a 3-yearly basis.

4 Safety Management Plan Development and Delivery

This section includes the processes related to the development and delivery of a Safety Management Plan (see definition in Table 2-2) for the Network. It is important that the Safety Management Plan is developed by the Contractor to incorporate all of the activities and deliverables as outlined within this document and the Network Outcomes Contract.

The purpose of the SMP is to foster a responsible attitude towards the Principal’s objective on achieving network safety.

The SMP is to integrate the contract standard and performance framework requirements of the Contract Documents with the Contractor’s systems to ensure the SOI and associated measures detailed within the Safer Journeys Action plans for Safe Speeds and Safe Roads and Roadside are being achieved. When developing the SMP the types of indicators detailed in the Principal’s State Highway Safe Network Activity Manual should be selected to reflect the Networks dynamic and complexity. However, the primary outcome is a ‘reduction in deaths and serious injuries’ and this indicator should always be included in all SMP’s.

The SMP should establish clear lines of responsibilities between the Principal, Contractor and Stakeholders regarding protocols, communication and interactions. There are a number of processes and specific activities relating to the development and delivery of the SMP including collecting data, analysis of data, development of a plan or programme of works, delivery of works and the evaluation of the effectiveness of work.

The Contractor can expect that there will be changes in the safety management best practice over the duration of the contract. To this end, the Principal encourages open communication to ensure that such changes positively enhance the management of safety outcomes.

The SMP must support the Principal’s State Highway Safe Network Activity Manual. Typical details of what could be included in a SMP are included in Appendix A.

There are a number of processes and specific activities relating to the development and delivery in relation to the key outcomes defined within the Safety Strategy (Section 2.4). This process is illustrated in Figure 4-1.

Figure 4-1: Safety Plan Development and Delivery process



Each of these steps are further clarified within Sections 4.1 and 4.5.

4.1 Collect Data

Information will be collected from a variety of different sources to help develop and deliver the SMP. Data can be collected a number of ways; including via road inspections, crashes and information from key stakeholders and the public as illustrated in Table 4-1.

Table 4-1: Collect data analysis

	Category	Activities	Reference
Collect Data	Road Inspections	Maintenance	Network Outcomes Contract
		Safety	Network Outcomes Contract - Section 5
		Road Pavement	Section 5.7
	Crashes	Safety Studies	Section 5.1
		Fatal and Serious Crash reporting	Section 5.5
		Safety Reporting and Monitoring	Section 0
		Network Trends, Reports and Monitoring	Section 0
		KiwiRAP	Section 6.2.1.3
	Information from key stakeholders and public	Road Safety Action Plan meetings	Section 5.4
		Coroners reports (part of Fatal and serious crash reporting)	Section 5.5
		Stakeholder and Partnership Arrangements	Section 6.3.2
		Feedback Forms	Section 6.3.4

4.2 Analyse Data

Once data has been collected, the Information will be analysed in a variety of ways to help develop and deliver the SMP and determine the key themes. Analysis includes using data and tools that have been developed for pavement and geometry programmes, crash analysis reports and system tools, and using analysed information from key stakeholders. This is further detailed in Table 4-2.

Table 4-2: Processes and Tools to analyse Data

	Category	Activities	Reference
Analyse Data	Pavement/ Geometry	Skid Resistance management	Section 5.7.2
		KiwiRAP Assessment Tool (KAT)	Section 6.2.1.3
		Highway information Data (Tools)	Section 6.2.2
	Crashes	SafetyNET (Tools)	Section 6.2.1.1
		CAS (Tools)	Section 6.2.1.2
		KiwiRAP Assessment Tool (KAT)	Section 6.2.1.3
		Crash Reduction and Modification Factors (CMF)	Section 6.2.1.4
		High Risk Guides (Tools)	Section 6.2.3.3
	Information from key stakeholders and public	Road Safety Action Plan meetings	Section 5.4

4.3 Plan and Programme

Once the data has been collected and analysed specific projects (maintenance or capital) will be able to be identified, analysed further to compare to other projects on a national level and then assigned within the programme of works. Data programmes such as SWIPP, KAT, and liaison with key stakeholders will help plan and programme work. Specific activities are described in Table 4-3.

Table 4-3: Activities to assist with Planning and Programming works

	Category	Activities	Reference
Plan and Programme Work	All Data	Safety Improvements Database	Section 5.2
		Safety Projects Programme	Section 5.3
		KiwiRAP Assessment Tool (KAT)	Section 6.2.1.3
	Liaison	Road Safety Action Plan meetings	Section 5.4
		Safety Meetings	Network Outcomes Contract – section 5.5.9 and 5.5.10
		Stakeholder and Partnership Arrangements	Section 6.3.2

4.4 Design and Deliver

Once projects have been programmed for implementation they need to be designed and delivered to appropriate standards. Specific activities to help with achieving correct and safe design standards are listed in Table 4-4.

Table 4-4: Activities to help design and deliver projects

	Category	Activities	Reference
Design and Deliver	Policy, Standards and guidelines	Safe System Design	Section 5.8
		Traffic Control Devices	Section 0
		Land Development and Access	Section 5.11
		Vulnerable and Active Road Users	Section 5.12

4.5 Evaluate

After projects have been design and delivered, there is a need to ensure that what was implemented is operating effectively, and that the designs provide a safe and efficient solution that may be applied to other similar situations in the future. There are several methods that can help evaluate and monitor projects as listed in Table 4-5.

Table 4-5: Activities and Tools to help evaluate projects

	Category	Activities	Reference
Evaluate	General	CAS (Monitoring Tools)	Section 6.2.1.2
		KiwiRAP Assessment Tool (KAT)	Section 6.2.1.3
		Safety Works investment Prioritisation Process (SWIPP)	Section 6.2.1.5
		Evaluation, Review and Improvement	Section 8

5 Safety Related Activities

This section includes reference to the specific activities; structured so it includes information, requirements and references to the NOC. Further information on each of these activities are found within the following sections of this Manual.

5.1 Safety Studies

5.1.1 Crash Reduction studies

Network Outcomes Contract Reference	<p>Network Outcomes Contract Reference: Crash Reduction Studies - Section 5.1.11</p> <p>Description of Network Outcomes Contract requirement: When requested by the Principal, the Contractor shall provide a suitably qualified person to participate in, and inform, any crash reduction study that is undertaken on the Network.</p> <p>(Note that as stated in the Transport Agency’s SHCM at least annually, the NZ Transport Agency Manager, operations shall review the crash situation on their network. This will be achieved by means of a regional Safety Strategy (Section 2.4). CRS’s shall be carried out on a minimum of a 5 yearly cycle. However these studies should be completed earlier if crash patterns/themes or the presence of crash clusters, high severity crashes etc. warrant that specific studies be completed).</p> <p>Schedule of Prices: Covered under the Provisional Sum</p>	
Description, Deliverables	<p>Description: Crash Reduction Studies (CRSs) are reactive based on reported crashes and complement proactive studies (identification of high risk sites and routes using KAT and themes inspections etc.). CRS will also include consideration of the Safe System approach which identify recommendations that provide an environment where if mistakes are made the road user is protected from death and serious injury.</p> <p>Deliverables: A typical CRS will include the collection of site data, analysis and recommendations and the estimation of crash reductions as a result of the implementation of the recommended treatments. The use of tools and resources to analyse data and make appropriate recommendation is essential to help identify and treat the highest risk sites and routes.</p> <ul style="list-style-type: none"> • CRS’s are to be conducted in accordance with the New Zealand Guide to the Treatment of Crash Locations, 2004, which outlines all steps needed to undertake a study. In addition the Transport Agency’s high risk guides provide information on how to identify, treat and prioritise high risk sites and routes (Section 6.2). • Note also that safety audits (Section 0) now have a safe system approach as part of the methodology. • A CRS will help capture all potential projects and then can be added into the Safety Improvements Database and improvements programme (Sections 5.2/ 5.3) 	
Benefits	<p>A CRS will identify and treat high risk sites and routes with the appropriate measures and lead to a reduction in crashes.</p>	
Other References	<p>The Transport Agency - Treatment of crash locations</p> <p>The Transport Agency - State Highway Control Manual</p> <p>Austrroads - Part 8 Treatment of crash locations</p> <p>Tools and resources - Section 5</p> <p>Safety Audits - Section 4.4.6</p> <p>Safety projects Programme - Section 5.3</p> <p>SWIPP - Section 5.3</p>	<p>http://www.nzta.govt.nz/resources/guide-to-treatment-of-crash-location/</p> <p>http://hip.nzta.govt.nz/processes/maintain-and-operate/state-highway-control-manual</p> <p>https://www.onlinepublications.austrroads.com.au/items/AGRS08-09</p> <p>N/A</p> <p>N/A</p> <p>N/A</p> <p>N/A</p>

5.1.2 Theme Studies and inspections

<p>Network Outcomes Contract Reference</p>	<p>Network Outcome Contract Reference: Section 5.5.4 - Road Safety Theme Inspections and Reporting</p> <p>Description of Network Outcomes Contract requirement: When requested by the Principal, the Contractor shall provide a suitably qualified person to undertake road safety theme inspections and reporting</p> <p>(Note that Road safety theme inspections must be conducted by network management consultants and contractors as requested by the Principal. The objective of these is to identify projects).</p> <p>Schedule of Prices: Covered under the Provisional Sum</p>						
<p>Description, Deliverables</p>	<p>Description: The inspections will be based on a theme which may include signs and delineation, clear zones, guardrail, active road users (i.e. pedestrian facilities), intersections and side roads etc. Theme inspections being tailored to risk are more safety focussed than general day or night time inspections.</p> <p>The identification of theme inspections can be from: Crash data – sites or routes where there are clusters of crashes Crash data – site or routes where there are common features, themes or movements (i.e. run off road, head on, intersections, crashes into bridges, pedestrian and cyclists, night-time, Scrim results etc.) High Risk Rural Roads and intersections, motorcycling routes and rural schools (using high risk guides) High personal or collective routes/sites. Using KiwiRAP and safety NET Tools – Section 6.</p> <p>Deliverables: Any sites identified (using measures within Sections 4.1 and 4.2 (Collect and Analyse Data) for further measures to remove, mitigate or contain the problem should be entered into the Safety Improvement Database (Section 5.2), prioritised and considered for inclusion within the Safety projects programmed (referred to as SWIPP (Section 5.3).</p>						
<p>Benefits</p>	<p>Identification of hazardous locations can be programmed for treatment to reduce risk to road users</p>						
<p>Other References</p>	<table border="0"> <tr> <td data-bbox="448 1473 847 1547"> The Transport Agency – Treatment of crash locations </td> <td data-bbox="847 1473 1410 1547"> http://www.nzta.govt.nz/resources/guide-to-treatment-of-crash-location/ </td> </tr> <tr> <td data-bbox="448 1547 847 1621"> Austroads – Part 8 Treatment of crash locations </td> <td data-bbox="847 1547 1410 1621"> https://www.onlinepublications.austroads.com.au/items/AGRS08-09 </td> </tr> <tr> <td data-bbox="448 1621 847 1648"> Tools and resources - Section 5.1 </td> <td data-bbox="847 1621 1410 1648"> N/A </td> </tr> </table>	The Transport Agency – Treatment of crash locations	http://www.nzta.govt.nz/resources/guide-to-treatment-of-crash-location/	Austroads – Part 8 Treatment of crash locations	https://www.onlinepublications.austroads.com.au/items/AGRS08-09	Tools and resources - Section 5.1	N/A
The Transport Agency – Treatment of crash locations	http://www.nzta.govt.nz/resources/guide-to-treatment-of-crash-location/						
Austroads – Part 8 Treatment of crash locations	https://www.onlinepublications.austroads.com.au/items/AGRS08-09						
Tools and resources - Section 5.1	N/A						

5.2 Safety Improvements Database

Network Outcomes Contract Reference	<p>Network Outcomes Contract Reference: Safety improvements Database - Section 5.5.1</p> <p>Description of Network Outcomes Contract requirement: The Contractor shall develop and maintain a register of potential safety improvements that will inform the Principal of future Network safety improvements.</p> <p>(Note that the Safety engineer will support the Contractor in the development of the database)</p> <p>Schedule of Prices: Covered under the Lump Sum</p>	
Description, Deliverables	<p>Description: The Safety Improvements Database (previous known as safety deficiencies database) as developed by the Contractor will include any potential safety improvements for the network.</p> <p>Deliverables: The database includes the name, location, and the nature of the problem i.e. the problem pedigree – where did the problem come from i.e. fatal crash report, network inspection, the likely category of works (minor improvements, block, major), the agreed treatment philosophy, KiwiRAP Star ratings, crash data, works recommended by and its status.</p>	
Benefits	The information provided within the database will form the projects to be considered for programming within the Safety Projects Programme	
Other References	(SWIPP) – Section 5.3 and Section 6.2.1.5. of this Manual	N/A

5.3 Safety Projects Programme

Network Outcomes Contract Reference	<p>Reference: Section 5.5.2, Safety Projects Programme</p> <p>Description of Network Outcomes Contract requirement: The Contractor is required to provide support to the Principal to develop this programme.</p> <p>(Note that the Safety team will develop a list of regional projects which should be put into the national Safety Projects Programme [SWIPP database - Section 6.2.1.5]).</p> <p>Schedule of Prices: Covered under the Lump Sum</p>	
Description, Deliverables	<p>Description: Projects from these SWIPP should be developed as requested on a regional basis by consultation with the Transport Agency regional road safety, transport planning and asset management teams along with the network consultant and contractor.</p> <p>Deliverables: These projects will be analysed and prioritised using risk profiles and approved nationally based on their potential to reduce deaths and serious injuries (DSi).</p>	
Other Benefits	Projects that are analysed and treated according to their risk profile and potential to reduce DSi will provide the best results in terms of improving road safety.	
Other References	SWIPP - Section 6.2.1.5 of this Manual.	N/A

5.4 Road Safety Action Plans Meeting and Outputs

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: Attendance at Road Safety Forums – Section 5.5.10</p> <p>Description of Network Outcomes Contract requirement: When requested by the Principal, the Contractor shall provide a suitably qualified person to attend meetings of the wider road safety community and forums outside the Network.</p> <p>(Note that it is important that the Transport Agency Safety team should provide representation at RSAP meetings. If not possible the Transport Agency can request the Contractor to attend on their behalf).</p> <p>Schedule of Prices: Covered under the Provisional Sum</p>	
<p>Description, Deliverables</p>	<p>Description: These plans are developed by a partnership of agencies and organisations concerned about a particular geographical area. Such areas may be a large city council or a cluster of smaller rural councils.</p> <p>Deliverables: The purpose of the Road Safety Action Plan (RSAP) meeting is to:</p> <ul style="list-style-type: none"> • Develop plans and outputs that allow activities to be delivered across a range of agencies and disciplines to work together to provide a coordinated output. • Those outputs can be used to inform the NZ Transport Agency’s Regional groups (REG) group and then inform the Regional Transport Committee on possible projects. <p>jects supported as a result of the RSAPs should be used to develop the safety projects gramme (Section 5.3) and assist with justification.</p>	
<p>Benefits</p>	<p>Road Safety Action Plan meetings create relationships between key partners and provide a multi-disciplined approach a local focus on mitigating road safety risks and justifying investment</p>	
<p>Other References</p>	<p>The Transport Agency – RSAP</p>	<p>http://www.nzta.govt.nz/resources/road-safety-action-plan/</p>

5.5 Fatal and Serious Crash Reporting

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: Fatal and Serious Crash Reporting - Section 5.5.6, Appendix 5.5</p> <p>Description of Network Outcomes Contract requirement: The Contractor shall provide a draft report on all fatal crashes, or where road deficiencies appear to have been major contributing factors, within 48 hours of the date of the crash or when requested by the Principal. The final report is to be accepted by the Principal within 10 days of issuing the draft report.</p> <p>Schedule of Prices: Each report that is completed</p>	
<p>Description, Deliverables</p>	<p>With regards to the Fatal and serious crash reporting there will be:</p> <ul style="list-style-type: none"> • Notification by either the New Zealand Police who will send out the POL550 to inform the Transport Agency of a fatal crash, or the contractor must notify the Transport Agency within 48 hours of a fatal crash or a crash where road deficiencies appear to have been a major contributing factor (As per the Network Outcomes Contract requirements) • Instances where the Principal may require the contractor or other crash specialist to prepare additional information. The content and timeframe will be determined by the principal. • Requests for further information by the Coroner, and therefore a representative (contractor, consultant, and NZ Transport Agency staff) may need to prepare, supply and present evidence to the Coroner. Police, politicians and others may also request additional information. Timeframe for delivery to be specified at the time of request i.e. an official information request normally has to be delivered within 7 days or as stated. 	
<p>Benefits</p>	<p>The benefits of reporting on why a high severity crash occurred is that it provides important information on the cause and why the outcome was a high severity injury which allows the Transport Agency to plan measures to ensure these types of crashes do not occur in the future.</p>	
<p>Other References</p>	<p>n/a</p>	<p>n/a</p>

5.6 Safety Reporting and Monitoring

5.6.1 Safety Reporting and Monitoring

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: Safety Reports – Section 5.5.7</p> <p>Description of Network Outcomes Contract requirement: When requested by the Principal, the Contractor shall provide a suitably qualified person to produce a safety report on specific sites or issues</p> <p>(Note that the NZ Transport Agency Safety engineer can provide feedback and assistance to the Contractor in the development of these reports).</p> <p>Schedule of Prices: Covered under the Provisional Sum</p>
<p>Description, Deliverables</p>	<p>Description: This report should be provided to the Principal for consideration, who may request further information or detailed safety reports from the contractor/consultant.</p> <p>Deliverables: Safety reports are delivered as a result of third party enquiries, inputs from RSAP (Section 5.4) meetings, coroner’s requests, and any other safety requirements outlined in contractual documents and any assigned safety works.</p>
<p>Benefits</p>	<p>The benefits of reporting on safety issues is that it identifies opportunities and target to risk type improvements which can be considered and programmed for the future in an effort to improve overall safety for the network.</p>
<p>Other References</p>	<p>http://www.nzta.govt.nz/resources/state-highway-maintenance-contract-proforma-manual/docs/SM032-d6.pdf</p>

5.6.2 Network Trend, Report and Monitoring

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: Network Safety Trend Monitoring and Reporting – Section 5.5.3</p> <p>Description of Network Outcomes Contract requirement: The Contractor shall provide quarterly safety reports that are based on factual data, the requirements of the safety management strategy and any assigned safety works.</p> <p>(Note that once hazardous locations have been determined the Transport Agency safety team should record network safety improvements as a ‘site of interest’. (CAS)).</p> <p>Schedule of Prices: Covered under the Lump Sum</p>
<p>Description, Deliverables</p>	<p>Description: Sites of interest are locations that users can identify spatially and for which crash data can be recalled. Once recalled, the user can then analyse the effects of a programme of works.</p> <p>Guidance on entering ‘sites of interest’ can be found with the Help section of CAS and further information can be found with the Transport Agency’s high-risk rural roads guide.</p>

	Deliverables: The report should be provided to the Principal for consideration, who may request further information or detailed safety reports from the contractor/consultant.	
Benefits	The benefits of reporting on safety issues and network trends is that it identifies opportunities and target to risk type improvements which can be considered and programmed for the future in an effort to improve overall safety for the network.	
Other References	CAS	http://www.nzta.govt.nz/resources/crash-analysis-system/
	HRRRG – Section 7.4.2	http://www.nzta.govt.nz/resources/high-risk-rural-roads-guide/

5.7 Road pavement

5.7.1 Pavement condition – types, monitoring and management

Network Outcomes Contract Reference	<p>Network Outcomes Contract Reference: Safety operational performance measures – section 2.3.2</p> <p>Description of Network Outcomes Contract requirement: key and safety-related Operational Performance Measures means a subset of the OPMs that have a greater safety impact. These are the Key and Safety-related Operational Performance Measures for this contract relating to pavement condition in terms of safety.</p> <ul style="list-style-type: none"> • OPM 14 – Skid Resistance Management • OPMs 71 to 72 – Ice Gritting and CMA - Treatment Decisions and Compliance • OPMs 22 to 25 – Potholes • OPMs 28 to 29 – Deformation, Heaves and Shoves <p>Schedule of Prices: Covered under the Lump Sum</p>
	<p>Description: Pavement condition reporting allows the Transport Agency to assess the performance of the network, specifically in this instance to road safety, road user comfort and expectation. Issues identified are put into the safety improvements database (section 5.2). Pavement condition needs to be monitored as certain conditions can affect road safety and road user comfort; including:</p> <ul style="list-style-type: none"> • Skid resistance and texture (section 5.7.2) • Rutting • Loose chip • potholes • Drainage • Pavement edge drops; and • Loss of pavement shape. <p>Furthermore, maintenance activities which manage snow and ice also improve safety. Specifications and levels of maintenance for specific pavement conditions can be found in the NOC documents and reference documents (the Transport Agency P-series (paving and surfacing), C-series (maintenance), and HM (highway maintenance) specifications listed below.</p> <p>Deliverables: The report outlining the delivery of safety related operation</p>

	performance measures provided by the contractor is to be provided to the NZ Transport Agency. The regional office can review and provide feedback and/or recommendations on results if necessary.	
Benefits	Improved safety and efficiency for all road users	
Other References	the Transport Agency – pavement condition report	http://www.nzta.govt.nz/resources/state-highway-national-pavement-condition-report/docs/2009-pavement-report.pdf
	the Transport Agency – technical specifications	http://www.nzta.govt.nz/resources/results.html?catid=330

5.7.2 Skid Resistance - Monitoring and Management

Network Outcomes Contract Reference	<p>Network Outcomes Contract Reference:</p> <ul style="list-style-type: none"> • Changes to annual renewals investment levels (Skid Resistance Renewal Quantities) - Sections, 2.5.4 • Skid Resistance Management - Section 5.5.5, • Sealed Road Resurfacing - Section 6.1.3 <p>Description of Network Outcomes Contract requirement:</p> <ul style="list-style-type: none"> • The requirements for delivery for contractors are provided under the Network Outcomes Contract in which they are to proactively manage network skid resistance performance ensuring skid resistance considerations are included in all asset management decisions. • The Contractor will carry out requirements outlined in the Skid Resistance Investigation and Treatment Selection (the Transport Agency T/10) in consultation with the Principal • Extract information from the Safety Team report in T/10 <p>Note that in summary the contractor identifies sites and proposes treatments and the NZ Transport Agency Safety team should review intervention levels (IL's) on an annual basis and decide whether to fund treatments. Specifically:</p> <ul style="list-style-type: none"> • HNO National office will manage general skid resistance issues including approval of changes to locational data and Investigatory Levels (IL's) as well as reviews of regions. • Regional offices are responsible for proactively maintaining adequate skid resistance in accordance with this specification throughout their network. It includes: <ul style="list-style-type: none"> • Provision of adequate micro and macro texture • Action following release of the Exception Report • Maintenance of existing surfacing's • Review of full RAMM database for skid resistance • Construction of new surfacing's • Aggregate selection and monitoring • Regional review of Investigatory levels (IL's) <p>Schedule of Prices: Covered under the Lump Sum and Provisional Sum</p>
	Description, Deliverables

	<ul style="list-style-type: none"> Variations may be approved by the Transport Agency’s National Pavements Manager.
Benefits	Using the Transport Agency’s T/10 Policy specification for state highway skid resistance management, will enable and reinforce a nationally consistent approach to skid resistance and therefore an overall reduction in DSI. In terms of safety, research has shown that “increasing the SCRIM coefficient (SC) by 0.1 reduces crash rates on average by 30% on wet roads and 20% on dry roads”. [www.nzta.govt.nz]
Other References	The Transport Agency – T/10 Skid Resistance Treatment and Investigation http://www.nzta.govt.nz/resources/skid-resistance-investigation-treatment-selection/
	The Transport Agency – T/10 - Notes http://www.nzta.govt.nz/resources/skid-resistance-investigation-treatment-selection/docs/skid-resistance-investigation-treatment-selection-notes.pdf

5.8 Safe System Design

A Safe System should be included in all designs as part of the development of any new or reconstructed road, maintenance or capital works projects.

Safe roads and roadsides are those that are predictable and forgiving of mistakes. Features include:

- Roadside Hazard Management including some form of side barrier system or clear zone
- Wide shoulders
- Median divided roads
- Grade separated intersections
- Good overtaking opportunities
- Good sight distance
- Effective speed management.

Their design should encourage appropriate road user behaviour and safe speeds and therefore provide a reduction in crashes, more specifically deaths and serious injuries.

Note refer to the Transport Agency’s High Risk guides (Section 6.2.3.3) for other treatment philosophies (safer corridors, safety management and safety maintenance).

It is important that the safety audit process be undertaken at each stage of these projects to ensure that safety has been considered within the design. Refer to Section 0.

5.8.1 Design (Roads and Roadsides)

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: Capital Projects involvement – section 6.5.71</p> <p>Description of Network Outcomes Contract requirement: Capital Projects - The focus of the Contractor’s involvement is to provide recommendations in the Provision of maintenance and operations designs that lead to safe and efficient maintenance activities. Any design standards will be determined as part of any variation if designing or constructing projects.</p> <p>(Note the Contractor is to design and build to current standards and the Transport Agency Safety team’s role is to support the contractor and assess the safety of the design).</p> <p>Schedule of Prices: Variation</p>	
<p>Description, Deliverables</p>	<p>Description: All design of new and the reconstruction of existing roads and bridges must conform to NZ Transport Agency Standards.</p> <p>Deliverables: It is requirement that a safety audit is undertaken at each stage of these projects to ensure that safety has been considered during the design. Refer to section 0.</p> <p>Each new or reconstructed design must be completed in accordance with Australian/New Zealand best practice and should be peer reviewed/Safety audited to ensure best practice is adhered to (Section 0)</p>	
<p>Benefits</p>	<ul style="list-style-type: none"> • The type of geometric design and its features can affect safety and crash reduction significantly by: • Influencing the ability of the driver to maintain vehicle control and identify hazards. Significant features include lane width, alignment, sight distance, and super elevation; • Influencing the number and types of opportunities that exist for conflicts between vehicles. Significant features include, intersection design, number of lanes, and medians; • Affecting the consequences of an out-of-control vehicle leaving the travel lanes. Significant features include shoulder width, side slopes and roadside hazard management such as barriers (Section 5.8.3.1) and clear zones (Section 5.8.3.2); and • Considering the needs of vulnerable road users such as pedestrians, cyclist and motorcyclists. • Roads and Roadside design on state highways are to be designed in accordance with Australian/New Zealand best practice. Specifically • Austroads Guide to Road Design series • The Transport Agency State Highway Geometric Design Manual 	
<p>Other References</p>	<p>Austroads Guides – Guide to Road Design</p>	<p>http://www.austroads.com.au/road-design</p>
	<p>Austroads Guides – Guide to Road Design - Part 6: Roadside Design, Safety and Barriers</p>	<p>https://www.onlinepublications.austroads.com.au/items/AGRD06-10</p>
	<p>the Transport Agency – Research Report – Clear zones versus roadside barriers</p>	<p>http://www.nzta.govt.nz/resources/research/reports/517/</p>
	<p>Austroads Guide to Road Safety Part 9:</p>	<p>https://www.onlinepublications.austroads.com.au/items/AGRS09-08</p>

5.8.2 Intersections

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: Network trend safety monitoring and reporting – Section 5.5.3</p> <p>Description of Network Outcomes Contract requirement: The Contractor shall provide quarterly safety reports that are based on factual data, the requirements of the safety management strategy and any assigned safety works. The report shall contain any other safety concerns such as any intersection issues.</p> <p>(Note the Contractor is to design and build to current standards and the Transport Agency Safety team’s role is to support the contractor and assess the safety of the design).</p> <p>Schedule of Prices: Covered under the Lump Sum</p>	
<p>Description, Deliverables</p>	<p>Description: It is important that the safety audit process be undertaken at each stage of these projects to ensure that safety has been considered within the design. Refer to section 0.</p> <p>Deliverables: Intersection design on state highways are to be designed in accordance with Australian/New Zealand best practice. Specifically</p> <p>Austroads Guide to Road Design:</p> <ul style="list-style-type: none"> • Part 4: Intersections and Crossings - General • Part 4A: Unsignalised and Signalised Intersections • Part 4B: Roundabouts • Part 4C: Interchanges • The Transport Agency State Highway Geometric Design Manual 	
<p>Benefits</p>	<p>Crash reduction figures for safe system type treatments can produce significant crash reduction benefits. Specific information can be sourced from the Transport Agency high-risk intersection guide</p>	
<p>Other References</p>	<p>the Transport Agency – Geometric Design Manual</p>	<p>http://www.nzta.govt.nz/resources/state-highway-geometric-design-manual/shgdm.html</p>
	<p>Austroads Guides – Guide to Road Design – Part 4</p>	<p>https://www.onlinepublications.austrroads.com.au/items/AGRD04-09</p>
	<p>Austroads Guides – Guide to Road Design – Part 4A</p>	<p>https://www.onlinepublications.austrroads.com.au/items/AGRD04A-10</p>
	<p>Austroads Guides – Guide to Road Design – Part 4B</p>	<p>https://www.onlinepublications.austrroads.com.au/items/AGRD04B-11</p>
	<p>Austroads Guides – Guide to Road Design – Part 4C</p>	<p>https://www.onlinepublications.austrroads.com.au/items/AGRD04C-09</p>

5.8.3 Roadside Hazard Management

5.8.3.1 Safety Barriers

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: Section 6.3.1 – Structure Routine Maintenance – Barriers and Handrails</p> <p>Description of Network Outcomes Contract requirement:</p> <ul style="list-style-type: none"> The Contractor shall complete all routine work necessary to maintain the condition and appearance of structures including repairing damaged barriers and handrails. All barrier repairs shall be undertaken in accordance with NZTA M/23 <p>(Note that the contractor is to build/ design to current standards, and the Transport Agency Safety team is to support the contractor and assess the safety of the design)</p> <p>Schedule of Prices: Covered under the Lump Sum and Provisional Sum</p>	
<p>Description, Deliverables</p>	<p>Description: Barriers include:</p> <ul style="list-style-type: none"> Roadside and/or Median Barriers, Bridge Barriers, Crash Cushions and/or End Terminals, and Barrier Transitions. Safety Fence (normally 1.2 - 1.4m high – discourage access between a footpath and road i.e. a school access next to a major intersection). Security fence (normally 1.8m+ -prevents access- desirable where cycleway/pedestrian facilities are adjacent to a motorway throw screens - reducing the risk of objects being thrown from overhead structures onto State Highways Hand rails <p>Deliverables: Barriers installed and maintained on State Highways are to be provided in accordance with the following standards:</p> <ul style="list-style-type: none"> The Transport Agency: Road Safety Barrier Systems (M/23) The Transport Agency: State Highway Design Manual which adopts AS/NZS 3845: Road Safety Barriers Systems. (based on NCHRP Report 350) The Transport Agency: Barriers Repairs specification (HM17) The Transport Agency: Maintenance of Guardrail and Median Barriers (C19) 	
<p>Benefits</p>	<p>Barriers are an effective safe system countermeasure in reducing the severity of road crashes where head-on crashes are common or where vehicles regularly leave the carriageway, provided they are properly installed and are placed at warranted locations.</p>	
<p>Other References</p>	<p>The Transport Agency – SHGDM – Barriers</p>	<p>http://www.nzta.govt.nz/resources/state-highway-geometric-design-manual/docs/shgdm-part-7.pdf</p>
	<p>The Transport Agency – Technical Specifications - Barriers</p>	<p>http://www.nzta.govt.nz/resources/results.html?catid=348</p>
	<p>Austrroads Guide to Road Design Part 6: Roadside Design, Safety and Barriers</p>	<p>https://www.onlinepublications.austrroads.com.au/items/AGRD06-10</p>
	<p>Guidelines for reducing the risk of objects being thrown from overhead structures onto State Highways. Transit NZ Sept 2006 (draft) (Under review).</p>	<p>N/A</p>
	<p>Technical Direction for Road Safety Practitioners: Policy for safety screening of bridges. TD2002/RS02</p>	<p>http://roadsafety.transport.nsw.gov.au/downloads/technicaldirection_roadsafe_2002rs02.pdf</p>

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5.8.3.2 Clear Zones

Network Outcomes Contract Reference	<p>Network Outcomes Contract Reference: N/A</p> <p>Description of Network Outcomes Contract requirement: N/A</p> <p>Schedule of Prices: N/A</p>	
Description, Deliverables	<p>Description: The clear zone is the space outside the road carriageway available for an errant vehicle to recover or come to a rest. Often the clear zone won't be adequate in terms of its width.</p> <p>Deliverables: The road safety engineer should determine whether there is merit providing a clear zone compared to barriers along a route. This should be discussed as part of the design review process.</p> <p>Addition information on this can be provided within the Transport Agency's <i>State Highway Geometric Design Manual (SHGDM)</i> and the Transport Agency research report 517: <i>Use of roadside barriers versus clear zones</i>.</p>	
Benefits	<p>Safety benefits could include a 25-40% reduction in run-off-road injury crashes. References and other benefits are provided within the Transport Agency's HRRRG.</p>	
Other References	the Transport Agency – SHGDM – Clear Zones	http://www.nzta.govt.nz/resources/state-highway-geometric-design-manual/docs/shgdm-part-6.pdf
	the Transport Agency – Research Report – Clear zones versus roadside barriers	http://www.nzta.govt.nz/resources/research/reports/517/
	the Transport Agency – high risk rural roads guide	http://www.nzta.govt.nz/resources/high-risk-rural-roads-guide/docs/high-risk-rural-roads-guide.pdf
	Austrroads Guide to Road Design Part 6: Roadside Design, Safety and Barriers	https://www.onlinepublications.austrroads.com.au/items/AGRD06-10

5.8.4 Bridges

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference:</p> <ul style="list-style-type: none"> • Bridge and other structures maintenance management - Section 5.4 • Structure Routine Maintenance – Bridges and other structures – section 6.3.1 <p>Description of Network Outcomes Contract requirement:</p> <ul style="list-style-type: none"> • The Contractor shall complete Routine Surveillance Inspections of bridges, large sign gantries, other road structures and retaining structures of those not inspected by the bridge consultant. • The inspections shall identify any obvious defect which may affect the safety of road users or anything else needing urgent attention, such as those safety items listed below: • Impact damage from vehicles, especially to structural elements, guardrails and handrails • Adequacy of signs and road marking • The Contractor shall complete all routine work necessary to maintain the condition and appearance of structures <p>(Note that the contractor is to build/ design to current standards, and the Transport Agency Safety team is to support the contractor and assess the safety of the design)</p> <p>Schedule of Prices: Covered under the Lump Sum</p>	
<p>Description, Deliverables</p>	<p>Description: If bridges are not protected by appropriate barriers systems (Section 5.8.3.1), they can be a hazard to road users.</p> <p>Deliverables: All new or replacement bridges on state highways are to be:</p> <ul style="list-style-type: none"> • Designed in accordance with the Transport Agency Bridge Manual. • maintained in accordance with the Transport Agency bridge Inspection and Maintenance Manual and • managed in accordance with the Network Operations Contract (if applicable) • Signed and marked in accordance with MOTSAM parts 1 and 2 (new TCD Manual part 5) 	
<p>Benefits</p>	<p>The benefits of them being designed, maintained, protected and noticeable are important for road safety.</p>	
<p>Other References</p>	<p>The Transport Agency – Bridge Manual</p>	<p>http://www.nzta.govt.nz/resources/bridge-manual/</p>
	<p>The Transport Agency – Bridge Inspection and Maintenance Manual</p>	<p>http://www.nzta.govt.nz/resources/bridge-inspection-maintenance-manual/</p>
	<p>The Transport Agency - MOTSAM</p>	<p>http://www.nzta.govt.nz/resources/motsam/part-1/</p>

5.8.5 Lighting

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference:</p> <ul style="list-style-type: none"> • Section 5.4 – Bridge and other structures maintenance management • Section 5.5.4 – Road Safety Theme inspections and reporting • Section 6.3.1 – Structures routine maintenance • Section 6.5 (6.5.1) – Carriageway lighting <p>Description of Network Outcomes Contract requirement: The contractor will be required to undertake:</p> <ul style="list-style-type: none"> • Routine structures maintenance of large lighting masts on bridges and other structures (Network Outcomes Contract – Section 5.4), and • When requested by the Principal, the Contractor shall provide a suitably qualified person to undertake road safety theme inspections and reporting • Shall complete all routine work necessary to maintain the condition and appearance of structures including maintaining lighting (Network Outcomes Contract – Section 6.3.1), • Routine traffic services maintenance, including Carriageway Lighting (road lighting, weigh pit and effluent facility lighting, belisha beacons, floodlighting and highmast lighting) (Network Outcomes Contract – Section 6.5 and 6.5.1) <p>(Note where it is not the responsibility of the contractor then lighting service can be delegated to the territorial authority)</p> <p>Schedule of Prices: Covered under the Lump Sum and Provisional Sum</p>
<p>Description, Deliverables</p>	<p>Description: Lighting can refer to a number of things, including that type of lighting that occurs within the road for safety and security of property and active road users (i.e. urban lighting and refuge beacons) and those that provide for safety or traffic moving along a road, such as light poles along a route and flag lighting at intersections.</p> <p>In New Zealand lighting required:</p> <ul style="list-style-type: none"> • To ensure a reasonable level of personal security is known as Category P lighting; and • To ensure road safety and lighting for traffic routes is called Category V lighting. <p>Under a Safe system, the Transport Agency also supports the local programmes of ‘undergrounding’ services, where funding allows, so that non-frangible lighting and/or service utility poles are removed from the roadside.</p> <p>Deliverables Three zones for placement of street lighting poles on the side of the road can be defined adjacent to the carriageway:</p> <p>Zone 1: No poles at all [0 - 0.7 m. with kerb]and [0 - 1.0 m. no kerb]</p> <p>Zone 2: Frangible poles only [defined by the RCAs clear zone policy or Austroads Guide to Road Design, Table 4.1]</p> <p>Zone 3: Unrestricted</p> <p>[Source: Road Safety Engineering Workshop – 2013 – Mike Jackett]</p> <p>Design and installation: All new or upgraded traffic route lighting installations</p>

	<p>should comply with the join Australian/New Zealand Standard for road lighting;</p> <p>AS/NZS 1158 Road Lighting Series; including:</p> <ul style="list-style-type: none"> ○ 1158.1.1: 2005 – Vehicular traffic (category V) lighting – Performance and design requirements ○ 1158.1.2: 2010 - Vehicular traffic (category V) lighting – Guide to design, installation, operation and maintenance ○ 1158.3.1: 2005 – Pedestrian Area (category P) lighting – Performance and design requirements ○ 1158.5: 2007 – Tunnels and underpasses ○ 1158.0: 2005 – Introduction ○ 1158.6: 2010 – Luminaires ○ 1158.4: 2009 – Lighting of pedestrian crossings <p>Austrroads Guides – Various (namely – Guide to Road Design Part 6 and 6B, Guide to Traffic Management ,and all Guides to Road Design)</p> <p>When designing any new or upgrades to lighting, LED lighting should be considered. Even though a higher initial cost, LED lighting requires less maintenance over a 15 year period and is more energy efficient. [Source: Road Safety Engineering Workshop – 2013 – Mike Jacket]</p> <p>Frangible Poles: As appropriate, avoid placing new lighting in hazard locations, protect poles or provide frangible poles in exposed, high speed locations and comply with relevant the Transport Agency specifications, including M/26: Specification for Lighting Columns</p> <p>Maintenance: The Transport Agency specification for the maintenance of highway lighting includes C/24: (and notes) Maintenance of highway lighting</p>						
<p>Benefits</p>	<p>The benefits of providing good lighting is that it improves forward visibility at night and leads to an improvement of those crashes that occur in dark or overcast conditions, and for personal security reasons. The crash benefits for night time casualties can be a 35% reduction when existing lighting is upgraded and a 35-60% reduction when lighting has been installed where there previously has been none. [Source: www.engtoolkit.com.au]</p>						
<p>Other References</p>	<table border="1"> <tr> <td data-bbox="518 1357 858 1429">AS/NZ Standards for road lighting</td> <td data-bbox="858 1357 1468 1429">http://shop.standards.co.nz/search/ed</td> </tr> <tr> <td data-bbox="518 1429 858 1464">Austrroads</td> <td data-bbox="858 1429 1468 1464">https://www.onlinepublications.austrroads.com.au/</td> </tr> <tr> <td data-bbox="518 1464 858 1527">the Transport Agency – Specification M/26</td> <td data-bbox="858 1464 1468 1527">http://www.nzta.govt.nz/resources/tubular-steel-lighting-columns/</td> </tr> </table>	AS/NZ Standards for road lighting	http://shop.standards.co.nz/search/ed	Austrroads	https://www.onlinepublications.austrroads.com.au/	the Transport Agency – Specification M/26	http://www.nzta.govt.nz/resources/tubular-steel-lighting-columns/
AS/NZ Standards for road lighting	http://shop.standards.co.nz/search/ed						
Austrroads	https://www.onlinepublications.austrroads.com.au/						
the Transport Agency – Specification M/26	http://www.nzta.govt.nz/resources/tubular-steel-lighting-columns/						

5.8.6 Safety Audits

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: N/A</p> <p>Description of Network Outcomes Contract requirement: Variation</p> <p>Schedule of Prices: Variation</p>	
<p>Description, Deliverables</p>	<p>Description: A road safety audit is intended to “help deliver a safe road system and is not a review of compliance with standards.” [www.nzta.govt.nz]. The key objective is to identify and rank potential safety concerns for all road users and others affected by a road project.</p> <p>Deliverables: Any project requiring funding (under the NLTP) must have a safety audit completed at the key stages of a projects. The decision to undertake a road safety audit for State highway projects is determined by the project manager for any specific project, and if a safety audit is not undertake then the project manager must complete an exemption declaration with the agreement of the Transport Agency’s Safety Engineer.</p> <p>Safety audits are to be undertaken using the Transport Agency safety audit procedures 2013 9 (interim release). In addition Austroads Guide to Road Safety Part 6: Road Safety Audit and Part 8: Treatment of Crash Locations (note these are both under review).</p> <p>The Project Manager should ensure that all recommendations are responded to and approved and actions completed. Any evaluation departs from recommended practice or comment on findings should be documented.</p>	
<p>Benefits</p>	<p>The benefits of undertaking a safety audit are to ensure that safety elements have been considered in all stages of the project and that it does/will not pose any significant risks to road users.</p>	
<p>Other References</p>	<p>the Transport Agency – Safety Audit guidelines</p>	<p>http://www.nzta.govt.nz/resources/road-safety-audit-procedures/docs/road-safety-audit-procedures-tfm9.pdf</p>
	<p>the Transport Agency – State Highway Control manual</p>	<p>http://hip.nzta.govt.nz/processes/maintain-and-operate/state-highway-control-manual</p>
	<p>Austroads – Part 6</p>	<p>https://www.onlinepublications.austroads.com.au/items/AGRS06-09</p>
	<p>Austroads – Part 8</p>	<p>https://www.onlinepublications.austroads.com.au/items/AGRS08-09</p>

5.9 Traffic Control Devices

5.9.1 Bylaws

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: Section 3.9 - Bylaws</p> <p>Description of Network Outcomes Contract requirement: The Contractor shall compile, maintain and submit in a timely manner amendments required to the Principal’s Bylaws, including, but not limited to, no-stopping, parking restrictions and speed limits</p> <p>(Note that bylaws or proposed changes to existing bylaws should be submitted to the Regional Transport Agency office to review and confirm content.</p> <p>Schedule of Prices: Covered under the Lump Sum</p>																					
<p>Description, Deliverables</p>	<p>Description: Bylaws are legal rules made by the Transport Agency for undertaking certain activities on State Highways. Some activities on the highway reserve can lead to unsafe environments so it is important to have a consistent approach to delivery of these key issues. In relation to this State Highway Safe Network Activity Manual, these include</p> <table border="1" data-bbox="528 1032 1469 1653"> <thead> <tr> <th>Bylaw Type</th> <th>Responsibility</th> </tr> </thead> <tbody> <tr> <td>Speed Limits</td> <td>Transport Agency Safety Engineer</td> </tr> <tr> <td>Signs on State Highways -2010</td> <td>Transport Agency Safety Engineer</td> </tr> <tr> <td>Roadside Vendors</td> <td>Network Managers/ Safety Engineers</td> </tr> <tr> <td>Movement of Stock</td> <td>To be confirmed</td> </tr> <tr> <td>Stopping and parking of vehicles (will be part of new Traffic Control Devices Bylaw)</td> <td>Network Managers</td> </tr> <tr> <td>Fishing off Bridges</td> <td>Network Managers</td> </tr> <tr> <td>Parking Management</td> <td>Transport Agency Safety Engineer delegated to relevant Council enforcement purposes)</td> </tr> <tr> <td>Traffic Control Devices bylaw (in preparation)</td> <td>To be confirmed</td> </tr> <tr> <td>Cars for Sale</td> <td>Transport Agency Safety Engineer</td> </tr> </tbody> </table> <p>Deliverables: Quarterly approval is required by the Board prior to any changes being made to the Speed Limits and No Stopping/Parking Restrictions bylaws. Timing of these is provided within the State Highway Control Manual. All other subject bylaws will be reviewed as and when required.</p>		Bylaw Type	Responsibility	Speed Limits	Transport Agency Safety Engineer	Signs on State Highways -2010	Transport Agency Safety Engineer	Roadside Vendors	Network Managers/ Safety Engineers	Movement of Stock	To be confirmed	Stopping and parking of vehicles (will be part of new Traffic Control Devices Bylaw)	Network Managers	Fishing off Bridges	Network Managers	Parking Management	Transport Agency Safety Engineer delegated to relevant Council enforcement purposes)	Traffic Control Devices bylaw (in preparation)	To be confirmed	Cars for Sale	Transport Agency Safety Engineer
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Traffic Control Devices bylaw (in preparation)	To be confirmed																					
Cars for Sale	Transport Agency Safety Engineer																					
<p>Benefits</p>	<p>A consistent approach to undertaking activities on the network improves road safety for all road users</p>																					
<p>Other References</p>	<p>Transport Agency</p>	<p>To be confirmed</p>																				

5.9.2 Traffic Signs and Markings

5.9.2.1 Signs

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: Section 6.5.1 – Routine Traffic Services Maintenance</p> <p>Description of Network Outcomes Contract requirement: The Traffic Services section allows for the routine traffic services maintenance of signs. The Contractor shall undertake an annual maintenance inspection on those sign types listed in Appendix 6.13 of the Network Outcome Contract.</p> <p>Schedule of Prices Covered under the Lump Sum</p>
<p>Description, Deliverables</p>	<p>Description: Road users depend on traffic signs to guide, warn and regulate them during daylight, darkness, and poor weather. Deficiencies in traffic signing can impact on road safety. A missing, improper, or poorly maintained sign can be a direct cause of a road crash.</p> <p>Deliverables: Signs must comply with the Land Transport Rule: Traffic Control Devices 2004 and amendments. Refer to Section 0 for trialling non-standard signs.</p> <p>In addition to the legal requirements, The <i>Traffic control devices manual (TCD Manual)</i> will provide guidance on industry good practice guidance on the installation and use of traffic signs. The TCD manual will supersede the Transport Agency’s Manual of Traffic Signs and Markings (MOTSAM); some parts of this manual are still under development and therefore MOTSAM Part 1: Signs can still be referred to.</p> <p>Specifications: The Transport Agency Traffic Specifications website contains the dimensional, colour and layout requirements for traffic signs in New Zealand. For each sign a table shows the allowed sizes with detailed dimensions. All dimensions are given in millimetres. EPS files for each traffic sign can be downloaded and imported directly into sign manufacturing or publication software.</p> <p>Maintenance, materials and Installation: The Transport Agency specification C20 outlines guidance for of the installation and maintenance of traffic signs, chevrons, markers, and signs rails.</p> <ul style="list-style-type: none"> • Transport Specification P/24 sets out the requirements for the design, manufacture, installation and maintenance of permanently installed traffic signs used on the state highway network. • Land Transport Rule: Traffic Control Devices, and the Transport Agency TCD Manual and Traffic Specifications outline the reflectorisation requirements. • Specific maintenance requirements are included within the relevant Network Outcomes Contract. • Road Safety Billboards are included within the Transport Agency’s State Highway Control Manual. <p>Durability, Strength and Performance: The new standard titled the ‘RSMA COMPLIANCE STANDARD FOR TRAFFIC SIGNS’, dated March 2003, is the only [the Transport Agency] endorsed Compliance Standard to [the Transport Agency] Specification P/24:2003. This document was designed to set minimum requirements for durability, strength and performance of goods and services for use by manufacturers and suppliers of traffic signs and their support systems.” [www.RSMA.org.nz]</p>
<p>Benefits</p>	<p>The benefits of good signage are the provision of a clear and consistent message to road users and help deliver a no surprises environment to improve safety.</p>
<p>Other References</p>	<p>Land Transport Rule: Traffic http://www.nzta.govt.nz/resources/results.html?c</p>

	Control Devices	atid=84
	The Transport Agency - TCD Manual	http://www.nzta.govt.nz/resources/traffic-control-devices-manual/index.html
	The Transport Agency - MOTSAM	http://www.nzta.govt.nz/resources/motsam/part-3/index.html
	The Transport Agency - State Highway Control manual	http://hip.nzta.govt.nz/processes/maintain-and-operate/state-highway-control-manual
	The Transport Agency – Traffic Specs	http://www.nzta.govt.nz/resources/traffic-control-devices-manual/sign-specifications/
	The Transport Agency – Proforma Manual	http://www.nzta.govt.nz/resources/state-highway-maintenance-contract-proforma-manual/
	RSMA- Compliance Standard	http://www.rsma.org.nz/index.asp?g_csset=1

5.9.2.2 Markings

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: Section 6.5.1 – Routine Traffic Services Maintenance – pavement marking</p> <p>Description of Network Outcomes Contract requirement: Pavement-marking programme development shall be completed in collaboration with the Principal and General condition inspection results. Two pavement-marking programmes shall be prepared by the Contractor and presented to the Principal by the 1ST September each year:</p> <p>NZTA P/22 maintenance programme NZTA P/30 maintenance programme for high-performance road marking</p> <p>Schedule of Prices: Covered under a provisional sum</p>	
<p>Description, Deliverables</p>	<p>Description: Road users make use of road markings to guide and warn them during daylight, darkness and poor weather.</p> <p>Deliverables: All markings must comply with the Land Transport Rule: Traffic Control Devices. In addition to the legal requirements, The <i>Traffic control devices manual (TCD Manual)</i> will provide guidance on industry good practice guidance on installation and use of road markings. The TCD manual will supersede the Transport Agency Manual of Traffic Signs and Markings (MOTSAM, however some parts of this manual are still under development and therefore MOTSAM Part 2: Markings can still be referred to.</p> <p>Skid resistance (of markings): requirements are provided within each of the road marking specifications listed above.</p>	
<p>Benefits</p>	<p>Pavement lines and markings can increase traffic capacity, improve safety and contribute to the orderly use of design paths by drivers, particularly at critical points in the road system. Pavement lines and markings are also used to supplement some traffic signs</p>	
<p>Other References</p>	<p>The Transport Agency - Specification M/7</p> <p>the Transport Agency - Specification M/20</p> <p>the Transport Agency – Specification M/24</p> <p>the Transport Agency – Specification P/22</p> <p>the Transport Agency – Specification P/30</p> <p>The Usability and Safety of Audio Tactile Profiled Road Markings</p> <p>Profiled edge lines</p>	<p>http://www.nzta.govt.nz/resources/roadmarking-paints/</p> <p>http://www.nzta.govt.nz/resources/long-life-roadmarking-materials/</p> <p>http://www.nzta.govt.nz/resources/audio-tactile-profiled-roadmarkings/</p> <p>http://www.nzta.govt.nz/resources/reflectorised-pvmt-marking/</p> <p>http://www.nzta.govt.nz/resources/high-performance-roadmarking/docs/high-performance-roadmarking.pdf</p> <p>http://www.nzta.govt.nz/resources/research/reports/365/docs/365.pdf</p> <p>http://www.nzta.govt.nz/resources/audio-tactile-profiled-roadmarkings-guidelines/docs/atp-guidelines.pdf</p>

5.9.2.3 Delineation

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: Section 6.5.1 – Routine Traffic Services Maintenance – raised pavement markers and marker posts</p> <p>Description of Network Outcomes Contract requirement: The contractor shall maintain [edge marker] posts in a clean condition and in a vertical position with reflectors of the correct type facing oncoming traffic and replace or repair damaged posts or reflectors</p> <p>All hardware installed [for raised pavement markings] shall comply with the <i>Manual of Traffic Signs and Makings</i></p> <p>Schedule of Prices: Covered under the Lump Sum</p>	
<p>Description, Deliverables</p>	<p>Description: Delineation is used by drivers to assist them to make navigation and control decisions, and highlight hazards. Adequate delineation slows the driver to keep the vehicle within the traffic lane, and plan the immediate forward driving task. Delineation should be consistent and continuous to provide good safety benefits. Benefits of specific delineation measures can be found in the Transport Agency High Risk Rural Roads Guide.</p> <p>Deliverables: All delineation devices (Edge Marker Posts; Raised Pavement Markers; Chevrons – curve advisory signs, and Bridge End Markers) must comply with the Land Transport Rule: Traffic Control Devices 2004 and subsequent amendments.</p> <p>In addition to the legal requirements, The <i>Traffic control devices manual (TCD Manual)</i> will provide guidance on industry good practice guidance on installation and use of road markings. The TCD manual will supersede the Transport Agency Manual of Traffic Signs and Markings (MOTSAM), however some parts of this manual are still under development and therefore MOTSAM Part 2: Markings can still be referred to.</p> <p>The Transport Agency guidelines and specifications are provided which outline the need, placement, manufacture, installation and maintenance of edge marker posts, RPM’s, Chevrons and Bridge End Markers are referenced below.</p>	
<p>Benefits</p>	<p>Delineation can improve safety and contribute to the orderly use of design paths by drivers, particularly at critical points in the road system. Delineation is used to supplement other pavement markings and some traffic signs</p>	
<p>Other References</p>	<p>The Transport Agency – RTS 5</p> <p>The Transport Agency – MOTSAM – Part 2/Section 5</p> <p>The Transport Agency – TCD Manual</p> <p>The Transport Agency Specification –M/14</p> <p>The Transport Agency Specification –P/16</p> <p>The Transport Agency Specification –M/12</p> <p>The Transport Agency Specification –P/14</p> <p>The Transport Agency – Traffic Note 25</p> <p>The Transport Agency Specification –C/20</p>	<p>http://www.nzta.govt.nz/resources/road-traffic-standards/docs/rts-05.pdf</p> <p>http://www.nzta.govt.nz/resources/motsam/part-2/docs/motsam-2-section-5.pdf</p> <p>http://www.nzta.govt.nz/resources/traffic-control-devices-manual/index.html</p> <p>http://www.nzta.govt.nz/resources/edge-marker-posts/</p> <p>http://www.nzta.govt.nz/resources/edge-marker-posts-installation/index.html</p> <p>http://www.nzta.govt.nz/resources/raised-pvmt-markers/</p> <p>http://www.nzta.govt.nz/resources/raised-pvmt-markers-installation/docs/raised-pvmt-markers-installation.pdf</p> <p>http://www.nzta.govt.nz/resources/traffic-notes/docs/traffic-note-25-rev1.pdf</p> <p>http://www.nzta.govt.nz/resources/erection-maint-traffic-signs/docs/erection-maint-traffic-</p>

5.9.2.4 Reflectivity Management

Network Outcomes Contract Reference	<p>Network Outcomes Contract Reference: Section 6.5.1 – Traffic Services Maintenance</p> <p>Description of Network Outcomes Contract requirement:, There are outcome requirements for traffic control devices which include missing signs or reflectors, illegible, incorrectly located and what level of reflectivity for approach visibility and whether it meets the requirements of the network contract</p> <p>Schedule of Prices: Covered under the Lump Sum</p>																																																				
Description, Deliverables	<p>Description: Reflectivity management refers to:</p> <ul style="list-style-type: none"> • Traffic Control Devices (Traffic Signs and Markings) • Lighting (Section 5.8.5) <p>Reflectivity of traffic control devices is included in the Land Transport Rule: Traffic Control Devices. If the rule requires any part of a traffic sign to be reflectorised then it must use material approved by the Transport Agency of the Transport Agency by notice in the Gazette.</p> <p>Deliverables - Traffic signs are installed to aid the safe and orderly movement of traffic. Therefore, they need to be clear and conspicuous in both day-time and night-time conditions.</p> <p>The visibility of signs can be largely determined through the:</p> <ul style="list-style-type: none"> • Sign reflectivity (Section 8.2 of the Transport Agency TCD Manual Part 1: General Requirements for traffic control devices), • Sheeting type (Section 8.3 of the Transport Agency TCD Manual Part 1: General Requirements for traffic control devices) and • Levels of illumination (Section 8.4 of the Transport Agency TCD Manual Part 1: General Requirements for traffic control devices). • Standard 1906.1 Retro reflective materials and devices for traffic control purposes, part 1 Retro reflective sheeting (AS/NZS 1906.1:2007) <p>Sheeting Type</p> <p>The following use of reflective material types meets current practice</p> <table border="1"> <thead> <tr> <th>Sign or Sign Category</th> <th>Fluorescent</th> <th>Class 1 Prismatic WOA</th> <th>Class 1 High Intensity</th> </tr> </thead> <tbody> <tr> <td>Standard Guide Signs (Urban)</td> <td></td> <td>✓</td> <td></td> </tr> <tr> <td>Standard Guide Signs (Rural)</td> <td></td> <td></td> <td>✓</td> </tr> <tr> <td>Overhead Guide Signs</td> <td></td> <td>✓</td> <td></td> </tr> <tr> <td>Stops and Give Ways</td> <td></td> <td>✓</td> <td>✓</td> </tr> <tr> <td>RG 17 – keep left</td> <td></td> <td>✓</td> <td>✓</td> </tr> <tr> <td>Width (bridge end) markers</td> <td></td> <td></td> <td>✓</td> </tr> <tr> <td>Tourist signs</td> <td></td> <td></td> <td>✓</td> </tr> <tr> <td>Street Name blades</td> <td></td> <td>✓</td> <td>✓</td> </tr> <tr> <td>Permanent Warning signs</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>White and Yellow background signs</td> <td></td> <td></td> <td>✓</td> </tr> <tr> <td>Temporary Warning</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>IG-I1 Fingerboard</td> <td></td> <td>✓</td> <td></td> </tr> </tbody> </table> <p>Source: Road Safety Engineering Workshop - Part 8: Signs, Markings and Delineation, May 2013 (updated)</p> <p>Deliverables – Road markings visibility can be largely be attributed to:</p>	Sign or Sign Category	Fluorescent	Class 1 Prismatic WOA	Class 1 High Intensity	Standard Guide Signs (Urban)		✓		Standard Guide Signs (Rural)			✓	Overhead Guide Signs		✓		Stops and Give Ways		✓	✓	RG 17 – keep left		✓	✓	Width (bridge end) markers			✓	Tourist signs			✓	Street Name blades		✓	✓	Permanent Warning signs	✓	✓	✓	White and Yellow background signs			✓	Temporary Warning	✓	✓	✓	IG-I1 Fingerboard		✓	
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Permanent Warning signs	✓	✓	✓																																																		
White and Yellow background signs			✓																																																		
Temporary Warning	✓	✓	✓																																																		
IG-I1 Fingerboard		✓																																																			

	<ul style="list-style-type: none"> • Reflective qualities (i.e. percentage of glass beads) • Product type (i.e. long life, cold applied plastic) • Width • Height i.e. ribbed markings <p>Deliverables –Lighting. The use of any lighting in terms of reflectivity management should ensure that lighting arrangements are consistent with corridor and intersection layouts, are orientated correctly to provide even distribution of light and do not distract from the driving task. The specific requirements can be found within the AS/NZS 1158 Road lighting series.</p>						
Benefits	Visible markings provide a clear and consistent message to road users regarding risk on the road and help address lane keeping, crashes relating to those in the dark and wet conditions and fatigue.						
Other References	<table border="1"> <tr> <td data-bbox="518 714 766 817">Land Transport Rule – Traffic Control Devices</td> <td data-bbox="766 714 1468 817">http://www.nzta.govt.nz/resources/results.html?catid=84</td> </tr> <tr> <td data-bbox="518 817 766 913">The Transport Agency – TCD Manual</td> <td data-bbox="766 817 1468 913">http://www.nzta.govt.nz/resources/traffic-control-devices-manual/index.html</td> </tr> <tr> <td data-bbox="518 913 766 978">AS/NZS 1906.1:2007</td> <td data-bbox="766 913 1468 978">http://shop.standards.co.nz/catalog/1906.1%3A2007(AS%7C%20NZS)/view</td> </tr> </table>	Land Transport Rule – Traffic Control Devices	http://www.nzta.govt.nz/resources/results.html?catid=84	The Transport Agency – TCD Manual	http://www.nzta.govt.nz/resources/traffic-control-devices-manual/index.html	AS/NZS 1906.1:2007	http://shop.standards.co.nz/catalog/1906.1%3A2007(AS%7C%20NZS)/view
Land Transport Rule – Traffic Control Devices	http://www.nzta.govt.nz/resources/results.html?catid=84						
The Transport Agency – TCD Manual	http://www.nzta.govt.nz/resources/traffic-control-devices-manual/index.html						
AS/NZS 1906.1:2007	http://shop.standards.co.nz/catalog/1906.1%3A2007(AS%7C%20NZS)/view						

5.9.2.5 Trials

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: N/A</p> <p>Description of Network Outcomes Contract requirement: N/A</p> <p>Schedule of Prices: Variation</p>
<p>Description, Deliverables, Safety Team</p>	<p>Description: Any application to temporarily trial a non-standard traffic control device (i.e. one that is not provided for within the Land Transport Rule: traffic Control Devices 2004) is to be signed off by the Principal and sent to the NZ Transport Agency for approval.</p> <p>Deliverables:</p> <p>The necessary elements of a trial of traffic control devices is provided for with the Transport Agency’s Traffic Control Devices Manual: Part 1 General requirements for traffic signs</p> <p>The following Transport Agency Traffic Notes detail information on trials and those that are currently approved:</p> <p>Traffic Note 10: Trials of traffic control devices – Guidelines (to be superseded by the TCD Manuals)</p> <p>Traffic Note 14: Approved trials of traffic control devices – information (to be superseded by the TCD Manuals)</p> <p>Note that the responsibilities of the:</p> <ul style="list-style-type: none"> • National Traffic & Safety Manager for trials involves: <ul style="list-style-type: none"> ➢ Consulting with other sections within NZTA, including Legal Counsel, as appropriate for all proposed trials. ➢ Submitting proposed trials to the Group Manager RP&P or appropriate delegate for authorisation. Note that normally, the agreement of the Traffic Control Devices Steering Group will be necessary prior to authorisation. ➢ Notifying such authorisation along with any conditions imposed to the originator of the request for the trial. ➢ Submitting a copy of the final results of the trial to all State Highway Managers and the Group Manager RP&P. ➢ Ensuring all trials are registered in a central database and progress is tracked through to completion. The National Safety Engineer is responsible for the database. ➢ Distributing a copy of the database and its updates to all State Highway Managers and the Group Manager RP&P. • Highway Strategy and Standards Manager for trials includes: <ul style="list-style-type: none"> ➢ Ensuring all necessary approvals is obtained from the Access & Use Group, NZTA. ➢ Ensuring the results of all trials is considered and a decision is made on whether existing NZTA policy should be amended. ➢ Notifying the originator of the request to trial, and the Principal Advisor State Highway Operations, of the decision made above. ➢ Amending, as necessary, NZTA policy for traffic control devices
<p>Benefits</p>	<p>The benefits of undertaking trials using a formal process, is that it can be completed in a controlled environment and allow an informed decision to made on the use of</p>

	that traffic control device in the future, and prevents installation of uncontrolled and potentially risky or ineffective treatments.	
Other References	The Transport Agency – Land Transport Rule: Traffic Control Devices	http://nzta.thomsonreuters.co.nz/DLEG-NZL-LTSA-T.LTR-54002.pdf
	The Transport Agency – TCD Part 1	http://www.nzta.govt.nz/resources/traffic-control-devices-manual/docs/draft-tcd-traffic-signs.pdf
	The Transport Agency Traffic Note 10	http://www.nzta.govt.nz/resources/traffic-notes/docs/traffic-note-10-rev3.pdf
	The Transport Agency Traffic Note 14	http://www.nzta.govt.nz/resources/traffic-notes/docs/traffic-note-14-rev4.pdf

5.9.3 Traffic Signals

Network Outcomes Contract Reference	<p>Network Outcomes Contract Reference: Existing Services – Section 3.10</p> <p>Description of Network Outcomes Contract requirement: The Contractor responsibility is related to existing services, and where all existing inductance loops relating to traffic counting and traffic signal control must be protected at all times</p> <p>Schedule of Prices: N/A</p>	
Description, Deliverables	<p>Description: Traffic Signals are generally intersection control devices used in urban areas and occasionally rural areas. Traffic signals can be used at:</p> <ul style="list-style-type: none"> • Intersections • Midblock pedestrian facilities; and • Roundabout metering • Ramp metering <p>Deliverables: All traffic signals on State Highways must comply with the Land Transport Rule: Traffic Control Devices, 2004.</p> <p>All traffic signal installation should have a safety audit undertaken (Section 0). It is important the any phasing, operational and maintenance deficiencies are also added to the Safety Improvements Database (Section 5.2). It is recommended that a signal safety expert be included as part of the safety audit team.</p> <p>New and upgraded installations are to be designed in accordance with the following Austroads Standards as referenced below.</p> <p>Maintenance and repair of Traffic signals on State Highways are to be done in accordance with the Transport Agency Specification C/25: Maintenance and Repair of Traffic Signal Installations</p> <p>Other tools that may assist investigations include SIDRA and SCATS</p>	
Benefits	<p>The benefits of using and having well maintained and correct phasing of traffic signals are a significant reduction in both the number and severity of conflicts.</p>	
Other References	<p>Land Transport Rule – Traffic Control Devices</p>	<p>http://www.nzta.govt.nz/resources/rules/traffic-control-devices-index.html</p>
Other References	<p>Austroads – RD Part 4a Unsignalised and Signalised Intersections</p>	<p>https://www.onlinepublications.austroads.com.au/items/AGRD04A-10</p>
Other References	<p>Austroads – TM Part 6 : Intersections, Interchanges, and Crossings</p>	<p>https://www.onlinepublications.austroads.com.au/items/AGTM06-13</p>
Other References	<p>Austroads – TM Part 9 - Traffic Operations</p>	<p>https://www.onlinepublications.austroads.com.au/items/AGTM09-09</p>
Other References	<p>Austroads – TM Part 10 Traffic Control and communication Devices</p>	<p>https://www.onlinepublications.austroads.com.au/items/AGTM10-09</p>
Other References	<p>The Transport Agency – Maintenance and Repair Specification– C/25</p>	<p>http://www.nzta.govt.nz/resources/maint-repair-traffic-signal-installations/index.html</p>
Other References	<p>The Transport Agency – high risk intersection guide</p>	<p>http://nzta.govt.nz/resources/high-risk-intersections-guide/</p>
Other References	<p>the Transport Agency – Traffic note</p>	<p>http://www.nzta.govt.nz/resources/traffic-</p>

	60	notes/docs/traffic-note-60.pdf
	The Transport Agency – Pedestrian and Planning Design Guide	http://www.nzta.govt.nz/resources/pedestrian-planning-guide/docs/pedestrian-planning-guide.pdf
	The Transport Agency – Ramp Metering	http://www.nzta.govt.nz/resources/intelligent-transport-systems-05-03/docs/its-05-03.pdf
	The Transport Agency – Safety Audit Findings	http://www.nzta.govt.nz/resources/stop-and-goes-of-traffic-signals/docs/stop-and-goes-of-traffic-signals.pdf

5.9.4 Speed Management

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: N/A</p> <p>Description of Network Outcomes Contract requirement: N/A</p> <p>Schedule of Prices: N/A</p>	
<p>Description, Deliverables</p>	<p>Description: Under a Safe System, designers are required to protect road users who are alert and compliant are protected from death and serious injury. There are four key components of a Safe System which includes Safe Speeds that suit the function and level of safety of the road. Road users understand and comply with speed limits and drive to the conditions.</p> <p>Speed management is about achieving safe and appropriate speeds on New Zealand’s road network, reflecting different road types and the risks that exist on them. Speed Management requires input from policy makers, engineers, educators, the Police, and the general public in order to be effective.</p> <p><i>Note: “The government is reviewing best practice and ways of moving towards a speed management system that takes into account the function and use of roads using the safe system principles.</i></p> <p><i>A good speed limit regime is expected to provide clear and consistent messages to road users and communities and would promote understanding and support for speed limits.</i></p> <p><i>Realistic and credible speed limits need to be appropriate for the road environment and could be expected to make use of new technology as it becomes available to assessing, manage and improve compliance with speed limits.”</i></p> <p>Deliverable:</p> <p>Any development of a speed management plan with associated recommendations should be undertaken with a working group encompasses key stakeholders; specifically the New Zealand Police, Engineers, Territorial Authorities, Planners and Educators.</p> <p>All speed management devices including any speed limit signs and traffic control devices must comply with the Land Transport Rule: Speed Limit Setting and Land Transport Rule: Traffic Control Devices.</p>	
<p>Benefits</p>	<p>Crash reductions due to changes in mean speed are significant and effective in reducing deaths and serious injuries further information on benefits is provided within the Transport Agency’s high-risk rural roads guide</p>	
<p>Other References</p>	<p>NZ Transport Agency’s Safer Journeys</p> <p>NZ Transport Agency’s Safer Journeys _Action Plans</p> <p>Austrroads – Part 3</p> <p>World Health Organisation</p> <p>NZ Transport Agency – high risk rural roads guide</p>	<p>http://www.saferjourneys.govt.nz/about-safer-journeys/frequently-asked-questions/safe-speeds/</p> <p>http://www.saferjourneys.govt.nz/assets/Uploads/Safer-Journeys-Action-plan-2013-2015.pdf</p> <p>https://www.onlinepublications.austrroads.com.au/items/AGRS03-08</p> <p>http://www.who.int/roadsafety/projects/manuals/speed_manual/en/</p> <p>http://www.nzta.govt.nz/resources/high-risk-rural-roads-guide/docs/high-risk-rural-roads-guide.pdf</p>

5.9.5 Speed Limits

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: Bylaws – Section 3.9, and Temporary Speed Restrictions - section 5.3.8</p> <p>Description of Network Outcomes Contract requirement:</p> <p>Bylaws - The Contractor shall compile, maintain and submit in a timely manner amendments required to the Principal’s Bylaws including speed limits (amongst others)</p> <p>Temporary Speed limits - the contractor is delegated (by the State Highway Manager) to approve and record temporary speed restrictions at work-sites are delegated to the Contractor.</p> <p>Schedule of Prices: Covered under the Lump Sum and Provisional Sum</p>
<p>Description, Deliverables</p>	<p>Description: Speed limits are used to inform road users of the most appropriate speeds for a particular area or corridor. Setting and maintaining speeds limits will be an on-going task that requires input and agreement from a wide range of parties</p> <p>The current legislation and process for undertaking speed limits setting is by using Speed limits New Zealand which are defined and determined within Land Transport Setting of Speeds limits rule, 2004.</p> <p>Deliverables:</p> <p>Bylaws and Gazettes: Under the Government Rounding Powers Act the Transport Agency has the power to make bylaws (Section 5.9.1.) to set speed limits. Within that Act it also states that that Transport Agency must advise their bylaws by way of a notice in the NZ Gazette. Other Road Controlling authorities have the power to set speed limits by way of bylaws under the Local Government Act without using the gazette process.</p> <p>Speed zones are a speed limit that has been posted based on the 85th percentile operating speeds along a section of road, rather than the frontage based process defined in the Rule. There has been some trials undertaken with these types of speed limits. The Government is currently reviewing speed management practices including this method of setting speed limits. (Section 0)</p> <p>Temporary speeds limits must comply with the requirements detailed in COPPTM and can be used where:</p> <ul style="list-style-type: none"> • There is a specific safety issue that cannot be immediately addressed and needs a lower speed limit in place to reduce risk i.e. where an intersection access has a sudden increase in crashes, where there are deficiencies in SCRIM, an event or incident (Sections 0 and 5.10). • There is a construction zone <p>Safety Team uses the following process for setting speed limits:</p> <ul style="list-style-type: none"> • To initiate the process, either the Transport Agency becomes aware that the roading environment or use of a road has changed, or the Agency has received a request from one of our road safety partners or the public for a change to the speed limit; then • The Agency may commission a formal review of the speed limit in accordance with the requirements of Land Transport Rule 54001 <i>Setting of Speed Limits</i>; then

	<ul style="list-style-type: none"> • If the Speed Limit Review Report appears to be reasonable, and a change is warranted, the report is then forwarded to the Agency's National Safety Engineer for endorsement; then • If the proposal is endorsed by the National Safety Engineer, the Transport Agency must then enter into formal, mandatory consultation with <i>at least</i> the NZTA P&I Division, the Police, the local RCA/TA, National Road Transport Association, the NZ Automobile Association any local community group that the RCA/TA considers to be affected by the proposal and any other road user group that the RCA considers to be affected by the proposed speed limit; then • When the consultation phase has been completed satisfactorily, a sample consultation letter, response, and a draft Gazette Notice must then be sent to the National Safety Engineer for ratification, requesting promulgation of the change to the NZTA's Bylaw by Public Notice in the NZ Gazette; then the "proof" of the <i>Gazette Notice</i> will need to be checked in the Regional Office prior to publication; then after the Notice has been published, a copy of the Notice should be obtained to ensure the legality of the change; then instructions can be issued to the Agency's consultants/contractors, requesting that the traffic signs be installed to define the value and extent of the changed speed limit. The signs must not be changed until at least 28 days after publication of the Gazette Notice advising the public of the change; then • 'THANK YOU' letters must be sent to all those organisations consulted with, along with a copy of the Gazette Notice and often another copy of the supportive plan(s); then • Some changed speed limits require monitoring and analysis following implementation; then • A copy of all relevant documents relating to changes of speed limits are required to be kept and are occasionally audited. 	
Benefits	Crash reductions due to changes in mean speed are significant and effective in reducing deaths and serious injuries> further information on benefits is provided within the Transport Agency's high-risk rural roads guide	
Other References	Land Transport Rule: Setting of Speed Limits	http://www.nzta.govt.nz/resources/results.html?catid=82
	Austroads – Report AP-R272-05	https://www.onlinepublications.austroads.com.au/items/AP-R272-05
	Austroads Guide to Road Safety Part 3	https://www.onlinepublications.austroads.com.au/items/AGRS03-08
	NZ Transport Agency - Traffic Note 61	http://www.nzta.govt.nz/resources/traffic-notes/docs/traffic-note-61.pdf
	Speed Limits in the Safe System Concept' (source Journal of the Australasian College of Road Safety – May 2010)	www.acrs.org.au/publications/journalscurrentandbackissues.html
	World Health Organisation	Speed Management: A Road Safety Manual for Decision Makers and Practitioners

5.9.6 Temporary Traffic Management

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: Traffic Control Plan - Section 4.3 Temporary Traffic Management and Safety of Work sites - Section 5.3.7 Temporary Speed Restrictions - Section 5.3.8</p> <p>Description of Network Outcomes Contract requirement:</p> <ul style="list-style-type: none"> • All Traffic Management Plan’s (TMPs) required to perform the Contract Works must be developed by the Contractor and accepted by the Principal • The Contractor shall coordinate TMP approvals to eliminate conflicts between work-sites, particularly in respect to timing and journey-time reliability through fulfilling the TMC roles as required by CoPTTM • The Contractor shall have suitably qualified and experienced personnel with the appropriate qualifications as required by CoPTTM to fulfil the following responsibilities • The Contractor shall carry out TMP audits in accordance with the CoPTTM on a random sample of all parties working within the road corridor • In terms of the Traffic Control Devices Rule, the powers of the State Highway Manager to approve and record temporary speed restrictions at work-sites are delegated to the Contractor <p>Schedule of Prices: Covered under the Lump Sum</p>
<p>Description, Deliverables</p>	<p>Description: Construction and maintenance activities often result in increased road safety risks, reduced traffic capacities, delays, and loss of access to abutting properties and businesses.</p> <p>Deliverables: The Transport Agency Code of Practice for Temporary Traffic (COPTTM) is the standard reference for all temporary traffic management on state highways and local roads. It includes levels of temporary traffic management, signs and forms used, and a series of sample traffic management plans (TMPs).</p> <p>Information on plans, temporary speeds restrictions, approvals and audit of TMP’s are included within the Network Outcomes Contract. TMP audit findings will be included as part of the Contractors monthly report and OPM compliance controls.</p>
<p>Benefits</p>	<p>The benefits of temporary traffic management are acceptable levels of safety and traffic service. Effective management of traffic through work zones is essential.</p>
<p>Other References</p>	<p>The Transport Agency - COPTTM http://www.nzta.govt.nz/resources/code-temp-traffic-management/</p>

5.10 Incident Management

Incident Management

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: Emergency Procedures and Preparedness Plan (EPPP) - Section 4.7 Operational Activities – incident response - Section 6.6.1 Incident Response - Section 7.4</p> <p>Description of Network Outcomes Contract requirement:</p> <p>The Contractor must:</p> <ul style="list-style-type: none"> • Develop an EPPP must be developed by the Contractor with agreement from the Principal and any other stakeholders the Principal may identify • Manage the incident in accordance with Section 5.3.5 of the Network Outcomes Contract Maintenance Specification. • Provide sufficient resources to attend to all incidents 24 hours a day, seven days a week (regardless of risk allocation). • Respond according to the Contractor’s Emergency Procedures and Preparedness Plan • Provide appropriate signage and barriers at all road closures, including changing permanent road condition signs before and after the closure. • Manage road closure barricades at all times. • Provide incidence response reports as part of the monthly meetings <p>(Note that the safety team must ensure that any emergency reinstatement works are safety audited or passed as fit for purpose from the point of view of safe travel).</p> <p>Schedule of Prices: Covered under the Lump Sum (up to 10 hours per incident) then a variation</p>
<p>Description, Deliverables</p>	<p>Description: Incident management is how the Transport Agency will identify, analyse and respond to any issues or potential risk that occurs on roads and roadsides within the network.</p> <p>Deliverables: Note there is a national Transport Agency incident management document currently being developed.</p>
<p>Benefits</p>	<p>The benefits in dealing with incident management in a methodical manner are reducing delays and risks and returning the road back to the normal operating conditions.</p>
<p>Other References</p>	<p>CIMS http://www.civildefence.govt.nz/memwebsite.nsf/Files/The-Guide-2009-revision/\$file/section-14-cims.pdf</p>

5.11 Land Development and Access Management

5.11.1 Access Management

Access management is the control of traffic (including pedestrians and cyclist) entering from other roads, including intersections, driveways, and median crossovers.

Access control manages the variety and spacing of events to which a driver must respond.

The benefits of managing the frequency of intersection and median openings, prevents direct access from abutting property and reduces conflict. The use of other frontage road, road by-passes, and turning lanes can help to improve access management.

5.11.1.1 Motorways

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: Corridor Access Management – Section 5.3.10</p> <p>Description of Network Outcomes Contract requirement: The Contractor shall coordinate, review and manage all activities that require access to the road The Contractor’s safety engineer will check the Access Control report (ACR) and send to the Transport Agency planning and safety team to approve.</p> <p>Schedule of Prices: Covered under the Lump Sum</p>	
<p>Description, Deliverables</p>	<p>Description: Under the Government Roding Powers Act 2008 (previously Transit Act 1989) motorways can be declared. Under KiwiRAP they are likely to be a 4 or 5 star road. Refer back to the One Network Road classification for information on road classification and level of service (Section 6.2.3.2). Under the Government Roding Powers Act 2008 (previously Transit Act 1989) the direct access from abutting properties, pedestrian, cycle, and equestrian traffic, and the stopping and parking of vehicles is prohibited on a Motorway. Deliverables: Refer to the NZ Transport Agency’s State Highway control Manual which sets out the Transport Agency (NZTA) powers and policy with regard to State highways in terms of a number of key areas and issues in relation to the management of motorways.</p>	
<p>Benefits</p>	<p>A motorway will have facilities are in place (median and side barriers) and reduced conflict due to less access and no vulnerable road users; thus providing a high quality, safer road.</p>	
<p>Other References</p>	<p>the Transport Agency – Planning Policy Manual</p>	<p>http://www.nzta.govt.nz/resources/planning-policy-manual/</p>
	<p>the Transport Agency – State Highway Control Manual – section 1.3</p>	<p>http://www.nzta.govt.nz/resources/state-highway-control-manual/ Re</p>
	<p>the Transport Agency – TCD Manual – Part 10</p>	<p>http://www.nzta.govt.nz/resources/motsam/part-3/motsam-3.html</p>

5.11.1.2 Expressways

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: Corridor Access Management – Section 5.3.10</p> <p>Description of Network Outcomes Contract requirement: The Contractor shall coordinate, review and manage all activities that require access to the road, and the Contractor’s safety engineer will check the Access Control report (ACR) and send to the Transport Agency planning and safety team to sign off</p> <p>Schedule of Prices: Covered under the Lump Sum</p>	
<p>Description, Deliverables</p>	<p>Description: Expressways are high speed road with minimal direct property access, and may have a mix of grade separated and at grade-intersections. Typically expressways are 100km/h. Expressways are managed with a high level of access control typically by the use of segregation strips (refer to NZ Transport Agency’s Planning Policy Manual) Pedestrians and cyclists are usually permitted.</p> <p>Under KiwiRAP they are likely to be a 4-star road (Section 6.2.1.3).</p> <p>Refer back to the One Network Road classification for information on road classification and level of service (Section 6.2.3.2).</p> <p>Deliverables: Refer to the NZ Transport Agency’s State Highway control Manual which sets out the Transport Agency (NZTA) powers and policy with regard to State highways in terms of a number of key areas and issues in relation to the management of expressway type roads.</p>	
<p>Benefits</p>	<p>Consistent road environments provide better driving conditions and perform better in terms of safety risk</p>	
<p>Other References</p>	<p>the Transport Agency – State Highway Control Manual – section 1.3</p>	<p>http://www.nzta.govt.nz/resources/state-highway-control-manual/</p>

5.11.1.3 Limited Access Road (LAR)

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: Unauthorised Works – section 5.3.12</p> <p>Description of Network Outcomes Contract requirement: Where the existing road is declared Limited Access Road (LAR), the Contractor shall, in addition to the above, monitor all accesses against schedules, plans and notices provided by the Principal to ensure compliance with the LAR declaration</p> <p>Schedule of Prices: Covered under the Lump Sum</p>	
<p>Description, Deliverables</p>	<p>Description:</p> <p>Under the Government Roothing Powers Act, 2008 (previously Transit Act 1989) the Transport Agency has the power to create and revoke limited access roads</p> <p>LARs allow the Transport Agency to manage access from abutting property. The Transport Agency has control over the number, design, and location of access on LARs, although each property has legal right to one access to either the state highway or a district road.</p> <p>Under a safe system it is important to manage access to reduce the number of conflict areas along a highway and ensure adequate sight distances and turning facilities are considered.</p> <p>Deliverables: Refer to the Transport Agency Planning and Policy Manual, Section 5.2 – Development and Access and the State Highway Control Manual. In Summary:</p> <p>State Highway Managers are responsible for initiating declaration proposals, provided the lengths proposed are in accordance with the following:</p> <ul style="list-style-type: none"> • the National State Highway Strategy; and • the annual national priority listing of State highway lengths for declaration as established by the process outlined in the Planning Practice Guidelines Manual. <p>The procedures to be followed are as follows:</p> <ul style="list-style-type: none"> • for prioritisation of lengths for declaration refer to the Planning Practice Guidelines Manual • for initiating declarations, management and revocation of LARs refer to the appropriate generic Project Quality Plan. The criteria for legal descriptions for New Zealand Gazette notices are given in appendix 1I of the State Highway Control Manual • each region is required to include its priority listing of length for declaration in the annual plan and business plan as appropriate. 	
<p>Benefits</p>	<p>Reduction in conflict along state highways reduce overall crashes across the network</p>	
<p>Other References</p>	<p>the Transport Agency – Planning Policy Manual</p>	<p>http://www.nzta.govt.nz/resources/planning-policy-manual/</p>
	<p>The Transport Agency – State Highway Control Manual</p>	<p>http://www.nzta.govt.nz/resources/state-highway-control-manual/docs/sm012-01.pdf</p>

5.11.1.4 Land Use Development/Planning Assessment Report

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: Planning Assessment Report – Section 5.3.9, Appendix 5.1</p> <p>Description of Network Outcomes Contract requirement: When requested by the Principal, the Contractor shall provide a suitably qualified person to produce an on-site engineering assessment report that assesses the effects of a land use development or activity on the safety, efficiency or sustainability of the Network.</p> <p>The planning assessment includes (but not limited to):</p> <ul style="list-style-type: none"> • Site location • Future works • Sight distances • Access standards • AADT and additional traffic generated by the development • Carriageway and surrounding environment characteristics • Any access close to the site that are significant traffic generators • Recommendations <p>Schedule of Prices: Covered under the Provisional Sum</p>	
<p>Description, Deliverables</p>	<p>Description: The Transport Agency has policies and methods to manage the transport effects of subdivision and development. This includes development proposals which are not directly adjacent to state highways, but which still have an effect due to the traffic generated.</p> <p>Deliverables: Any application for land use development requires the Senior Management Team (SMT) review and sign off of the safety recommendations to the planning team.</p>	
<p>Benefits</p>	<p>Under a Safe System approach it is important to manage accesses and side roads. These accesses can increase the number and severity of crashes so any rationalisation and reduction in the number of accesses and therefore conflicts will significantly improve safety. This will also provide a more even distribution of speeds and therefore decrease risk.</p>	
<p>Other References</p>	<p>the Transport Agency – Planning Policy Manual – Section 5.2 Development and Access</p>	<p>http://www.nzta.govt.nz/resources/planning-policy-manual/</p>

5.11.1.5 Corridor Access Management and Requests (CAR)

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: Corridor Access management - Section 5.3.10</p> <p>Description of Network Outcomes Contract requirement:</p> <p>This requires the Contractor to assist the Principal to produce a Works Access Permit as part of the approval process.</p> <p>The Contractor shall coordinate, review and manage all activities that require access to the road.</p> <p>(Note that the Safety team should be consulted with regards to any corridor access requests).</p> <p>Schedule of Prices: Covered under the Lump Sum</p>	
<p>Description, Deliverables</p>	<p>Description: Corridor access management refers to the management of contractors, the public and utilities working within the road corridor.</p> <p>Deliverables: Corridor access requests seek written permission from the Principal to enable works on a road or motorway corridor to proceed. This includes Deeds of Grants, Licence to Occupy, stock underpasses, event management, road closures, private and public utilities access, and access requirements.</p>	
<p>Benefits</p>	<p>The benefits of having a managed corridor access request system is ensuring health and safety and risk to all road users are considered before any work commences.</p>	
<p>Other References</p>	<p>National Code of Practice for Utility Operators’ Access to Transport Corridors</p>	<p>http://www.nzuag.org.nz/news/media/nr1321395904.pdf</p>
	<p>Before you Dig</p>	<p>http://www.beforeudig.co.nz/#</p>

5.11.2 Highway Stopping Places

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: N/A</p> <p>Description of Network Outcomes Contract requirement: related to routine environment maintenance (Section 6.4.1). The Contractors safety management team will review any new or revised highway stopping place for safe access provision.</p> <p>Schedule of Prices: Covered under the Lump Sum</p>	
<p>Description, Deliverables</p>	<p>Description: A stopping place provides road users with an opportunity to break their journey and reduce fatigue. It also provide areas for enforcement, i.e. places to put speed camera’s and provide turning opportunities</p> <p>Deliverables: The Transport Agency regional offices are to:</p> <ul style="list-style-type: none"> • Produce and maintain a regional strategy for the selection and development of highway stopping places • Maintain an inventory of highway stopping places identifying the current standards and services of each stopping place <p>Highway stopping places are to be located, designed and operated to ensure the safe and efficient movement of vehicles (on and off-site) pedestrians (on-site).</p> <p>Standard “rest area” signs shall be installed, including advance information ones.</p> <p>Stopping places designed to be suitable for heavy motor vehicles must be signposted as such. Refer MOTSAM for details.</p> <p>Specific details on the key design principals are described within the Transport Agency’s SHCM.</p>	
<p>Other Benefits</p>	<p>Reduction in fatigue related crashes</p>	
<p>References</p>	<p>Transport Agency – State Highway Control manual</p>	<p>http://www.nzta.govt.nz/resources/state-highway-control-manual/</p>

5.11.3 Vegetation Control

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: Network and Adjacent landowner – related issues - Section 5.3.13 Routine Environmental Maintenance – Vegetation Control - Section 6.4.1 Routine Traffic Services – Vegetation Control - Section 6.5.1</p> <p>Description of Network Outcomes Contract requirement: The Contractor shall identify and report as necessary on any factors that may adversely affect the safety, efficiency or sustainability of the Network Vegetation including issues such as trees which are unsafe, unstable or cause obstruction.</p> <p>Schedule of Prices: Covered under the Lump Sum</p>	
<p>Description, Deliverables</p>	<p>Description: Vegetation can be a safety concern as it can affect both forward visibility and visibility of hazards. If left unchecked, trees can grow from minor to significant hazards.</p> <p>Deliverables: Vegetation control can relate to both maintenance and planting policies.</p>	
<p>Benefits</p>	<p>The benefit of correctly planted vegetation can assist sight visibility and enhance route guidance.</p>	
<p>Other References</p>	<p>The Transport Agency – guidelines for highway landscaping</p>	<p>http://www.nzta.govt.nz/resources/guidelines-highway-landscaping/highway-landscaping.html</p>
	<p>The Transport Agency – High-risk rural roads guide</p>	<p>http://www.nzta.govt.nz/resources/high-risk-rural-roads-guide/</p>
	<p>The Transport Agency – Planning Policy Manual – section 5.4.3</p>	<p>http://www.nzta.govt.nz/resources/planning-policy-manual/docs/planning-policy-manual-chapter-5.pdf</p>

5.12 Vulnerable and Active Road Users

The Safe System approach to road safety supports the safety of pedestrians, cyclists, and those who use mobility scooters. Actions to improve roads include improvements to mixed-use arterial roads, intersections, and road user rules. In addition, actions for Safe Speeds aim to moderate speeds to reduce the risks motor vehicles can pose to cyclists and pedestrians. (Safer Journeys)

5.12.1 Pedestrians

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: Road Safety Theme Inspections and Reporting – section 5.5.4</p> <p>Description of Network Outcomes Contract requirement: When requested by the Principal, the Contractor shall provide a suitably qualified person to undertake road safety theme inspections (i.e. pedestrian facilities) and reporting</p> <p>(Note the NZ Transport Agency’s Senior Management Team (SMT) will review all requests and management of pedestrian facilities).</p> <p>Schedule of Prices: Covered under the Provisional Sum</p>	
<p>Description, Deliverables</p>	<p>Description: Pedestrians, especially the young, the elderly, and people who are mobility impaired for whatever reason, are vulnerable in terms of any type of conflict with another road user and need to be considered in every roading project that is developed.</p> <p>Deliverables: Delivery shall be in accordance with the following reference documents.</p>	
<p>Benefits</p>	<p>The benefits of accommodating pedestrians within the design and projects is a reduction in the overall crash risk and high severity crashes.</p>	
<p>Other References</p>	<p>The Transport Agency – Land Transport Rules</p> <p>The Transport Agency – Pedestrian and Planning Design Guide</p> <p>The Transport Agency – TCD Manual</p> <p>The Transport Agency – MOTSAM – Part 1</p> <p>The Transport Agency – MOTSAM – Part 2</p> <p>The Transport Agency – RTS 14</p> <p>Austroads Guides</p> <p>The Transport Agency- Non motorised users</p> <p>The Transport Agency – Safer Journeys to Rural Schools</p> <p>Austroads – Guide information for Pedestrian Facilities</p>	<p>http://www.nzta.govt.nz/resources/results.html?catid=2</p> <p>http://www.nzta.govt.nz/resources/pedestrian-planning-guide/</p> <p>http://www.nzta.govt.nz/resources/traffic-control-devices-manual/index.html</p> <p>http://www.nzta.govt.nz/resources/motsam/part-1/</p> <p>http://www.nzta.govt.nz/resources/motsam/part-2/</p> <p>http://www.nzta.govt.nz/resources/road-traffic-standards/docs/draft-rts-14-revision-2007.pdf</p> <p>https://www.onlinepublications.austroads.com.au/?from=/script/home.asp</p> <p>http://www.nzta.govt.nz/resources/cycle-network-and-route-planning/docs/nmu-guidelines-interim.pdf</p> <p>http://www.nzta.govt.nz/consultation/rural-schools-guide/docs/safer-journeys-for-rural-schools-draft.pdf</p> <p>https://www.onlinepublications.austroads.com.au/items/AP-R423-13</p>

5.12.2 Cyclists

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference:</p> <ul style="list-style-type: none"> • Compliance Sampling and Auditing process – Section 2.3.3 • Bridges and other structure maintenance management – Section 5.4 • Road Safety Theme Inspections and Reporting – Section 5.5.4 <p>Description of Network Outcomes Contract requirement:</p> <ul style="list-style-type: none"> • Cycle lanes and paths shall be included in the compliance inspections when the adjacent road carriageway has been selected as part of the compliance audit programme. • The Contractor remains responsible for the overall maintenance of the Network which includes routine structures maintenance including foot bridges and cycle bridges. • When requested by the Principal, the Contractor shall provide a suitably qualified person to undertake road safety theme inspections (i.e. pedestrian facilities) and reporting <p>Schedule of Prices:</p> <ul style="list-style-type: none"> • Covered under the Lump Sum and Provisional Sum 	
<p>Description, Deliverables</p>	<p>Description: Providing for cycling can improve the safety and perceived security of cycling to the extent that it becomes a more accepted and widely used mode of transport. There are a range of facilities including exclusive cycle facilities and those which may be shared with either pedestrians or motor vehicles, for example wide shoulders. Careful attention to the safety of cyclists on routes, intersections, and where cycle paths cross roads is essential.</p> <p>Deliverables: Delivery shall be in accordance with National Cycleway and the following reference documents.</p>	
<p>Benefits</p>	<p>Improving and developing cycling facilities not only provide improved safety to those road users if designed with a Safe System approach but it will also encourages cycling and improves public health</p>	
<p>Other References</p>	<p>The Transport Agency – Land Transport Rules</p> <p>The Transport Agency – Cycle Network and Route Planning guide</p> <p>The Transport Agency – TCD Manual</p> <p>The Transport Agency – MOTSAM – Part 1</p> <p>The Transport Agency – MOTSAM – Part 2</p> <p>The Transport Agency- Non motorised users</p> <p>Austrroads Guides</p>	<p>http://www.nzta.govt.nz/resources/results.html?catid=2</p> <p>http://www.nzta.govt.nz/resources/cycle-network-and-route-planning/</p> <p>http://www.nzta.govt.nz/resources/traffic-control-devices-manual/index.html</p> <p>http://www.nzta.govt.nz/resources/motsam/part-1/</p> <p>http://www.nzta.govt.nz/resources/motsam/part-2/</p> <p>http://www.nzta.govt.nz/resources/cycle-network-and-route-planning/docs/nmu-guidelines-interim.pdf</p> <p>https://www.onlinepublications.austrroads.com.au/?from=/script/home.asp</p>

5.13 Motorcyclists

<p>Network Outcomes Contract Reference</p>	<p>Network Outcomes Contract Reference: Road Safety Theme Inspections and Reporting – Section 5.5.4</p> <p>Description of Network Outcomes Contract requirement: When requested by the Principal, the Contractor shall provide a suitably qualified person to undertake road safety theme inspections (i.e. motorcycle crash locations) and reporting</p> <p>Schedule of Prices: Covered under the Provisional Sum</p>	
<p>Description, Deliverables</p>	<p>Description: Safer Journeys is working to improve safety for motorcyclists through a number of areas. Policy changes will be put in place, and training will be improved. There will also be improvements to roads popular with motorcyclists and enforcement targeted at careless or unsafe motorcyclists. [Safer journeys]</p> <p>Riding a motorcycle requires a different set of skills and a higher level of vehicle control than driving a car. The potential outcomes of any crash, whether caused by the rider, other road users, the road environment, or the vehicle itself, are more severe for motorcyclists.</p> <p>The risk of a motorcyclist being killed or seriously injured in a crash is about 18 times higher than for a car driver [Safer Journeys Strategy].</p> <p>Deliverables: Key issues and appropriate treatments for motorcycling can be found within the Transport Agency’s Safer Journeys for Motorcycling Guide.</p> <p>General traffic management and road design for motorcyclists can also be found in a range of Austroads Guides.</p>	
<p>Benefits</p>	<p>The benefits of incorporating motorcyclist specific treatments are that all road users will benefit from improved safety and crashes and casualties will reduce.</p>	
<p>Other References</p>	<p>The Transport Agency – Safer journeys for Motorcycling</p>	<p>http://www.nzta.govt.nz/resources/safer-journeys-motorcyclists/docs/safer-journeys-motorcyclists.pdf</p>
	<p>Austroads Guides</p>	<p>https://www.onlinepublications.austroads.com.au/?from=/script/home.asp</p>

6 Expertise, Tools and Communication

6.1 Expertise

6.1.1 Roles

All those required in managing and working on State Highways will have expertise requirements in relation to their roles.

6.1.2 The Transport Agency Staff

All Transport Agency staff will have a job description that outlines the requirements of their position. Where requirements exceed the skills of those appointed to particular positions there should be a training plan developed to provide certain skills in the future. In the interim it should be noted that other experts (internal or external) may be identified to assist in any specialist road safety role. E.g. the need for:

- Traffic Management training – as per COPTTM which is a requirement for all the Transport Agency (and others) who ‘work’ on site
- Safety Audit Training
- Experienced Safety Auditors
- CAS and KAT operators and training providers
- Crash Investigators
- Other technical specialists (i.e. traffic signal experts, designers and planners etc.)

The Transport Agency staff should request sight of a supplier’s job description and C.V if unknown to determine that a nominated person has the appropriate experience.

6.1.3 Consultants and Contractors

The Transport Agency’s Consultants and Contractors must have the experience and expertise to deliver what is required and funded for under the Transport Agency contracts. This means that consultants and contractor staff involved in safety should:

- Be familiar with this Manual and its procedures
- Have attended a Safe System Engineering Workshop (formerly known as the Road Safety Engineering workshop)
- Is familiar with the concepts of a Safe System in practice
- Have a thorough understanding of the TCD Rule/MOTSAM (to be superseded by the Transport Agency TCD Manual), if involved with site inspection, design and installation
- Must have obtained a temporary traffic management level (through COPTTM training) if working on or beside the state highway
- Have a thorough understanding of each of the specifications/relevant legislation and guidance documents related to specific requirements within the activity sheets provided for within this manual. I.e. for any barrier installation, the consultant of contractors must be familiar with the Transport Agency: Road Safety Barrier Systems (M/23), AS/NZS 3845: Road Safety Barriers Systems. (based on NCHRP Report 350), Barriers Repairs specification (HM17) and the maintenance of Guardrail and Median Barriers specification (C/19)

- Note that the Network Outcomes Contract states the Contractor will “Have available suitably trained personnel who could be included in Safe System and Crash Reduction Studies activities” (Network Outcomes Contract - Section 5.5. Safety Management).

6.2 Tools and resources

6.2.1 Tools

6.2.1.1 SafetyNET

SafetyNET has been developed for the Transport Agency by Abley Transportation Consultants and is a GIS based system that incorporates KiwiRAP and Crash Data and identifies high risk corridors, and sites along with possible safe system treatment options.

SafetyNET can help with prioritising projects. It can be used to select sites and routes where road safety performance is either good or not performing, or has a predicted risk.

Reference	Web address
SafetyNET	www.safetynet.org.nz

6.2.1.2 Crash Analysis System (CAS)

CAS can be used to collect, map, query, and report on road crash and related data. The information provided by CAS is used to:

- Determine crash clusters, other issues and analyse trends
- Prepare quarterly and annual plans
- Help direct recommendations around road safety funding allocations
- Target road safety programmes
- Monitor their performance.

It is important to maintain a robust system. If when using CAS the user determines that the data is incorrect, then it is the responsibility of that user to contact cas.info@nzta.govt.nz and let them know so it can be changed if necessary.

Reference	Web address
CAS	http://www.nzta.govt.nz/resources/crash-analysis-system/

6.2.1.3 KiwiRAP and KiwiRAP Assessment Tool (KAT)

KiwiRAP is the New Zealand Road Assessment Programme. It is part of the International Road Assessment Programme, otherwise known as iRAP. Similar road assessment programmes have been implemented in Europe (EuroRAP), Australia (AusRAP) the United States of America (usRAP), South Africa and Malaysia. KiwiRAP uses information to access information on where the greatest levels of collective and personal risk and star ratings are across the network for every 5km length of state highway.

Risk Maps:

- For the purposes of displaying the safety risk of the state highway network, KiwiRAP looks at two different measures of risk: Collective Risk and Personal Risk. The focus of both is on crashes where people have been killed or seriously injured. The roads highlighted as being of higher risk than others are likely to have specific reasons why. The road, the vehicle, the speed and the driver/rider each contribute to risk.
- Star ratings - a proactive approach to road safety. It enables sections of road with a relatively high level of risk to be identified before a crash occurs. Star ratings range from 1 to 5, with 5 being the best.

Note that this information is also included within the SafetyNET programme (Section 6.2.1.1). Use KiwiRAP risk maps and SafetyNET to better define high risk sites and routes and apply more informed treatments (see Section 6.2.1.3).

KAT is a web-based tool that:

- Enables registered users to view the star rating results and underlying road infrastructure data by searching for road sections by location or by criteria to identify high risk locations and corridors, and can also be used to test the effects of potential road improvements using a “what if” analysis which determines the change in risk associated with various options for upgrades or projects involving multiple treatments. Finally, KAT provides a mechanism for updating the KiwiRAP road infrastructure data once road works have been completed.
- Has been developed specifically to enable KiwiRAP to be used as a key input to support future asset management plans, resource targeting and funding applications, and to monitor improvements across the highway network.

The tool helps to better prioritise and target road safety interventions. It uses the KiwiRAP road protection scores (RPS) to compare the relative risk before and after an intervention (what-if analysis), giving guidance on whether a treatment will be beneficial.

Requirements

After road improvement work has been completed, the information must be updated and submitted within KAT to ensure that the KiwiRAP Road Protection Scores (RPS) and risk ratings are reflective of the current road environment.

This submitted information must be validated and approved by the Transport Agency Regional Safety Engineers.

KAT updates are also included as part of the Network Outcomes Contract specifications for Contractors.

Monitoring: KiwiRAP risk and star rating maps are updated on an annual basis and will monitor and provide information about highway performance and whether specific sections of state highways have either increased or decreased their risk. Also see the Transport Agency’s High Risk Rural Roads guide for further information on monitoring and evaluation.

Reference	Web address
KiwiRAP	http://www.kiwirap.co.nz/

the Transport Agency – KAT	https://glsgwpro01.transactpro.nzta.govt.nz/gateway/access.aspx?goto=http%3a%2f%2fglsgwpro01.transactpro.nzta.govt.nz%2fgateway%2fSelectOrganisation.aspx%3fgoto%3dhttps%3a%2f%2fglsgwpro01.transactpro.nzta.govt.nz%3a443%2fportal%2fPortal.aspx
Network Outcomes Contract– updating KiwiRAP	Section 5.5.8

6.2.1.4 Crash Reduction and Crash Modification Factors (CRF and CMF)

Crash Reduction Factors (CRF) and Crash Modification Factors (CMF) are useful in determining effectiveness of the types of treatments to be used.

A CRF is a percentage reduction of crashes given a type of treatment i.e. a 25% reduction in night time crashes is expected if you use chevron board indicators on curves [NZTA high-risk rural roads guide].

A CMF is the same as a CRF but written in a different form. A CMF is a “multiplicative factor used to compute the expected number of crashes after implementing a given countermeasure at a specific site” [http://www.cmfclearinghouse.org/]. A CMF uses different number system to a crash reduction factor and is calculated by using the formula - 1-CRF/100. Therefore a CRF of 25% would equate to a CMF of 1- (25/100) = 0.75.

There are a number of references that can be used to determine specific crash reduction and crash modification factors, including:

- The NZ Transport Agency’s high risk guides (Section 6.2.3.3)
- CMF Clearing House
- Austroads Engineering toolkit
- IRAP Road Safety Toolkit

Reference	Web address
NZ Transport Agency – high-risk rural roads guide	http://www.nzta.govt.nz/resources/high-risk-rural-roads-guide/
NZ Transport Agency – high-risk intersection guide	http://www.nzta.govt.nz/resources/high-risk-intersections-guide/
CMF Clearing House	http://www.cmfclearinghouse.org/
Austroads Engineering Toolkit	http://www.engtoolkit.com.au/
IRAP Toolkit	http://toolkit.irap.org/

6.2.1.5 Safety Works Investment Prioritisation Process (SWIPP)

SWIPP is the national database that combines a list of high-risk sites/routes and areas for potential projects. It includes and incorporates data that is developed a part of the Safety improvements database (section 5.2) and was previously found in the hazard identification, minor safety works, and safety and construction programmes.

Reference	Web address
SWIPP	http://www.nzta.govt.nz/temp-repository/swipp/docs/swipp-data-entry.xls

6.2.2 Highway information

6.2.2.1 Pavement Data

Each year, skid resistance, texture, rutting, cross fall, curvature, and road roughness data is collected and entered into the Road Assessment and Maintenance Management System (RAMM). Key regional and national responsibilities in terms of collection and delivery of data is noted within the Transport Agency’s SHCM.

It is important this data is updated and validated as it is used for the analysis of a number of different outputs including the identification of hazards. This system also interrelates with other systems including annual updates to CAS.

Reference	Web address
The Transport Agency – State Highway Control Manual – section 4.6	http://www.nzta.govt.nz/resources/state-highway-control-manual/state-highway-control-manual.html
The Transport Agency – RAMM Manual	http://www.nzta.govt.nz/resources/road-assessment-and-maintenance-management/
The Transport Agency – Network Management Contract Proforma Manual	http://www.nzta.govt.nz/resources/state-highway-professional-services-contract-proforma-manual/professional-services-contract-proforma.html

6.2.2.2 Traffic Data

All the Transport Agency regions maintain a network of sites and equipment for monitoring traffic characteristics, including traffic volumes, speeds, composition and axle loadings. Each year the data is collated by the Highway and Network Operations Division to provide the National Traffic Volume Booklet.

The benefit of having updated traffic information is that it allows improved planning for future improvements to the network. If traffic volumes are predicted to increase significantly the predicted risk may increase, which may subsequently alter the treatment philosophy of a route.

Reference	Web address
The Transport Agency – SH Traffic Volumes	http://www.nzta.govt.nz/resources/state-highway-traffic-volumes/
The Transport Agency – SH Control Manual – Section 4.1.7	http://www.nzta.govt.nz/resources/state-highway-control-manual/state-highway-control-manual.html
The Transport Agency – SH Control	http://www.nzta.govt.nz/resources/state-highway-control-manual/state-highway-control-manual.html

Manual – Section 4.1.8	
Network Outcomes Contract	Section 3.10 – Existing Services

6.2.2.3 Highway Information, Route Data Sheets and Aerial Photographs

Highway information sheets give a pictorial and tabular description of the highway features. Route data sheets give a tabular distance listing of significant features on or abutting the highway. Both systems provide a quick, user friendly reference for frequently used highway data.

Highway information sheets shall be compiled in accordance with the Guideline for Preparation and Validation of Highway Information Sheets (HIS) - Connell Wagner 1994.

Responsibility: National office – Transport Agency

Requirements: The Transport Agency national office will coordinate and maintain highway information sheets and aerial photographs for state highways.

Highway information sheets can give a pictorial and tabular description of state highways.

These sheets shall be revised annually as at the 30 June each year. Two copies are to be forwarded to the Manager, Assets, HNO, NO, and one copy to the Regional Manager, Access & Use, appropriate for that region.

A summary schedule of all updated items shall accompany each revision.

Refer to the NZ Transport Agency’s SHCM for other business processes associated with updating highways/roads.

Reference	Web address/location
the Transport Agency – SH Control Manual – Section 4.1.5 to 4.1.7	http://www.nzta.govt.nz/resources/state-highway-control-manual/docs/sm012-04.pdf

6.2.2.4 Other inventory data

Requirements: whenever works are undertaken that involves a change to the road inventory data a contractor/supplier must update RAMM.

In addition to data described in Sections 6.2.2.1 to 6.2.2.3, all the Transport Agency’s regions maintain inventories of the key state highway assets including the following:

- Traffic Control Devices
- Road Safety Barriers
- Lighting installations
- Traffic signal installations
- Railway level crossings; and
- Bridges

Further information can be found within the Transport Agency’s SHCM.

Reference	Web address/location
the Transport Agency – SH Control Manual – Section 4.1.7 to 4.2	http://www.waikato.transit.govt.nz/content_files/technical/ManualSection32_FileName.pdf

6.2.3 Documents and References

6.2.3.1 High level

To understand the processes and definitions involved in the development of some of these guides, rules and strategies, a process document has been developed by the Transport Agency. Some high level strategy documents that provide useful guidance for road safety and the vision and goals of the Transport Agency is shown below.

Reference	Web address
Government Policy Statement	http://www.transport.govt.nz/ourwork/KeyStrategiesandPlans/GPsonLandTransportFunding/
the Transport Agency Statement of Intent	http://www.nzta.govt.nz/resources/statement-of-intent/
Safer Journeys Strategy	http://www.saferjourneys.govt.nz/about-safer-journeys/
Safer Journeys Action Plans - 2011	http://www.saferjourneys.govt.nz/assets/Uploads/Safer-Journeys-Action-plan-2011.pdf
Safer Journeys Action Plans – 2013-15	http://www.saferjourneys.govt.nz/assets/Uploads/Safer-Journeys-Action-plan-2013-2015.pdf

6.2.3.2 One Network Road Classification System

Responsibility: The Transport Agency’s REG Governance Group

The One Network Road Classification (ONRC) involves categorising roads based on the functions they perform as part of an integrated national network. The classification will help local government and the Transport Agency to plan, invest in, maintain and operate the road network in a more strategic, consistent and affordable way throughout the country.

The One Network Road Classification project has three elements:

- Classifying roads into categories based on their function in the national network
- Customer Levels of Service (CLoS), which define what the fit for purpose outcomes are for each category in terms of mobility, safety, accessibility and amenity
- Development of the performance measures and targets, which will effectively determine how the categories and customer levels of service translate into specific maintenance, operational and investment decisions

This work is still under development. Further information can be found within the Transport Agency’s website as referenced below.

Reference	Web address
The Transport Agency – REG	http://www.nzta.govt.nz/projects/road-efficiency-group/onrc.html

6.2.3.3 Operational Guides and Specifications

There are a number of recently developed Transport Agency guides that have been prepared to provide guidance to focus efforts in using Safe System concepts in high risk areas. These include the following documents:

- High Risk Rural Roads guide
- High Risk Intersection guide
- Safer Journeys for Motorcycling
- Safer Journeys for Schools
- Speed Management Guide (under development)

Specific Transport Agency rules, traffic notes, guides, technical notes and specifications can be found within the relevant activities.

Reference	Web address
High-risk rural roads guide	http://www.nzta.govt.nz/resources/high-risk-rural-roads-guide/
High-risk intersection guide	http://www.nzta.govt.nz/consultation/high-risk-intersections-guide/
Safer Journeys for Motorcycling	http://www.nzta.govt.nz/resources/safer-journeys-motorcyclists/
Safer Journeys for Rural Schools	http://www.nzta.govt.nz/consultation/rural-schools-guide/
the Transport Agency resources	http://www.nzta.govt.nz/resources/
the Transport Agency register of documents	http://www.nzta.govt.nz/resources/nzta-register-network-standards-guidelines/

6.2.3.4 General Standards and Guidelines

There are a number of Rules, Standards and Guidelines provided for within the Transport Agency’s website. Refer to the particular activity to find the specific reference. A global list is also provided on the webpage.

Reference	Web address
The Transport Agency register of documents	http://www.nzta.govt.nz/resources/nzta-register-network-standards-guidelines/
The Transport Agency – process manual	http://www.nzta.govt.nz/resources/process-manual-network-standards-guidelines/index.html
The Highways Information Portal (HIP)	http://hip.nzta.govt.nz/

The Highways Information Portal (HIP) provides a central hub for information on the standards, processes, and procedures to be used by Transport Agency staff and our suppliers to identify and develop

improvements to New Zealand's State Highways. In the Processes tab above, you'll find information that will guide you through the project lifecycle, while the Technical Disciplines tab provides subject specific information.

6.3 Customers, Consultation and communications

6.3.1 Relationships and Communications

It is vital to engage with key stakeholders (community, affected and interested parties) when developing projects in order to create a common sense of purpose, draw on and learn from other's perspectives, make better decisions, align mutual interests, identify and mitigate risks, and find shared solutions to challenges.

Relationship building, the basis for effective engagement, takes time. Many of the hallmarks of good relationships - trust, mutual respect and understanding - are intangibles that develop and evolve over time. Early engagement provides a valuable opportunity to set a positive tone with stakeholders from the outset of a project. The absence of established relationships and communication channels can put your project at an immediate disadvantage.

Establishing and maintaining good relationships requires a long-term view. Organisations that take this approach see the value of consistently following through on their commitments to stakeholders. They take grievances seriously and deal with them in a reliable and timely manner. They continually invest in communicating about their work in a way that makes sense to their stakeholders. Effective engagement and communication will ultimately ensure the project's success. [Austroads, 2013]

As stated within the Austroads Research Report [Austroads 2006].

- “An ideal consultation with road users and other stakeholders is one that:
 - Consists of a number of clearly defined stages, each with their own specific objectives
 - Includes both external stages (i.e. those that include road users and stakeholders) and internal stages (i.e. that include employees of the road agency only)
 - Is iterative in nature (i.e. part of an on-going and iterative cycle of learning, refinement and improvement embedded within the development process rather than an ‘isolated event’ that takes place externally to it).
- The development of levels of service and intervention criteria for maintenance and improvement activities through community consultation is complex and requires careful planning. The process consists of several iterative stages: listen, communicate, reflect and plan, implement, monitor and measure. The process alternates stages that involve the community with stages that require bi-internal agency assessment and evaluation. Each stage is conducted in a structured manner and requires specific techniques and specialised skills.
- The process begins with a two- way communication (‘listen’ and ‘communicate’) between the road agency and the community with the purpose of gaining a common understanding of community concerns, priorities, current road classification system and levels of service as well as agency issues, priorities and budget limitations. This part of the process also helps develop a common language and identify of the most effective channels for further communication of road maintenance issues. The two way communication establishes the foundation for a transparent and strong relationship between the road agency and the community’.

6.3.2 Stakeholder and Partnership arrangement

6.3.2.1 Network Outcomes Contract Safety Meetings

Under the Network Outcomes Contract, the Principal and Contractor shall meet on a monthly basis to discuss any identified major safety issues; sufficient time needs to be given to ensure all safety issues are discussed. In addition The Principal and Contractor shall meet on a quarterly basis to discuss major safety issues identified from the Network monthly meetings, common issues, exchange information, share innovation and ideas, agree to actions, and review any work completed since the previous meeting.

Refer to section 5.5.9 of the Network Outcomes Contract for further information.

6.3.2.2 Attendance at Road Safety Forums

Under the Network Outcomes Contract, when requested, the Contractor shall provide a suitably qualified person to attend meeting of the wider road safety community and forums outside the network.

6.3.3 Customer Relationship Management System (CRMS), Feedback and Complaints Process

Feedback: Highways & Network Operations State Highway State Highway Safe Network Activity Manual

Purpose:

A CRMS brings together information from various data sources in an organisation to provide a single, holistic view of its customers and every interaction with those customers. The CRMS is the basis on which to build stronger relationships with customers, by being able to access, record, and follow up customer queries, feedback, and complaints. It is aligned with the Transport Agency's 'customer first' approach, which reflects our desire to be more service-oriented rather than just delivery-focused.

For individuals and teams involved in Safety Management, the CRMS is a place to record information that has been brought to the attention of the Transport Agency or its contractors by customers and the responses and follow up actions. The CRMS will also be a source of information and insight for teams involved in Safety Management, using its searching and reporting capabilities.

Access:

The CRMS sits on the SAP software platform that is being used to manage many of the NZTA's business information needs. It is available to NZ Transport Agency employees on the internal network via a link on OnRamp; and to specific external users via Citrix or Web Services.

NZ Transport Agency employees who require a login should contact their manager to organise training, and the Service Desk for access.

External contractors (including NOC contractors) should contact their NZ Transport Agency Maintenance Contract Manager to organise training and access.

Requirements and responsibility:

The use of the CRMS is an important part of the 'Customer' Key Results Area in the new Network Outcome Contracts (NOCs), and its use should be detailed in the NOC 'Customer and Stakeholder Communications Plan'. External users are also expected to be aware of the Transport Agency's Code of Conduct, and act consistently with it; in this context particularly relating to accessing and using systems and information.

Procedure:

Customer queries, complaints and feedback are managed in a distributed manner within the group. NZ Transport Agency employees should review the processes and documentation available on OnRamp and talk to their local CRMS champions. External contractors (NOC contractors) should refer to the procedures described in their Stakeholder and Customer Plan.

Reference	Web address
HNO CRMS Users Group worksite	http://onramp/Work-with-others/Group-work-sites/List-of-group-work-sites/HNO-CRMS-Users/SitePages/Home.aspx
HIP webpage SAP CRMS	http://hip.nzta.govt.nz/technical-information/sap/sap-crms

6.3.4 Feedback Form

A feedback form for those using the system is located in Appendix B. The form outlines the comment and reference to specific sections of the Manual and the justification for the feedback given.

7 Management and Planning

7.1 Organisational Structure

The Transport Agency’s organisational chart is included on the Transport Agency website shown in the reference below.

Reference	Web address
The Transport Agency	http://www.nzta.govt.nz/about/who-and-what/who-we-are/our-structure.html

7.2 Leadership and Commitment

In order to demonstrate a high level of commitment to achieving the goals of this Manual, management accountability extends to ownership, availability of resources to undertake the activities, auditing of effectiveness, continual improvement and strengthening relationships and accountability.

7.2.1 Roles

The Roles relating to this document are that the document is:

- Owned by the Transport Agency’s National Traffic and Safety Manager
- Managed by the Transport Agency’s National Traffic and Safety Manager

7.2.2 Responsibilities

Whilst the Transport Agency is the manager of the State Highway network, it recognises that the success of reaching its goals and objectives is closely linked to the level of ownership taken by Network Management Consultants and Contractors engaged on the network.

In respect of road safety, the Transport Agency developed the State Highway Safe Network Activity Manual (this Manual) which outlines the key activities and guidance. This document will only be successful if embraced by consultants and contractors. Road safety has also been incorporated into the new Network Outcomes Contract (Network Outcomes Contract) and this State Highway Safe Network Activity Manual will also be referred to as the appropriate standard for addressing road safety on State Highways in addition to key contractual specifications provided in the Network Outcomes Contract document.

A safety culture is vital to a successful outcome needs to be adopted and practiced from management right through to an individual of all the companies involved. Helping improve a safety culture across networks with other agencies, consultants and contractors helps us work towards a one network safe system approach with all our key partners.

As part of the development of this Manual for national standards, guidelines and processes, each network maintenance contract should develop a specific SMP (definition provided in Table 2-2). This ensures that the safety requirements of each of the network contracts are specifically targeted to the area or network. This system provides high level guidance and legal requirements and therefore is flexible enough to allow network managers to tailor their own safe system requirements.

Contractors are encouraged to develop a Safety Strategy and Safety Plan than can be comprehended, and hence implemented, any all personal, especially those travelling the network on a frequent basis (Section 2.4).

7.2.3 Reporting

Regional Highways Managers will provide an annual assurance statement to their General Managers confirming implementation and compliance with this manual.

7.2.4 Review

The Transport Agency will review this State Highway Safe Network Activity Manual as a result of any significant changes to:

- Higher level documents such as the GPS, SOI, Safer Journeys Strategy to 2020 and the subsequent Safer Journeys Action Plans
- Data analysis with respect to identification of risk
- Current legislation, standards and guidelines

This is to ensure there is a consistent approach to delivering the outcomes, goals and objectives provided within this document. Information on evaluation and review of activities are provided in section 8.

Both technical and systemic audits of this document will be undertaken to ensure the document is relevant and achieving its key objectives. Further information is provided in Section 8.2.

7.3 Funding

The Transport Agency's investment in the land transport system is through the National Land Transport Fund (NLTF). The National Land Transport Fund is the main central government funding source for the land transport system.

To be eligible for funding from the NLTF, transport activities must contribute to the achievement of Government transport strategies and policies. These strategies and policies shape the criteria we use to assess activities for inclusion in the National Land Transport Programme [NLTP]", which is a 3 year programme. [www.nzta.govt.nz]

The Transport Agency's HNO as a Road Controlling Authority (RCA) still has to apply for the funding to the Transport Agency in the same manner as other RCA's and other Approved organisations.

Reference	Web address
the Transport Agency	http://www.nzta.govt.nz/planning/investment/index.html

7.4 Risk Management

HNO is responsible for the stewardship of New Zealand's State Highways, which comprises approximately 11,000km of roads with an asset value of over \$10 billion. In developing, maintaining and operating this

asset, HNO has responsibility for the expenditure of more than \$1.5 billion of road-sector funds each year. Highway activities affect a number of areas, in terms of social, environment and economic terms.

The main reference is the NZ Transport Agency’s ‘Minimum standard – Z44 – Risk Management’.

Any potential for non-achievement in these areas defines potential areas of risk to the Transport Agency. Some other less obvious risks may be political or physical, and they include:

- Changing transport policies
- Natural disasters
- The state of the economy
- Changes in local authority structures and politics.

It is important that we understand risks as both threats and opportunities. Effective processes should be put in place so that we can readily identify and manage significant risks.

The goal and benefit of risk management is to enhance our chances of success and to minimise the potential for failure, through greater risk awareness and proactive management.

The Transport Agency’s Risk Management Manual can be used to define the process, and roles and responsibilities and communication of significant risks.

This version of this manual is a major review of the risk management process to align it with AS/NZS 4360:2004 and to incorporate Z/10 from the Professional Services Proforma Manual.”[www.nzta.govt.nz]

Reference	Web address
the Transport Agency – Risk Management	http://www.nzta.govt.nz/resources/risk-management-process-manual/
AS/NZ4360:2004	http://www.standards.co.nz/news/Standards+information/Risk+management/default.htm

8 Evaluation, Review and Improvement

8.1 Evaluation

8.1.1 Key outcomes and indicators

The key outcomes and indicators for this system are a collaboration of those indicators identified in

- The Safer Journeys Strategy and Action plans.
- Network Outcome Contracts Operational Performance measures (OPM's) and Key Results Areas (KRA's)
- Safety Strategies and Safety Plans developed by Network Management Contractors.
- Road Safety Action Plan outcomes

A comprehensive list of those indicators and actions are included in Table 3-1 and the Network Outcome Contracts.

8.1.2 Responsibilities for achieving key outcomes and indicators

To ensure that this system is working and that the key outcomes are being achieved involves the following shared responsibilities:

- As part of the Network Outcomes Contract, the Contract Management team will check the safety outcome and Key results areas (KRA's) for safety to determine whether they have been met.
- Contractors as part of the development of their Safety Plan (Section 2.4) will develop and identify their key performance indicators and how they will evaluate them.
- Regional and National NZ Transport Agency Safety teams should develop Safety Strategies and undertake reviews of those Safety Plans (Section 2.4) to determine whether this analysis is being completed.

8.2 Review

8.2.1 System Review

8.2.1.1 System Review

- Each three years the Transport Agency is audited for its compliance with this Manual.
- Every three years (at most) the Transport Agency is audited against selected components of this Manual
- This review will identify areas on non-conformances and ask questions on where we need to improve the system and information provided.

8.2.1.2 Independent Reviewer

The audits are to be conducted by independent internal or external auditors contracted by the National Manager Traffic and Safety.

8.2.1.3 Establishing the Review Programme

Each year the National Traffic and Safety Manager, in consultation with the General Management team determines those aspects of this manual which will be audited in the next independent audit.

8.2.1.4 Results

Each year a report summarising the results of the independent audits will be submitted to the Chief Executive that will include a summary of those:

- Areas where there was high compliance with the System
- Areas where there was high non-compliance with the System
- Actions being taken to address the areas with high non-compliance
- Recommendations for the development of new or updated policies, standards, guidelines or specifications.

8.2.2 Technical

8.2.2.1 Annual Review

This document will be reviewed on a regular basis to ensure it is relevant, up to date, and effective. A rolling programme of formal audits is carried out to ensure that the requirements of the Transport Agency's quality system are met, in particular the requirements for continuous improvement (Section 8.3).

It is important to determine whether we have been successful in achieving those key outcome and indicators that were developed (Section 8.1.1).

8.2.2.2 Process for Review

The National Traffic and Safety Manager shall lead and administer each annual review. As part of the review, the Network Operations, Capital projects and Transport Planning Divisions will be invited to comment on:

- Aspects of this Manual that needs updating, and are no longer relevant or are not practical
- Whether there is a need for existing or new policies, standards, guidelines, manuals and specifications that influence state highway safety to be updated or developed

8.2.2.3 Results

The results of the review and audit process are used to:

- Update this manual
- Suggest/recommend changes to policy and procedures
- Develop future work programmes; and
- Initiate appropriate projects.

8.3 Improvement

It is important to have a continuous improvement system in place to ensure the most up to date information and processes are included. To do this a feedback form that allows the user of the document to make notes and identify actual and potential non-conformities is provided (Appendix B). This could be in relation to the information provided or lack of it within the guide, a lack of resources to undertake the activities within the guide etc. In summary:

- This form should be sent to the NZ Transport Agency's National Traffic and Safety manager who is the owner and manager of this document.
 - The NZ Transport Agency's National Traffic and Safety Manager will make a decision on what the urgency of the issue is and what if any action needs to be undertaken.
-

9 References

The following is a list of references used within the main body of the text. However note that references for specific activities are located within their respective sections.

Reference	Web address
Austrroads Guide to Road Safety Part 2: Road Safety Strategy and Evaluation, 2013	https://www.onlinepublications.austrroads.com.au/items/AGRS02-13
Austrroads research Report “Community Consultation Process and Methods for Quantifying Community Expectations on the Levels of Service for Road Networks AP-R290-06, 2006	https://www.onlinepublications.austrroads.com.au/items/AP-R290-06
Crown Entities Act 2004	http://www.legislation.govt.nz/act/public/2004/0115/latest/DLM329631.html
Government Policy Statement	http://www.transport.govt.nz/ourwork/keystrategiesandplans/gpsonlandtransportfunding/
Government Roading Powers Act 1989	http://www.legislation.govt.nz/act/public/1989/0075/latest/whole.html
Land Transport Management Act (2003)	http://www.legislation.govt.nz/act/public/2003/0118/latest/DLM226230.html
NZ Transport Agency – high risk intersection guide	http://www.nzta.govt.nz/consultation/high-risk-intersections-guide/docs/high-risk-intersections-guide.pdf
NZ Transport Agency – high risk rural roads guide	http://www.nzta.govt.nz/resources/high-risk-rural-roads-guide/
NZ Transport Agency – Land Transport Setting of Speed Limits Rule 2003	http://www.nzta.govt.nz/resources/rules/setting-speed-limits-2003-index.html
NZ Transport Agency – Land Transport Rule: Traffic Control Devices 2004	http://www.nzta.govt.nz/resources/rules/traffic-control-devices-index.html
NZ Transport Agency – Network Outcomes Contract	http://www.nzta.govt.nz/resources/state-highway-maintenance-contract-proforma-manual/maintenance-contract-proforma.html
NZ Transport Agency – Safer Journeys for Motorcycling	http://www.nzta.govt.nz/resources/safer-journeys-motorcyclists/
NZ Transport Agency – Safer Journeys for Rural Schools	http://www.nzta.govt.nz/resources/safer-journeys-for-schools/
NZ Transport Agency – State Highway Plan	http://www.nzta.govt.nz/resources/state-highway-plan/docs/state-highway-plan-2013-2014-complete.pdf
NZ Transport Agency – Statement of Intent	http://www.nzta.govt.nz/resources/statement-of-intent/
NZ Transport Agency – State highway asset management plan	http://www.nzta.govt.nz/resources/state-highway-asset-management-plan/
NZ Transport Agency – State Highway control manual, 2013	http://www.nzta.govt.nz/resources/state-highway-control-manual/docs/sm012-01.pdf
Safer Journeys Strategy	http://www.saferjourneys.govt.nz/
Safer Journeys Action Plans	http://www.saferjourneys.govt.nz/action-plans/

Appendices

Appendix A: Basic Components of a Contractors Safety Plan

Typical details of a Contractors Safety Management Plan shall include:

1. The key personnel who are responsible for safety management and information and lines of responsibility.
2. Evidence that the Contractors staff is suitably qualified to undertake a variety of activities which could be assigned and how this will be maintained throughout the Contract Period.
3. The Contractor’s safety inspection and audit programme.
4. How Temporary Traffic Management will be employed
5. How data will be collected from the variety of different sources, including road inspections, crashes and information from key stakeholders and the public.
6. The process and activities that will be used to update databases and tools.
7. How data will be analysed. Analysis can include using data, tools and activities that have been developed for pavement and geometry programmes, various crash and safety reports and system tools, and using analysed information from key stakeholders.
8. Crash trend analysis by type, road class and severity, comparison of crash rates with national averages for example
9. The procedures that will be undertaken during the design and construction of all pavement renewals to impart a high degree of confidence that safety design elements have been considered.
10. How specific safety projects (maintenance or capital) will be identified, using specific activities (i.e. CRS, Network trend analysis, KiwiRAP) and analysed further to compare to other safety projects on a national level and then assigned within the programme of works. Data programmes such as the Safety improvement and prioritisation databases and the KAT tool and liaison with key stakeholders will help plan and programme work.
11. Once safety projects have been programmed for implementation how they may be designed and delivered to ensure appropriate standards.
12. Once safety projects have been delivered, what methods can be used to help evaluate and monitor projects effectiveness, and determine whether the design is achieving the outcomes anticipated?
13. How the SMP links with the national policies and strategies the RMP and the MMP.

Appendix B: Feedback form



You can give us feedback through any channel, including online. If you want to find out more about the Agency's work and services go online to www.nzta.govt.nz



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Your feedback matters to us. It's one of the ways we can be more responsive and continually improve.



New Zealand Government

Appendix C: Key Activities compared to NZ Transport Agency Network Outcomes Contract

Structure and comparison to similar documents

Appendix Table 1 summarises the key activities within this document and cross references them to the associated NZ Transport Agency Network Outcomes Contract and its requirements.

Abbreviations:

- Provisional Sum (PS)
- Lump Sum (LS)
- Variation (VAR.)

Appendix Table 1: Network Outcomes Contract Requirements and References for Safety Related Activities

Activity No. (This document)	Activity Description	Associated Network Outcomes Contract reference/s	Network Outcomes Contract requirements	Schedule of Prices
5.1	Safety Studies			
5.1.1	Crash Reduction studies	Crash Reduction Studies - section 5.1.11	When requested by the Principal, the Contractor shall provide a suitably qualified person to participate in, and inform, any crash reduction study that is undertaken on the Network	Covered under the Provisional Sum
5.1.2	Theme Studies and inspections	Section 5.5.4 – Road Safety Theme Inspections and Reporting	When requested by the Principal, the Contractor shall provide a suitably qualified person to undertake road safety theme inspections and reporting	Covered under the Provisional Sum
5.2	Safety Improvements Database	Safety improvements Database - Section 5.5.1	The Contractor shall develop and maintain a register of potential safety improvements that will inform the Principal of future Network safety improvements	Covered under the Lump Sum
5.3	Safety Projects Programme	Section 5.5.2, Safety Projects Programme	The Contractor is required to provide support to the Principal to develop this programme	Covered under the Lump Sum

Activity No. (This document)	Activity Description	Associated Network Outcomes Contract reference/s	Network Outcomes Contract requirements	Schedule of Prices
5.4	Road Safety Action Plans (Meeting and Outputs)	Attendance at Road Safety Forums – Section 5.5.10	When requested by the Principal, the Contractor shall provide a suitably qualified person to attend meetings of the wider road safety community and forums outside the Network	Covered under the Provisional Sum
5.5	Fatal and Serious Crash Reporting	Fatal and Serious Crash Reporting - Section 5.5.6, Appendix 5.5	The Contractor shall report on all fatal crashes, or where road deficiencies appear to have been a major contributing factor, within 48 hours of the date of the crash	Covered under the Provisional Sum 4
0	Safety Reporting and Monitoring			
5.6.2	Safety Reporting	Safety Reports – Section 5.5.7	When requested by the Principal, the Contractor shall provide a suitably qualified person to produce a safety report on specific Sites or issues	Covered under the Provisional Sum
5.6.2	Network Trend, Report and Monitoring	Network Safety Trend Monitoring and Reporting – Section 5.5.3	The Contractor shall provide quarterly safety reports that are based on factual data, the requirements of the safety management strategy and any assigned safety works	Covered under the Lump Sum
5.7	Road pavement			
5.7.1	Pavement condition – types, monitoring and management	Network Outcomes Contract Reference: Safety operational performance measures – section 2.3.2	Key and safety-related Operational Performance Measures means a subset of the OPMs that have a greater safety impact. These are the Key and Safety-related Operational Performance Measures for this contract relating to pavement condition in terms of safety. <ul style="list-style-type: none"> OPM 14 – Skid Resistance Management OPMs 71 to 72 – Ice Gritting and CMA - Treatment Decisions and Compliance OPMs 22 to 25 – Potholes OPMs 28 to 29 – Deformation, Heaves and Shoves 	Covered under the Lump Sum
5.7.2	Skid Resistance –monitoring and management	<ul style="list-style-type: none"> Changes to annual renewals investment 	<ul style="list-style-type: none"> The requirements for delivery for Contractors are provided under the Network Outcomes Contract in which they are to proactively manage Network 	Covered under the Lump and Provisional

Activity No. (This document)	Activity Description	Associated Network Outcomes Contract reference/s	Network Outcomes Contract requirements	Schedule of Prices
		<p>levels (Skid Resistance Renewal Quantities) - Sections, 2.5.4</p> <ul style="list-style-type: none"> • Skid Resistance Management - Section 5.5.5, • Sealed Road Resurfacing - Section 6.1.3 	<p>skid resistance performance through ensuring appropriate skid resistance considerations are included in all asset management decisions.</p> <ul style="list-style-type: none"> • The Contractor will carry out requirements outlined in the Skid Resistance Investigation and Treatment Selection (the Transport Agency T/10) in consultation with the Principal • Extract information from the Safety Team report in T/10 	Sum
5.8	Safe System Design			
0	Design (Roads and Roadside)	Capital Projects involvement – section 6.5.71	Capital Projects - The focus of the Contractor’s involvement is to provide recommendations in the Provision of maintenance and operations designs that lead to safe and efficient maintenance activities.	Variation
5.8.2	Intersections	Network trend safety monitoring and reporting – section 5.5.3	The Contractor shall provide quarterly safety reports that are based on factual data, the requirements of the safety management strategy and any assigned safety works. The report shall contain Any other safety concerns such as any intersection issues.	Covered under the Lump Sum
0	Roadside Hazard Management			
5.8.3.1	Safety Barriers	Section 6.3.1 – Structure Routine Maintenance – Barriers and Handrails	<ul style="list-style-type: none"> • The Contractor shall complete all routine work necessary to maintain the condition and appearance of structures including repairing damaged barriers and handrails. • All barrier repairs shall be undertaken in accordance with NZTA M/23 • The inspections shall identify any obvious defect which may affect the safety of road users or anything else needing urgent attention, such as those safety items listed below: <ul style="list-style-type: none"> • Impact damage from vehicles, especially to structural elements, guardrails and handrails • Adequacy of signs and road marking 	Covered under the Lump and Provisional Sum

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5.8.3.2	Clear Zones	N/A		N/A
0	Bridges	<ul style="list-style-type: none"> • Bridge and other structures maintenance management - Section 5.4 • Structure Routine Maintenance – Bridges and other structures – section 6.3.1 	<ul style="list-style-type: none"> • The Contractor shall complete Routine Surveillance Inspections of bridges, large sign gantries, other road structures and retaining structures annually, or as required by any statutory approvals granted for the asset, on those structures not programmed for a General or a Principal inspection by the Regional Bridge Consultant in the year under consideration, in accordance with Bridges and Other Highways Structures Inspection Policy (NZTA S/6). • The inspections shall identify any obvious defect which may affect the safety of road users or anything else needing urgent attention, such as those safety items listed below: <ul style="list-style-type: none"> • Impact damage from vehicles, especially to structural elements, guardrails and handrails • Adequacy of signs and road marking • The Contractor shall complete all routine work necessary to maintain the condition and appearance of structures 	Covered under the Lump Sum
0	Lighting	<p>Section 5.4 – Bridge and other structures maintenance management</p> <p>Section 6.3.1 – Structures routine maintenance</p> <p>Section 6.5 (6.5.1) – Carriageway lighting</p>	<p>Contractor will be required to undertake:</p> <ul style="list-style-type: none"> • Routine structures maintenance of large lighting masts on bridges and other structures (Network Outcomes Contract – Section 5.4), and • Shall complete all routine work necessary to maintain the condition and appearance of structures including maintaining lighting (Network Outcomes Contract – Section 6.3.1), • Routine traffic services maintenance, including Carriageway Lighting (road lighting, weigh pit and effluent facility lighting, belisha beacons, floodlighting and highmast lighting) (Network Outcomes Contract – Section 6.5 and 6.5.1) 	Covered under the Lump Sum and Provisional Sum
0	Safety Audits	N/A	N/A	Variation

Activity No. (This document)	Activity Description	Associated Network Outcomes Contract reference/s	Network Outcomes Contract requirements	Schedule of Prices
0	Traffic Control Devices			
5.9.1	Bylaws	Section 3.9 - Bylaws	The Contractor shall compile, maintain and submit in a timely manner amendments required to the Principal’s Bylaws, including, but not limited to, no-stopping, parking restrictions and speed limits	Covered under the Lump Sum
0	Traffic Signs and Markings			
5.9.2.1	Signs	Section 6.5.1 – Routine Traffic Services Maintenance	The Traffic Services section allows for the routine traffic services maintenance of signs. The Contractor shall undertake an annual maintenance inspection on those sign types listed in Appendix 6.13 of the Network Outcome Contract	Covered under the Lump Sum
0	Markings	Section 6.5.1 – Routine Traffic Services Maintenance – pavement marking	Pavement-marking programme development shall be completed in collaboration with the Principal and General condition inspection results. Two pavement-marking programmes shall be prepared by the Contractor and presented to the Principal by the 1 ST September each year: <ul style="list-style-type: none"> NZTA P/22 maintenance programme NZTA P/30 maintenance programme for high-performance road marking 	Covered under the Provisional Sum
0	Delineation	Section 6.5.1 – Routine Traffic Services Maintenance – raised pavement markers and marker posts	<ul style="list-style-type: none"> The contractor shall maintain [edge marker] posts in a clean condition and in a vertical position with reflectors of the correct type facing oncoming traffic and replace or repair damaged posts or reflectors All hardware installed [for raised pavement markings] shall comply with the Manual of Traffic Signs and Makings 	Covered under the Lump Sum
5.9.2.4	Reflectivity Management	Section 6.5.1 – Traffic Services Maintenance	There are outcome requirements for traffic control devices which include missing signs or reflectors, illegible, incorrectly located and what level of reflectivity for approach visibility and whether it meets the requirements of the network contract	Covered under the Lump Sum
0	Trials	N/A		Variation

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0	Traffic Signals	Existing Services – Section 3.10	The Contractor responsibility is related to existing services, and where all existing inductance loops relating to traffic counting and traffic signal control must be protected at all times	N/A
0	Speed Management	N/A		
0	Speed Limits	Bylaws – Section 3.9, and Temporary Speed Restrictions - section 5.3.8	<ul style="list-style-type: none"> Bylaws - The Contractor shall compile, maintain and submit in a timely manner amendments required to the Principal's Bylaws including speed limits (amongst others) Temporary Speed limits - the contractor is delegated (by the State Highway Manager) to approve and record temporary speed restrictions at work-sites are delegated to the Contractor. Any new speed limit investigation (would be completed under safety reports) 	Covered under the Lump and Provisional Sum
0	Temporary Traffic Management	<ul style="list-style-type: none"> Traffic Control Plan - Section 4.3 Temporary Traffic Management and Safety of Work sites - Section 5.3.7 Temporary Speed Restrictions - Section 5.3.8 	<ul style="list-style-type: none"> All TMPs required to perform the Contract Works must be developed by the Contractor and accepted by the Principal The Contractor shall coordinate TMP approvals to eliminate conflicts between work-sites, particularly in respect to timing and journey-time reliability through fulfilling the TMC roles as required by CoPTTM The Contractor shall have suitably qualified and experienced personnel with the appropriate qualifications as required by CoPTTM to fulfil the following responsibilities The Contractor shall carry out TMP audits in accordance with the CoPTTM on a random sample of all parties working within the road corridor In terms of the Traffic Control Devices Rule, the powers of the State Highway Manager to approve and record temporary speed restrictions at work-sites are delegated to the Contractor 	Covered under the Lump Sum
0	Incident Management	<ul style="list-style-type: none"> Emergency Procedures and 	<p>The Contractor must:</p> <ul style="list-style-type: none"> Develop an EPPP must be developed by 	Covered under the Lump

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		<p>preparedness plan (EPPP) - Section 4.7</p> <ul style="list-style-type: none"> Operational Activities – incident response - Section 6.6.1 Incident Response - Section 7.4 	<p>the Contractor with agreement from the Principal and any other stakeholders the Principal may identify</p> <ul style="list-style-type: none"> Manage the incident in accordance with Section 5.3.5 of the Network Outcomes Contract Maintenance Specification. Provide sufficient resources to attend to all incidents 24 hours a day, seven days a week (regardless of risk allocation). Respond according to the Contractor’s Emergency Procedures and Preparedness Plan Provide appropriate signage and barriers at all road closures, including changing permanent road condition signs before and after the closure. Manage road closure barricades at all times. Provide incidence response reports as part of the monthly meetings 	Sum (up to 10 hours each incident then Variation)
5.11	Land Development and Access			
5.11.1	Access Management			
5.11.1.1	Motorways	Corridor Access Management – Section 5.3.10	<ul style="list-style-type: none"> The Contractor shall coordinate, review and manage all activities that require access to the road The Contractor’s safety engineer will check the Access Control report (ACR) and send to the Transport Agency planning team to sign off 	Covered under the Lump Sum
5.11.1.2	Expressways	Corridor Access Management – Section 5.3.10	<ul style="list-style-type: none"> The Contractor shall coordinate, review and manage all activities that require access to the road The Contractor’s safety engineer will check the Access Control report (ACR) and send to the Transport Agency planning team to sign off 	Covered under the Lump Sum
0	Limited Access Road (LAR)	Unauthorised Works – section 5.3.12	Where the existing road is declared Limited Access Road (LAR), the Contractor shall, in addition to the above, monitor all accesses against schedules, plans and notices provided by the Principal to ensure compliance with the LAR declaration	Covered under the Lump Sum

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0	Land Use Development	Planning Assessment Report – Section 5.3.9	When requested by the Principal, the Contractor shall provide a suitably qualified person to produce an on-site engineering assessment report that assesses the effects of a land use development or activity on the safety, efficiency or sustainability of the Network.	Covered under the Provisional Sum
0	Corridor Access Management and Requests (CAR)	Corridor Access management - Section 5.3.10	<ul style="list-style-type: none"> This requires the Contractor to assist the Principal to produce a Works Access Permit as part of the approval process. The Contractor shall coordinate, review and manage all activities that require access to the road. 	Covered under the Lump Sum
5.11.2	Highway Stopping Places	related to routine environment maintenance (Section 6.4.1)	The Contractor shall identify and report as necessary on any factors that may adversely affect the safety, efficiency or sustainability of the Network Vegetation including issues such as trees which are unsafe, unstable or cause obstruction.	Covered under the Lump Sum
0	Vegetation Control	<ul style="list-style-type: none"> Network and Adjacent landowner – related issues - Section 5.3.13 Routine Environmental Maintenance – Vegetation Control - Section 6.4.1 Routine Traffic Services – Vegetation Control - Section 6.5.1 	The Contractor shall identify and report as necessary on any factors that may adversely affect the safety, efficiency or sustainability of the Network Vegetation including issues such as trees which are unsafe, unstable or cause obstruction	Covered under the Lump Sum
5.12	Vulnerable and Active Road Users			
5.12.1	Pedestrians	Road Safety Theme Inspections and Reporting – section 5.5.4	When requested by the Principal, the Contractor shall provide a suitably qualified person to undertake road safety theme inspections (i.e. pedestrian facilities) and reporting	Covered under the Provisional Sum
5.12.2	Cyclists	<ul style="list-style-type: none"> Compliance Sampling and Auditing 	<ul style="list-style-type: none"> Cycle lanes and paths shall be included in the compliance inspections when the adjacent road carriageway has been 	Covered under the and

Activity No. (This document)	Activity Description	Associated Network Outcomes Contract reference/s	Network Outcomes Contract requirements	Schedule of Prices
		process – section 2.3.3 • Bridges and other structure maintenance management – section 5.4 • Road Safety Theme Inspections and Reporting – section 5.5.4	selected as part of the compliance audit programme • The Contractor remains responsible for the overall maintenance of the Network which includes routine structures maintenance including foot bridges and cycle bridges • When requested by the Principal, the Contractor shall provide a suitably qualified person to undertake road safety theme inspections (i.e. pedestrian facilities) and reporting	Provisional Sums Sum
5.13	Motorcyclist	Road Safety Theme Inspections and Reporting – section 5.5.4	When requested by the Principal, the Contractor shall provide a suitably qualified person to undertake road safety theme inspections (i.e. pedestrian facilities) and reporting	Covered under the Provisional Sum