Austroads

Research Report
AP-R612-20

Local Government Road Safety Management Guidance

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Abstract

The type of roads managed by local government means that safety issues are different in nature and spatial distribution than on state roads. Local government roads typically have lower traffic volumes, more dispersed crashes, a wider variety of road environments and a greater mix of road users, all of which make managing road safety on local government roads an especially challenging task.

This guidance is designed to provide contemporary best practice methods on the development and implementation road safety management frameworks suitable for use in a local government context. The guidance introduces functions necessary for the implementation of a road safety management system and describes key principles such as strategic partnerships, shared responsibilities, capacity building, program development and delivery and funding.

Keywords

Safe System, road safety, local roads, local government, low volume roads,

ISBN 978-1-925854-72-5

Austroads Project No. SAG6127

Austroads Publication No. AP-R612-20

Publication date January 2020

Pages 58

About Austroads

Austroads is the peak organisation of Australasian road transport and traffic agencies.

Austroads' purpose is to support our member organisations to deliver an improved Australasian road transport network. To succeed in this task, we undertake leading-edge road and transport research which underpins our input to policy development and published guidance on the design, construction and management of the road network and its associated infrastructure.

Austroads provides a collective approach that delivers value for money, encourages shared knowledge and drives consistency for road users.

Austroads is governed by a Board consisting of senior executive representatives from each of its eleven member organisations:

- Transport for NSW
- Department of Transport Victoria
- Queensland Department of Transport and Main Roads
- Main Roads Western Australia
- Department of Planning, Transport and Infrastructure South Australia
- Department of State Growth Tasmania
- Department of Infrastructure, Planning and Logistics Northern Territory
- Transport Canberra and City Services Directorate, Australian Capital Territory
- The Department of Infrastructure, Transport, Cities and Regional Development
- Australian Local Government Association
- New Zealand Transport Agency.

Acknowledgements

The authors would like to thank the working group of local government representatives that contributed to this guidance: Aoife Corcoran (Surf Coast Shire, Victoria); Engel Pendergast (WALGA); Katherine Russell (LGA, South Australia); Kym Foster (ALGA); Lesley Tipping (Hornsby Shire Council, NSW); Lisa Bagnati (City of Moonee Valley, Victoria); Lisa Pears (City of Ryde, NSW); Mal Shervill (WALGA); Melanie Suitor (Parkes, Forbes & Lachlan Shire Councils, NSW); Nicole Wood (Warrnambool City Council, Victoria); Robyn Denton (Hamilton City Council, NZ); Valerie Stamper (Lane Cove Council, NSW). The authors would also like to thank David Shelton of Safe System Solutions for his expertise in reviewing the guideline content.

Summary

The type of roads managed by local government means that safety issues are different in nature and spatial distribution than on state roads. Local government roads typically have lower traffic volumes, more dispersed crashes, a wider variety of road environments and a greater mix of road users, all of which make managing road safety on local government roads an especially challenging task.

Local government manages approximately 82% of Australian and 88% New Zealand road networks by length, accommodates around 36% of all travel in Australia and half of all travel in New Zealand, and has more than half of all crashes at a crash rate nearly double that of state-managed roads. Despite this, local government tends to receive less funding and have fewer staff dedicated to improving road safety than their state counterparts. Industry guidance has also largely mirrored the flow of safety investment i.e. towards situations more commonly found on state roads. As a result, much of the road safety guidance available to the industry is not directly relevant to local government.

The purpose of the guidance seeks to rectify this, by compiling contemporary information on the reasons for establishing, and processes for developing and implementing a road safety management framework for local government into a single document.

The guidance provides an overview of the road safety management system and its relevance for local government in Australia and New Zealand. It outlines principles and processes for the development of a framework for road safety management. Road safety treatment measures that are suitable for local government are identified in relation to the four pillars of the Safe System approach. The guidance introduces functions necessary for the implementation of a road safety management system and describes key principles such as strategic partnerships, shared responsibilities, capacity building, program development and delivery and funding. The importance and purpose of monitoring and evaluation is highlighted, and best practice evaluation principles are outlined. The final section identifies useful tools and resources for practitioners seeking further information.

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1. Introduction

1.1 Purpose

The purpose of the guidance is to compile contemporary information on the reasons for establishing, and processes for developing and implementing a road safety management framework for local government into a single document.

Although precise definitions are elusive, it is worth making the distinction between 'local government' and 'community' when it comes to road safety.

Local government road safety implies activities which are embedded in local government processes and operations, and where local government is the lead agency.

Community road safety is the more general term and is sometimes used to include local government road safety, but it also includes arrangements where the lead agency could be a community organisation not directly linked to council. Where such arrangements exist, local government is generally encouraging and assists with staff participation, use of facilities and financial support (Austroads 2009).

This document is therefore primarily intended for a local government audience. Notwithstanding, the role of 'Community Road Safety' within a local government context is covered in Section 4.6 of this document.

1.2 Need for Separate Guidance for Local Government

Managing road safety on local government roads is an especially challenging task. Austroads (2010) found that local government manages approximately 82% of Australian and 88% New Zealand road networks by length, accommodates around 36% of all travel in Australia and half of all travel in New Zealand, and has more than half of all crashes at a crash rate nearly double that of state-managed roads. Despite this, local government tends to receive less funding and have fewer staff dedicated to improving road safety than their state counterparts. So why the discrepancy? For starters, the type of roads managed by local government mean that safety issues tend to be very different in nature and spatial distribution than on state roads.

State roads are typically the highest order roads in the functional classification, carrying significantly higher traffic volumes than local roads. As such, crashes on state roads occur more frequently and at a higher density per kilometre. Traditional approaches to road safety, such as blackspot programs, have tended to prioritise investment towards these types of situations rather than local roads where crashes less frequently occur in clusters. Local government roads comprise a more diverse range of road environments, ranging from high speed rural and remote roads to local streets with residential and shopping functions and schools fronting them. Additionally, local government roads tend to have a greater mix of road users present, particularly vulnerable pedestrians and cyclists, which make them more difficult to manage because of the variability in road types and complex interactions between a wider mix of users. These are just some of the factors that make it difficult for local government to manage road safety effectively.

The findings of Austroads (2010) highlighted several factors contributing to the inferior safety performance on local government-managed roads, including:

- A general lower standard – poor intersection design and road alignment, unsealed shoulders, narrow roads, a common presence of roadside hazards, a lack of delineation, inappropriate speed limits, and a lack of pedestrian facilities.
- Behavioural issues – excessive speeds, distraction, inattention, road user impairment, and inconsistent driver expectations.

Industry guidance has largely mirrored the flow of safety investment i.e. towards situations more commonly found on state roads. As a result, much of the road safety guidance available to the industry is not directly relevant to local government. Local government may not have the capacity or capability to have a comprehensive understanding of every aspect of road safety management practice. In response, this guidance presents the relevant road safety approaches and practices that are most likely to be applicable in a local government context. However, for more detailed guidance on specific topics, reference should be made to the Austroads *Guide to Road Safety*, in particular the Parts relating to Safe Roads, Safe Speeds and Safe Vehicles, as well as other Austroads Guides.

1.3 Strategic Role of Local Government

Local government is an integral partner in the governance of New Zealand and Australia, as recognised by the Department of Internal Affairs (2011) and the Australian Government (2018).

The Australian Local Government Association's *Strategic Plan 2017-2020* (Australian Local Government Association, 2017a) identifies four core strategic priorities. Of relevance to local government and community road safety, these priorities include strengthened regions and cities, and infrastructure that meets the needs of local communities.

Building capacity, capability and sustainability are key strategies in pursuit of these priorities. The ethos and practical steps which have evolved in community road safety therefore provide a good fit to the priorities of local government as defined by its peak body. The *Local Government Roads and Transport Agenda* (Australian Local Government Association, 2019) describes local government's role in collaborating with federal and state/territory governments to manage transport networks and infrastructure, and advocates for increased partnerships for road safety programs.

In most jurisdictions, local road safety programs are delivered through local government. Even in jurisdictions where they are not, local government is a key player in the steering committee and is a major contributor to its functioning by making available premises, funding, staff and other support.

A broadly similar situation applies in New Zealand, where Local Government New Zealand (LGNZ) is a partner and stakeholder with central government in governance matters applying to local jurisdictions. LGNZ represents the 78 local authorities on all matters that affect local government, including road safety strategy and direction. LGNZ's policy priorities include infrastructure and social issues (Local Government New Zealand, 2017). These priorities have direct relevance for road safety outcomes, with transport networks and community safety specified as key issues.

1.4 Role of Local Government in Road Safety

In Australia and New Zealand, local government and community road safety has become established as an essential element in most jurisdictions' road safety programs. The role of Australian local government in delivering road safety and the importance of engaging the community are acknowledged in the *National Road Safety Strategy 2011-2020* (Australian Transport Council 2011) and the *National Road Safety Action Plan 2018 - 2020* (Transport and Infrastructure Council 2018). For New Zealand, the guiding documents are the *Government Policy Statement on Land Transport 2018/19 – 2027/28* (Ministry of Transport 2018), *Safer Journeys* (Ministry of Transport, 2010) and the *National Land Transport Programme 2018-21* (NZ Transport Agency, 2018a). In Australia, the role of local government in delivering road safety is also recognised in the road safety strategies developed by the different state governments. National road safety strategies are discussed further in Section 2.4. Effective local government road safety programs are based on the same general principles as other road safety activities managed at the national or state level, but they do pose some particular challenges.

Woolley et al. (2018) identify that achieving a vision of no harm on Australia's roads depends critically on creating a mechanism for national and state agencies to support local governments and effectively reduce trauma on locally managed roads. Information on the shared responsibility that national, state and territory agencies must take in supporting the implementation of road safety at a local level is covered in Section 5.2.

Local government has responsibilities in a number of other areas where there may be possibilities for productive synergies. All councils have land use planning and regulation and the provision of roads as core functions. Although arrangements differ across jurisdictions and differ among councils due to factors such as size, resources and priorities, councils are often active in the areas of transport and traffic planning, and health and community services, including youth services and services for older adults.

Local government has important roles to play in improving road safety:

- it has primary responsibility for the safety of the roads it owns and manages
- as a planning authority, it has a duty to consider the road safety implications of decisions regarding land use and the form of developments on roads that it controls, and may have an advocacy and/or partnership role in other situations
- it has a role in lobbying higher levels of government for funding transport infrastructure and services which will benefit the community and for changes to legislation which may have a particular impact on its community, e.g. aspects of police traffic enforcement
- it has a role in engaging and empowering its community in relation to road safety issues, in encouraging safe road user behaviour, and in coordinating local resources for better road safety outcomes.

Local governments in different jurisdictions fulfil these roles in different ways.

The *Guide to Road Safety Part 1: Road Safety Overview* (Austroads, 2013a) points out that road safety is a core responsibility for road authorities in Australia and New Zealand. The community expects a high level of road safety. Road crashes result in serious financial losses and emotional trauma which affect communities, particularly smaller communities. Road safety is high on the political agenda, and road crashes attract wide media coverage.

In Australia, a series of court decisions have established that road authorities have a duty of care towards road users. In practice, this means that they must do what is reasonable to be aware of deficiencies in the road system, to assess and prioritise them, and have a system for remedying them (Sarre 2003).

Road authorities are obliged to have in place reasonable programs of inspection to allow them to identify problems with their roads. This assessment should take into account the fact that road users might fail to take proper care of their own safety. Road authorities should also have in place arrangements to make sure that deficiencies which pose a risk to road users are dealt with in a reasonable time, having regard to available resources. Note that the requirement of duty of care does not demand that there be no deficiencies in the road system – only that a road authority will do what is reasonable to monitor and remedy problems. The court decisions recognise that the resources available to an authority, including the availability of material, skilled labour and funding, may limit how quickly defects can be addressed. If this results in a delay to remedying a situation which is hazardous for road users, the road authority should consider other alternatives such as using signs to alert road users of the hazard or, in extreme cases, closing the road.

As planning authorities, they have a duty to ensure that road safety is not compromised by excessive demands on the road system posed by developments, and have the capacity to ensure developers address potential safety issues as part of their development proposal (e.g. providing adequate road layouts (including lighting and footpaths) for new developments, providing traffic signals or intersection redesign for large new commercial developments).

In New Zealand, road controlling authorities have no specific duty under law to consider and implement measures to address road safety risk. Instead, personal injury is covered by a national injury insurance scheme. As in Australia, the community has a growing expectation that authorities will provide safe travel conditions.

Duty of care is discussed in more detail in Austroads (2013a). Its chief implications are that all local governments must take responsibility for the safe operation of the roads they manage. The minimum commitment to road safety is a process for identifying safety issues and prioritising them, a process for remedying these issues within a reasonable time frame and a process for managing unsafe situations until remedial works can be undertaken. Each of these processes must be defensible as ‘reasonable’.

International best practice is very clear that local government should seek to go beyond this minimum duty of care and demonstrate a commitment to eliminating death and serious injuries from their road network. The establishment and implementation of a road safety management system is a key method of doing this.

2. The Road Safety Management System

2.1 International Context

Road safety management is the first and fundamental pillar of the *Global Plan for the Decade of Action for Road Safety 2011-2020* (UNRSC, 2011). The *World Report on Road Traffic Injury Prevention* (Peden et al., 2004) and the Global Plan emphasise that improving road safety performance requires a systematic and planned approach. Establishing an effective road safety management system is the means by which organisations can achieve this.

Countries with the safest road networks demonstrate many common characteristics in their management of road safety. They have targeted better safety outcomes, adopted a systemic approach to intervention, and put in place a range of institutional arrangements built up over many years. Knowledge about successful practice has been integrated into management tools and applied to assist decision-makers and practitioners with the development and implementation of successful management systems.

As described in Wegman et al (2015), critical success factors in nations with the lowest mortality rates or the largest progress are data-driven problem identification and the development of evidence-driven countermeasure packages formalised in a strategy for effective implementation, combined with ambitious, quantitative targets and transparent lines of institutional accountability. Road safety management captures all these components.

Papadimitriou et al. (2012) documented road safety management systems in 13 European countries, Interestingly, they concluded that none of the national models represented complete best practice, rather good practices were evident across many countries. Countries with the best performance records did not consistently demonstrate good practice and good final outcomes could be derived from varying road safety management practices. However, it was possible to identify the worst performing countries due to their lack of good practice principles. Regardless of the variability in road safety management, the following good practice principles were identified:

- a strong lead agency for road safety, with a clear vision that guides implementation
- monitoring of strategy implementation
- evaluation embedded in the policy development cycle
- distribution of resources and coordination of action across levels of government.

The international context endorses the popular adage that “failing to plan is planning to fail”.

2.2 The Safe System Approach

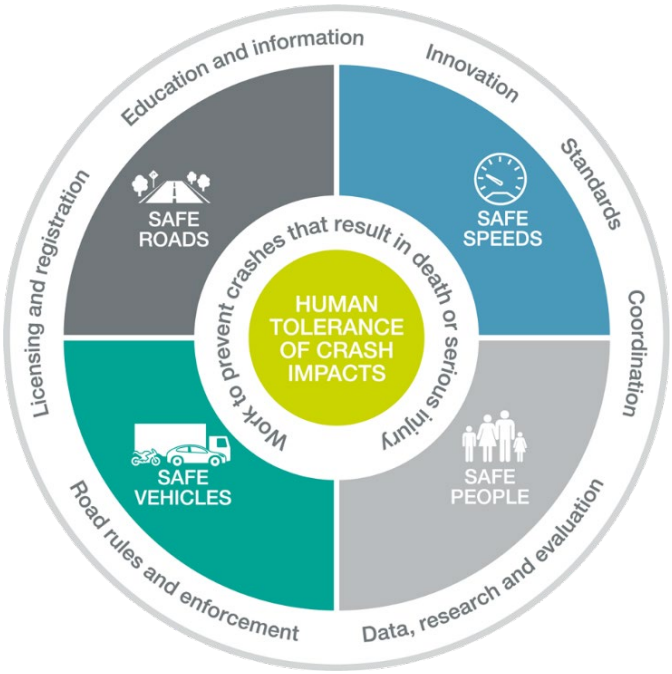
The Safe System approach underpins Vision Zero or Towards Zero. It was pioneered in Sweden and acknowledges the physiological and psychological limitations of humans and puts ultimate responsibility on the designers and operators of the system to accommodate these human limitations. This approach is derived from an understanding that people make mistakes, and from an ethical standpoint no-one should be killed or seriously injured on roads (Johansson 2009; Tingvall & Haworth, 1999). The focus is on adapting the road system to humans, rather than human behaviour to the roads (Belin, Tillgren, & Vedung, 2012).

The Safe System approach is a guiding road safety philosophy that is adopted by leading nations. The Safe System approach demands a holistic approach to the safety of the road system and the interactions among roads and roadsides, travel speeds, vehicles and road users. It is an inclusive approach that caters for all groups using the road system, including drivers, motorcyclists, passengers, pedestrians, cyclists, and commercial and heavy vehicle drivers. The Safe System approach operates on the following guiding principles:

- **People make mistakes**. Humans will continue to make mistakes, and the transport system must accommodate these. The transport system should not result in death or serious injury as a consequence of errors on the roads.
- **People are vulnerable and the system should be managed within human biomechanical injury limit**. Our bodies have a limited ability to withstand crash forces without being killed or seriously injured. A Safe System ensures that the forces in collisions do not exceed the limits of human tolerance. Speeds must be managed so that humans are not exposed to impact forces beyond their physical tolerance. System designers and operators need to take into account the limits of the human body in designing and maintaining roads, vehicles and speeds.
- **Shared responsibility**. The burden of road safety responsibility no longer rests solely with the individual road user. System managers have a primary responsibility to provide a safe operating environment for road users and ensuring that the system is forgiving when people make mistakes.
- **Strengthening all parts of the system**. All pillars of the road system need to be strengthened so that if one part fails, other parts will protect the people involved from serious harm.

Central to the Safe System approach is human tolerance to crash impacts and the management of kinetic energy transfer so these are within survivable limits. The Safe System approach is based on the following four Safe System pillars:

- **Safe Roads** - Roads and roadsides are designed and maintained to reduce the risk of crashes occurring, and to lessen the severity of injury if a crash does occur.
- **Safe Speeds** – speeds are managed to complement the road environment and ensure crash impact forces are within human tolerances;
- **Safe Vehicles** – vehicles lessen the likelihood of a crash and protect occupants and other road users;
- **Safe People** – road users are skilled, competent, alert and unimpaired.



It is acknowledged that Post-Impact Care of victims is considered by the World Health Organisation to be the fifth pillar of the Safe System approach to road safety. This pillar is yet to be formally adopted by Austroads or embedded into the Australian or New Zealand national road safety strategies. Research is taking place to evaluate the importance and role of this fifth pillar and recommend on how it can be incorporated in future road safety strategies and action plans (NZ Transport Agency 2018b).

As an industry, there is a need to acknowledge that the current road system is inherently unsafe and that road users are frequently placed in circumstances where errors are to be expected (Woolley et al. 2018). If this is to be accepted, then the scenarios that govern planning, road design and traffic management need to be added to.

No matter how well trained or skilled road users are, it must be acknowledged that errors are inevitable when using the road system. It is unrealistic to expect road users to be operating at peak performance all the time and many of us can relate to being tired, distracted, emotional, stressed, inexperienced or unwell when using the road system.

A Safe System that is accommodating of road user error will mean increasingly less severe road trauma. Many practices and designs in use today will continue to find application but new and different ways of doing things will also emerge. There will be a significant shift in philosophy as to what criteria govern decision making in relation to road safety matters especially when crash consequence is considered. There will also be a need to initiate systemic changes in the road system as the inherent risk of current design practices and injury mechanisms become better understood. Frameworks will also be developed that place a greater emphasis on seeking solutions across the pillars, rather than only within a single pillar. Design tools and stereotypes will emerge that associate design elements with injury severity outcomes. An example of differences between conventional and the Safe System approach are shown in Table 2.1 (Austroads 2018a).

Table 2.1: Paradigm shift between conventional and Safe System approaches

	Conventional	Safe System
What is the problem?	Accidents	Fatalities and Serious Injuries
What causes the problem?	Mainly poor road user performance Speeding, drink driving, inattention, deliberate risk taking	System failures
Who is ultimately responsible?	Individual road users	System designers and operators
What is the major planning approach?	Incremental approach to reduce the problem with an associated residual crash problem	A systemic approach to build a safe road system and minimise the harm
What is the appropriate goal?	Optimum number of fatalities and serious injuries based on competing objectives	Towards the virtual elimination of death and serious injuries
What is the trade-off?	A balance between mobility and safety	Maximising safe mobility
How is the effort coordinated?	Incremental gain within individual pillars (roads / speeds / vehicles / people)	Optimise solutions across pillars (roads / speeds / vehicles / people) – pillars compensate for each other where performance is poor
What are the cultural manifestations?	Legal liability avoidance and risk aversion	Risk assessment, innovation, trials and demonstrations
Context of tools in use	Bias towards pre-existing crash history, understanding crash causes and likelihood, optimising the network for motor vehicles	Risk analysis based on network design attributes supplemented by crash data, understanding crash consequence, optimising the network for all road users and human frailty

Source: Austroads 2018a

Inspired by the reframing of road safety as a societal health issue in the best performing countries, such as the Netherlands and Sweden, several principles have been articulated to characterise the Safe System approach:

1. Aim to develop a road transport system better able to accommodate human error, commonly achieved through better management of crash energy, so that no individual road user is exposed to crash forces likely to result in death or serious injury.
2. Incorporate many strategies for better management of crash forces, with a key strategy being road network improvement in conjunction with posted speed limits set in response to the level of protection offered by the road infrastructure.
3. Use strong economic analyses to understand the scale of the trauma problem, and direct investment into those programs and locations where the greatest potential benefit to society exists.

4. Develop comprehensive management and communication structures incorporating all key government agencies and other organisations which have a role in determining the safe functioning of the transport system.
5. Align safety management decision making with broader economic goals and human and environmental health goals and create a commercial environment that generates demand for and benefits the providers of safe road transport products and services.
6. Embrace the ethos of 'shared responsibility' for road safety among the various actors of the road transport system, such that there is a shared vision amongst citizens, public, private and not for profit organisations regarding the ultimate safety ambition, and how to achieve it.

The principles should not be regarded as fixed, but contrast with past approaches which have largely presented road safety as a task of perfecting rather than protecting humans. By embedding and applying these principles in a road traffic safety management system, road agencies can lay the platform for a much safer travelling environment for the communities they serve (Austroads 2015).

2.2.1 Role of Speed in the Safe System

Austroads (2018a) identifies that speed is at the core of a forgiving road transport system. While many can relate to the physics of stopping associated with travelling speed, the intricate and non-linear relationship with crash energy and consequent injury is more difficult to appreciate.

The effect of a small travelling speed change into an injury outcome

A small change in travel speed
↓
A relatively large change in stopping distance
↓
A much larger change in impact speed
↓
A still larger change in impact energy
↓
A very large change in probability of death and serious injury

Source: Austroads 2018a

In this context, all aspects associated with speed are important. Even small reductions in travelling speed can have large effects on injury outcomes and the creation of an inherently safe road system is largely dependent on the kinetic energy in the system. The transition towards the Safe System will be dependent not only on the adoption of speed limits compatible with harm minimisation but also the integration of solutions that guarantee safe interaction speeds where conflict occurs or where lane departure is possible (e.g. with driver assist technologies). From a road infrastructure perspective, this means the greater use of design features to ensure that survivable interaction speeds are actually being achieved.

Kinetic energy is the energy associated with the movement of an object and is determined by a combination of speed and mass such that:

$$E_k = \frac{1}{2} m\, v^2$$

where

E_k = kinetic energy (Joules)

m = mass (kg)

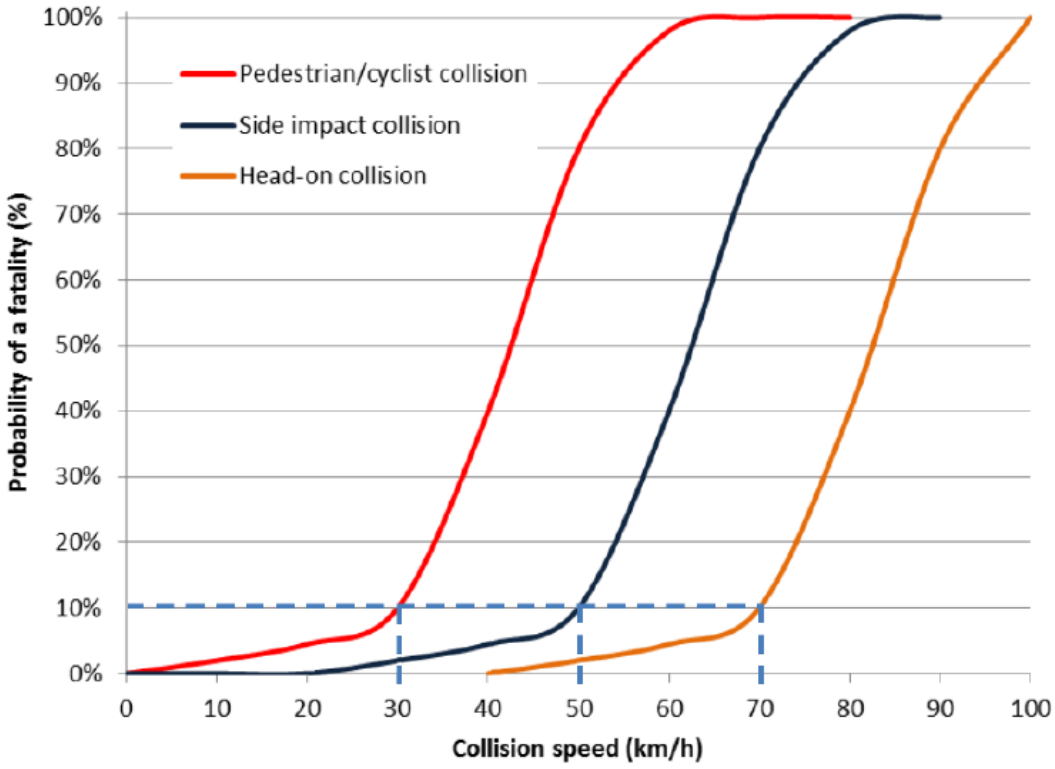
v= velocity (m/s)

Kinetic energy has a linear relationship with mass i.e. a doubling of mass doubles the kinetic energy, and a squared relationship with speed i.e. doubling the speed will result in four times the kinetic energy. It is therefore apparent that relatively small changes in speed can have large effects on kinetic energy transfers in a crash.

Managing the transfer of kinetic energy in the road transport system is a key to managing injury outcomes. Outside of vehicle design, speed management and the primary treatments identified in Section 4.2 provide key methods for managing kinetic energy transfer. With unprotected road users, safe speeds remain the most practical way for addressing safety.

The Wramborg curves developed in 2005 (reproduced as Figure 2.1) have been adopted internationally to illustrate "survivable" thresholds for different impact speeds. A 10% threshold for fatal outcomes was used as the basis for establishing a Safe System performance threshold; however, there is nothing to say that a threshold less than 10% would be inappropriate (Austroads 2018a).

Figure 2.1: Relationship between impact speed and probability of a fatality for different scenarios



Source: Jurewicz, Sobhani et al. (2015) and based on Wramborg (2005)

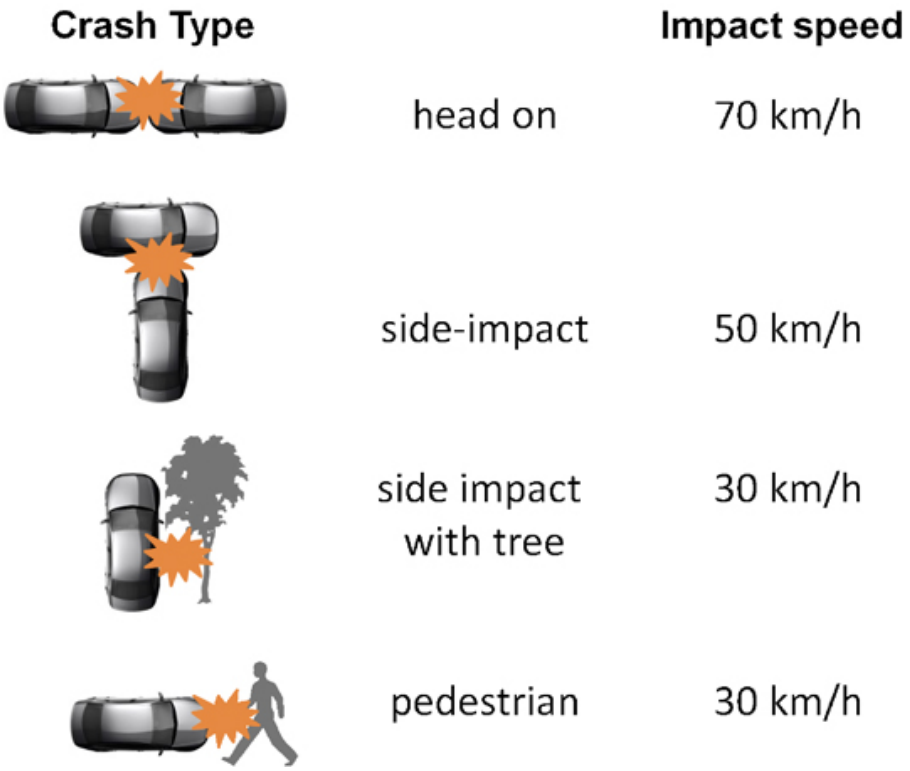
Based on these curves, the survivable impact speeds for different collision scenarios (often referred to as Safe System speeds) are shown in Table 2.2 and Figure 2.2:

Table 2.2: Safe impact speeds for different collision scenarios

Road and section type combined with road users	Target Safe System speed
Roads and sections used by cars and vulnerable road users	30 km/h
Intersections with possible side-on conflicts between cars	50 km/h
Roads with possible frontal conflicts between cars	70 km/h
Roads with no possible frontal or side-on conflicts between vehicles and no vulnerable road users	≥100 km/h

Source: ITF (2016)

Figure 2.2: Impact speeds for different crash types after which the risk of death escalates



Source: Towards Zero Foundation

Austroads (2018a) expands on the Wramborg curves and presents relationships between impact speed and the probability of a MAIS 3+ injury (a measure of traumatic injury). This modelling shows that when considering serious injury in addition to fatality risk, the speed thresholds reduce to 30 km/h for a head-on collision, 30 km/h for a side impact (near side) and 20 km/h for collisions involving a pedestrian.

The relationship between changes in mean speed and consequent changes in crashes and crash severity was originally described in research by Nilsson in 1981 through a series of power functions. In 2004, Elvik, Christensen and Amundsen conducted conventional and regression meta-analysis of the research and found the original power models proposed by Nilsson were robust, but suggested amendments to the model parameters.

The results of both studies show that small changes in travel speeds have a similar percentage change in property damage crashes, but a larger percentage change in casualties – particularly serious casualties, as shown in Table 2.3. For small speed changes, the percentage change in deaths is typically about four times the percentage change in speed.

Table 2.3: Relationship speed changes and changes in casualty rates

Change in	Change in mean speed					
	Speed reduction			Speed increase		
	-10%	-5%	-1%	+1%	+5%	+10%
Deaths	-38%	-21%	-4%	+5%	+25%	+54%
Serious injuries	-27%	-14%	-3%	+3%	+16%	+33%
Other injuries	-15%	-7%	-1%	+2%	+8%	+15%
Property damage crashes	-10%	-5%	-1%	+1%	+5%	+10%

Note: severity categories are mutually exclusive (for example, serious injuries exclude deaths).

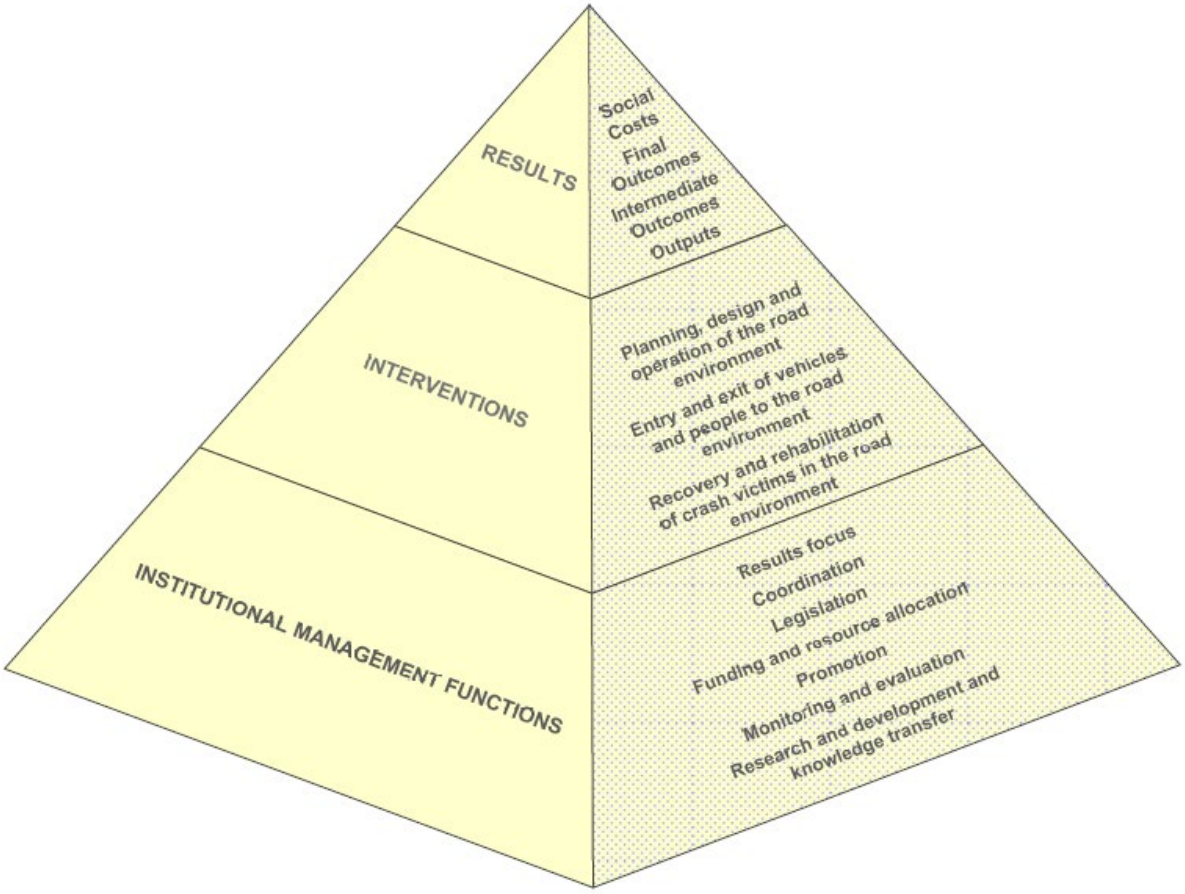
Source: Elvik et al. 2004

2.3 Systematic View of Road Safety Management

The long-term goal of the Safe System approach is the ultimate prevention of deaths and serious injuries, supported by interim, time-limited targets and key performance indicators. The strategic framework for road safety management is recognised as global best practice.

The latest evolution of the road safety management system which is recommended for use by the World Bank and the OECD is shown here. It contains three levels, **institutional management functions**, **interventions** and **results**, as shown in Figure 2.3.

Figure 2.3: Road Safety Management Model



Source: SafetyNet (2009) Road Safety Management, European Commission.

The **institutional management functions** provide the foundation on which road safety management systems are built. They develop and deliver the **interventions** to achieve the desired long and medium-term road safety **results** that have been established by the organisation. For this reason, they must receive the highest priority in road safety planning and policy initiatives.

Effective **intervention** focuses on evidence-based strategies to reduce exposure and likelihood of death and serious injury, as well as reducing the consequences of injury in the event of a crash occurring. Interventions cover the planning, design and operation of the road network, the entry and exit of vehicles, and users into the road network, and the recovery and rehabilitation of crash victims. They seek to manage exposure to the risk of crashes, prevent crashes, and reduce crash injury severity and the consequences of crash injury. They comprise safety designs, standards, and rules and well as a combination of activity to secure compliance with these such as information, publicity, enforcement and incentive.

In good practice, road safety **results** are expressed as long-term goals and interim quantitative targets. Targets specify the desired safety performance endorsed by governments at all levels, stakeholders and the community. To be credible, interim targets must be achievable with cost-effective interventions. Targets are usually set in terms of final outcomes. They can also include intermediate outcomes consistent with their achievement, and institutional output measures required to achieve the intermediate results.

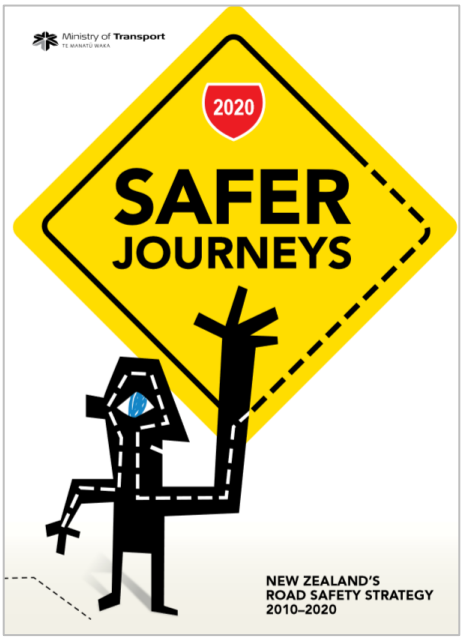
This process is applicable to all levels of government. National and state governments play a dominant role in most of the institutional management functions for road safety. These lead agencies develop the national and state road safety strategy and establish the results focus. The relationship between national and state road safety strategies and the role of local government is covered in the following sections.

2.4 National Road Safety Strategies

Both Australia and New Zealand have national road safety strategies. In New Zealand, the national government has primary responsibility for road safety. The national road safety strategy is therefore the document which determines the pattern of road safety investment and activity. In Australia, the states and territories retain primary responsibility for roads and road safety. The National Road Safety Strategy provides principles and documents an agreed set of priorities. The action plans which flow from it identify the directions for the different levels of government and their agencies in the shorter term. The state and territory strategies and related action plans spell out the specific goals and actions for each jurisdiction.

2.4.1 New Zealand

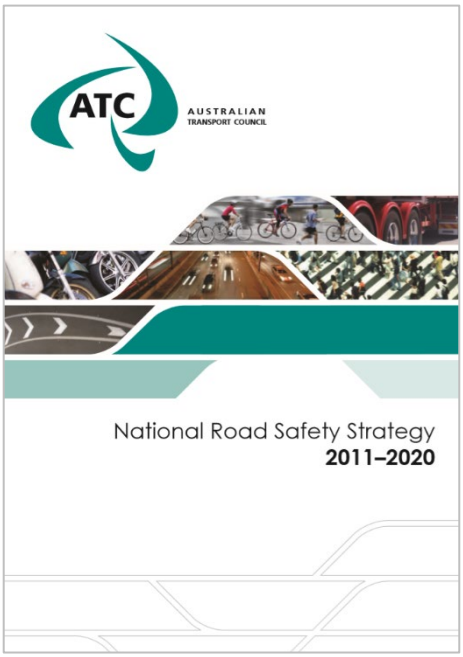
Safer Journeys is the government's strategy to guide improvements in road safety over the period 2010 to 2020. The strategy's vision is a safe road system increasingly free of death and serious injury and introduces the Safe System approach to New Zealand (Ministry of Transport 2010).



This vision recognises that while all road crashes could never be prevented from happening, many of them could be stopped from resulting in death and serious injury. It also broadens the focus beyond preventing deaths to also preventing serious injuries. To support the vision, *Safer Journeys* takes a Safe System approach to road safety. This approach means working across all elements of the road system (roads, speeds, vehicles and road use) and recognises that everybody has responsibility for road safety. The strategy also identifies and prioritises the road safety issues that are of most concern in New Zealand. *Safer Journeys* describes the first actions that will be taken to address these issues, using a Safe System approach that works across all elements of the road system.

In July 2019, the New Zealand Ministry of Transport released their proposal for the 2020-2030 Road Safety Strategy to replace *Safer Journeys*. This is the NZ Government's proposal for the 2020-2030 Road Safety Strategy that will replace "Safer Journeys" the current road safety strategy. The proposed strategy, named 'Road to Zero', has a Vision Zero approach and includes a target of reducing deaths and serious injuries on our roads by 40 per cent by 2030.

2.4.2 Australia



Australia's *National Road Safety Strategy 2011–2020* represents the commitment of federal, state and territory governments to an agreed set of national goals, objectives and action priorities; setting out a path for action to reduce fatal and serious injury crashes on Australian roads (ATC 2010).

It is firmly based on Safe System principles and is framed by the guiding vision that no person should be killed or seriously injured on Australia's roads. As a step towards this long-term vision, the strategy presents a 10-year plan to reduce the annual numbers of both deaths and serious injuries on Australian roads by at least 30 per cent.

The strategy sets out a range of high-level directions and interventions to drive national road safety performance to the end of 2020. These focus on the main areas where there is evidence that sustained, coordinated effort can lead to large gains. There is also a focus on measures which may not see results for some time, but which will lead to long-term improvement.

The National Road Safety Strategy represents the commitment of federal, state and territory governments to an agreed set of national road safety goals, objectives and action priorities. It is supported by a comprehensive performance monitoring and reporting regime.

2.5 Relevance for Local Government

National and state road safety strategies identify that local government has an important role to play in road safety. Woolley et al. (2018) point out that the vision of achieving no harm on Australia's roads depends critically on creating a mechanism for national and state agencies to support local governments and effectively reduce trauma on locally managed roads. Through their Action Plans, the ways in which local government can specifically contribute to achieve the aspirational goals are identified, as follows:

Australia's *National Road Safety Action Plan 2018-2020* identifies the organisations tasked with the responsibility for delivering the priority road safety actions and other critical actions (Transport and Infrastructure Council 2018). For local government this includes:

Priority Action 1: Review speed limits on high risk regional and remote roads, in consultations with the community

Priority Action 2: Target infrastructure funding towards safety-focused initiatives to reduce trauma on regional roads

Priority Action 3: Implement safety treatments to reduce trauma from crashes at urban intersections

Priority Action 6: Reduce speed limits to 40 km/h or lower in pedestrian and cyclist places

Critical Action A: Set safety plans for high risk corridors within the network to direct investment to reduce fatal and serious injury risk

Critical Action B: Apply Safe System principles and treatments to all road infrastructure investment programs

Critical Action J: Remote road safety – identify and implement key interventions

New Zealand's *Safer Journeys Action Plan 2016-2020* identifies four action areas, those organisations responsible for leading the action and those organisations that will play a role in enabling the action (New Zealand Government 2016). For local government this includes:

Action 1: Enable and encourage more use of safety technology, and ready accessibility of data and information to road users to support them to make smarter choices

Action 2: Encourage better consumer choice for protective equipment that reduces injury severity when crashes occur and ensure motorcycle safety is better reflected in transport plans and activity management plans

Action 3: Extend the coverage of risk-mapping tools, such as the high-risk curves mapping tool developed by SignatureNet and Urban KiwiRAP, and increase the provision of sensor warning signs and ensure new infrastructure is designed to provide for future technology to encourage safer driving

Despite the directive guidance through national and state road safety strategies, it is estimated that only around one third of local government organisations have a road safety management system, strategy or plan in place and close to half have no immediate proposal to develop one.

The absence of a road safety management system, strategy or plan does not infer that local government disregards for the safety of road users on their network. Local government organisations are constantly taking action to improve road safety conditions – ranging from incremental improvements in road safety maintenance regimes through to major improvement projects that move towards the establishment of a Safe System. The presence of a road safety management system does however infer that a local government organisation is likely to have brought all the elements of its safety responsibilities together in a manner that maximises the current level of safety experienced by road users (for the resources available), and demonstrates its commitment to a whole new level of safety in the future (Austroads, 2015).

Whilst all road safety management practices employed by local government should adopt the Safe System, the manner in which councils set about contributing to road safety objectives espoused in state and national road safety strategies will vary significantly between councils. For example, a road safety management plan developed by a large metropolitan council will undoubtedly look different to one developed by a council in a remote rural region with a low population. The best practice principles and processes involved in the development of a road safety management plan are presented in Section 3.4.

3. Developing a Framework for Road Safety Management

This section provides an overview of principles and processes that may be useful for assisting local government organisations with the development of a framework for road safety management.

3.1 Background

Austroads (2010) briefly described what a safety management system for local government should be like, outlining that it should provide '...comprehensive processes for achieving the goal of safety...' and include '...goal setting, planning and measuring performance. The safety management system aims to embed safety within the organisational culture and the way that people do their jobs.'

Austroads (2016b) identified that local government practitioners generally lacked the following:

- a clear framework for evaluating their road network against the principles of the Safe System approach to road safety
- a means of clearly communicating to colleagues within their council (both technical and non-technical), to their managers, the elected representatives and to members of the community, the road safety issue that exists at a site or along a road within a Safe System context.

To address this, it was determined that a safety management system for local government should:

- be developed utilising techniques familiar to council practitioners, to improve the likely take-up and understanding across the organisation
- be firmly embedded in the vision and principles of the Safe System approach, i.e. to eliminate death and serious injury from road crashes, by recognising that road users will make mistakes and road environments should be designed and operated to manage crash impact forces to within levels tolerable to the human body
- include consideration of road safety issues using all of the Safe System pillars, to maximise the scope for local government to develop and implement countermeasures and other actions.

Additionally, to ensure as broad an application as possible within local government, the approach should be:

- readily accessible to practitioners at all levels of council and across disciplines and functional areas
- scalable, so that it can be applied at the project level as readily as it can at the route and road network level
- simple to replicate and adaptable, so it can fit a council's site investigation process, or equally, communicate road safety needs via council's management plan.

Austroads (2015) promotes a systematic approach to road safety within road agencies using ISO 39001 as the template. This stems from Australia's National Road Safety Strategy, which includes an action to promote ISO 39001 Road Traffic Safety Management Systems. ISO 39001 closely aligns to the Safe System approach to road safety which underpins road safety strategies in Australia and New Zealand. It is a tool applicable to organisations of all sizes and types and is designed to help organisations reduce, and ultimately eliminate, the incidence and risk of death and serious injury related to road traffic crashes.

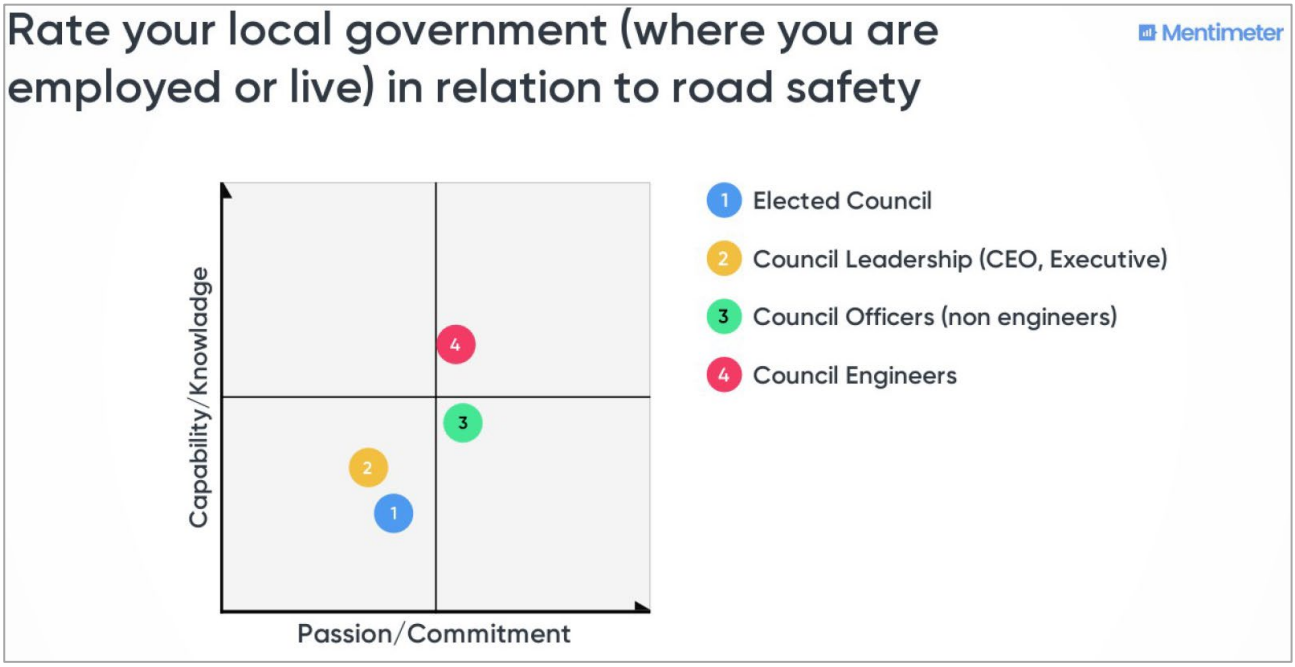
3.2 Getting Started

The development of a road safety management system from start to finish can seem like a daunting task. However, if it is approached from a strong project management perspective it is quite achievable. Getting started involves gaining early endorsement from the organisational leadership, scoping the project and gaining the resources needed to complete the project in a specific timeframe (Austroads 2015).

Gaining endorsement from the organisation leadership is a critical early step in the road safety management system development process, but one that can readily be overlooked if undertaken as an isolated task within the transport department. Leading road safety countries have recognised for some time that the development and delivery of successful road safety management systems depends on a number of critical success factors relating to political leadership and institutional arrangements (OECD 2002). In the past decade, good momentum has been achieved in Australia and New Zealand at a national and state level, but there remains a significant way to go for many local government organisations. Austroads has developed an information pack to assist road safety leadership (Austroads 2019f). A link to the material is provided in Section 7 of this document.

This was clearly demonstrated at a workshop on local government road safety held at the 2018 Australasian Road Safety Conference in Sydney where a clear gap in both the passion/commitment and capability/knowledge of elected officials and senior leadership in comparison to council officers and engineers was identified. Closing the gap in commitment and knowledge between elected officials and leadership to match those of officers and engineers is needed in order for the full potential of a council road safety management system to be realised. Following the processes and principles outlined in this section will help to close this gap.

Figure 3.1: Commitment and capability of different roles in local government



Any management plan developed by local government that has the endorsement and support of elected officials and senior leadership will be powerful, prioritised and acted upon compared to a management plan that lacks support. A road safety management plan is no exception. Ideally, the road safety management system for any local government should represent a statement of commitment to road safety by a council. This way the council assumes ultimate accountability for driving and implementing the plan. Success hinges on having the appropriate organisational structures, governance, resources, skills and relationships (Woolley et al. 2018). The road safety management plan extends beyond its purpose of setting out how lives will be saved and into the realms of organisational culture and management.

3.3 Commitment and Leadership

Policy makers seeking to achieve ambitious results in road safety are encouraged to recognise a paradigm shift to a Safe System is required to ultimately achieve and sustain transformational reductions in road deaths and serious injuries. Their strong and sustained leadership will be needed to establish that paradigm shift, change culture and then align current practice with a Safe System. The compass for the journey towards the eradication of road trauma is provided by Safe System principles, drawn from the practice developed in pioneering countries and cities. Leaders looking for a step-change in road safety can learn from the practices and tools used by the pioneers and translate those Safe System principles into on-the-ground action for their specific situations (ITF 2016).

A paradigm shift in the way road safety is viewed and responded to requires, first and foremost, leadership to initiate a change in mind-set and to guide stakeholders on the journey towards a Safe System. It also requires a sense of urgency to drive this change and raising awareness among all concerned that a Safe System is the best approach to deliver improved road safety.

The leadership component of road safety management is critical. Significant improvement in safety results cannot be expected to occur of their own accord, but instead tend to arise from leaders making well considered decisions which are then effectively implemented. The importance of the organisational leadership function for road safety management is demonstrated in part at least by the considerable requirements placed on top management within ISO 39001.

Local government is best placed to deliver road safety outcomes for local communities. Local government elected officials and leadership who are well informed and supportive of the Safe System approach are positioned to create a receptive road safety environment within their organisations. Political support provides ongoing advocacy for higher prioritisation of road safety among all stakeholders, while the operational side provides assistance to build community support and acceptance for Safe System strategies. These forms of leadership also benefit the community, who would ultimately receive a safer road transport system (WALGA 2012).

There are many aspects to organisational leadership. Improvements in road safety performance can be achieved through the leadership of a very small number of people who are capable of articulating, championing and leading significant reform processes, but sustaining and then further improving on these efforts can be challenging when those people move on. A road safety management system provides a mechanism for an organisation to capture the knowledge of how to go about the road safety task and to sustain and improve its approach over time (Austroads 2015).

3.4 Character and Benefits

A road safety management system and road safety management plan have different purposes and characteristics. A road safety management system covers the potential impact an organisation can have on road safety outcomes in a holistic sense. In contrast, a road safety management plan details the strategies and activities that an organisation will implement to tackle key road safety issues, meet agreed safety targets and ultimately progress towards the elimination of death and serious injuries from the road system.

3.4.1 Road Safety Management Systems

It is important that the road safety management system considers the safety impact and potential of the organisation as a whole. For local government, this means having a management system that goes beyond providing infrastructure services within which road fatalities and serious injuries occur. A road agency needs to have considered the complete range of safety issues relating to its network and its operation before it can expect to be able to identify how it will safely manage, maintain and improve the network. This would include, for example, the safe movement of the road agency's employees, the safe movement of goods and people by suppliers of services and products to local government, and the safety of the products and services used or provided by local government (Austroads 2015).

Determining the scope of a road safety management system is a reflection of how a local government not only sees its own functional responsibilities to the safety of road users, but also the responsibilities of those that it works with. There are many instances in which an organisation identifies the safety responsibilities it has and makes safety decisions which have a profound effect on the safety of others. Section 4 identifies the contributions local government can make to road safety outcomes across all Safe System pillars (Austroads 2015).

3.4.2 Road Safety Management Plans

A local government road safety management plan will bring together an agreed framework and action plan to tackle the key road safety issues in the area. Coordination with state and national strategies is important for establishing strategic links to mainstream programs and, potentially, to external funding sources. Local road safety management plans need to give effect to higher-order documents, such as the National Road Safety Strategy and Action Plans. The development of local road safety management plans enables resource planning and stakeholder engagement both within local government itself and with external stakeholders including the community.

The core of a road safety management plan is formed by its objectives and actions. The plan should state the rationale for the identification of its objectives and specify the actions by which these objectives will be achieved (IPWEA 2006). An action plan is the expression of that strategy over a shorter time period with key actions that address council's priorities. Over the life of the strategy, a number of action plans may be developed and implemented to achieve the desired outcome of the strategy. To be effective, it is essential that the road safety management plan is based on a rigorous assessment of the road safety issues that actions selected have been demonstrated to be effective, and that actions and messages are consistent with state or national campaigns.

Road safety management plans and strategies being developed by leading road safety organisations represent the latest evolution in road safety thinking as a means to further improve safety outcomes. These strategies embrace the Safe System approach and exhibit the following distinctive characteristics in that all:

- aim to eliminate all fatalities and serious trauma from road crashes in the long term
- recognise that road users will remain fallible and crashes will occur
- stress that those involved in the design and operation of the system share responsibility for the overall safety of the transport system
- aim to reduce crash energy through managing the interaction of all components of the transport system
- rely upon comprehensive management structures incorporating all relevant government agencies
- align safety management decisions with broader transport and planning decisions
- re-orient their interventions to focus on the inherent safety quality of the road infrastructure, and align travel speed with that infrastructure
- make comprehensive use of technology to improve the safety of the road transport system
- address road safety as a measure of organisational performance.

A common first response by local government to embedding the Safe System approach in their road safety management plan is an overwhelming sense that it is impossible to eliminate death and injury from the road system. Due to the complexity of the road system and its interacting components, a Safe System may take several decades with multiple strategies and shorter-term action plans to accomplish (Austroads 2018a). To be fully effective, the new strategies and plans must reassess priorities in the light of what has been achieved in the previous strategies, changes in the population, economy and transport system in the intervening years, and new developments in knowledge and practice.

Some benefits associated with having a road safety management plan include:

- a clear road safety direction for the council, community and other stakeholders
- establishing road safety as a priority within council

- a public commitment to action which the community can understand and support
- integrating the activities of different divisions of council in the achievement of road safety objectives
- a comprehensive examination and understanding of local road safety issues
- improving community relations for the council through closer contact, increased publicity and better understanding of community concerns
- gaining the commitment of stakeholders to a coordinated set of actions
- promoting community involvement and ownership of road safety issues
- positioning the council to take greater advantage of national and state road safety funding programs
- enabling long-term and short-term objectives to be balanced in terms of priorities and resources
- prioritisation of effort and efficient allocation of resources
- providing a basis for planning activities and determining budgets over a three-year program, and avoids some of the limitations of working within the constraints of year-to-year planning
- prioritising road safety when new building and streetscape developments are proposed.

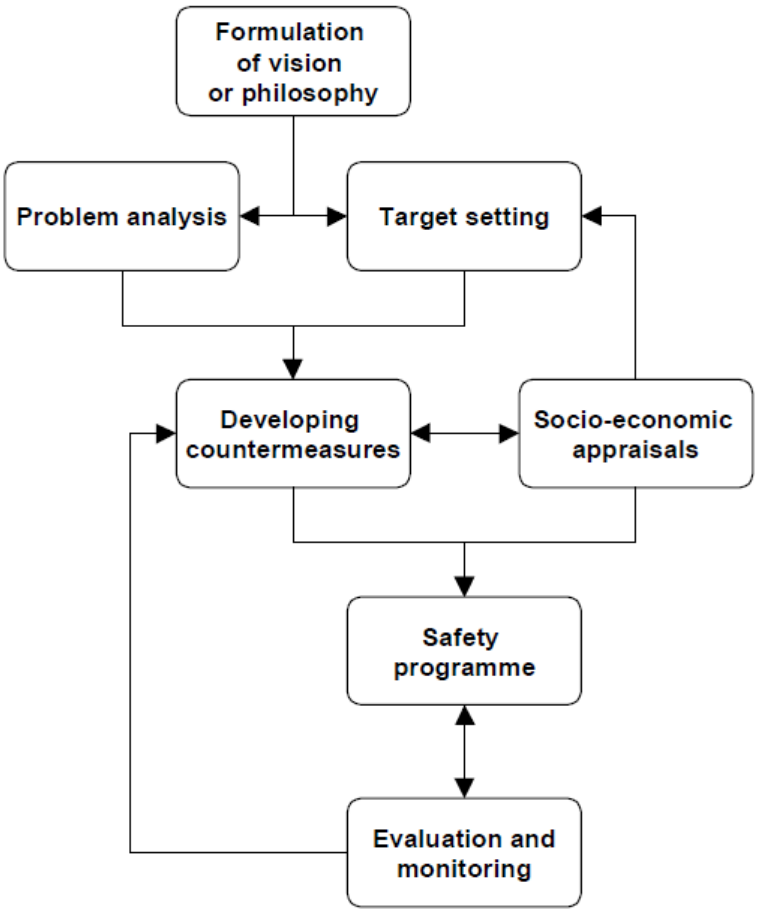
3.5 Development Processes

Whilst there is no strict 'recipe' that must be adhered to when developing a road safety management plan, the basic 'ingredients' remain the same. Plans need to reflect not only the nature of issues present in the local area, but also acknowledge the scale and ability of local government to influence road safety outcomes.

Best practice guidance suggests there are a common set of processes that need to be followed when developing a robust evidence-based road safety management plan. These are from Austroads *Guide to Road Safety Part 2: Road Safety Strategy and Evaluation* (2013b), and Austroads *Safety Management Systems for Road Agencies ISO 39001 and the Next Step Towards a Safe Road Transport System* (2015).

3.5.1 Top Down Approach

The Austroads *Guide to Road Safety Part 2: Road Safety Strategy and Evaluation* process is based on an OECD report on road safety strategies. The adjacent figure illustrates a 'top down' approach, starting with a vision or philosophy.



For local government, the 'vision' for road safety should align with that of the State or National road safety strategy; that being the elimination of deaths and serious injuries from the road transport system. This long-term vision needs to be balanced with firm and achievable interim targets. It is very difficult to achieve ambitious targets that seek very large reductions in road trauma by specific dates without links to specific interventions and achievable interim targets. Targets that fail to be achieved often undermine the credibility of target setting and road safety programs in general (ITF 2016). As such, targets based on expected outcomes from specified interventions should be set as a means to move systematically towards achieving an ambitious vision.

The OECD (2008, p. 14) states:

> *The only effective use of aspirational targets is in establishing a long term vision for achieving rates of deaths and serious injuries close to zero coupled to a twin track approach to make the vision operational: interim targets for quantified improvements over specific periods along the way, through interventions that are part of the road safety strategy; and research into more effective and new interventions to push the performance frontier.*

In Sweden, New Zealand and some states of Australia, this 'twin track approach' involves expressing the vision in terms of an end state for the road system which would result in the agreed trauma levels. Back casting techniques are then used to identify the interventions and their timeframes needed over the life of the strategy to transform the road system and hence meet the trauma targets. Packages of countermeasures are then produced as scenarios to inform funding and policy considerations. This approach is designed specifically for long term strategies aimed at eliminating road trauma (Swedish Transport Administration 2012).

After the vision has been stated, the next steps in strategy development are the detailed work of problem analysis, countermeasure development, countermeasure appraisal, and target setting. Socio-economic appraisal includes economic analysis of the costs and benefits of the countermeasures, an assessment of their acceptability on the part of the public, and a consideration whether the trained personnel or other specialised resources are available to deliver particular countermeasures.

Once targets are set and countermeasures agreed, the specific details of the safety program can be planned and delivered. Ongoing monitoring and evaluation are an essential part of the process to discover what impact the safety program is having and whether the targets set out in the strategy are likely to be met. The results of monitoring and evaluation enable adjustments to the program to bring it closer to meeting the targets specified in the strategy (Austroads 2013b). Further details on monitoring and evaluation practices can be found in Section 6. Communicating the results of monitoring to road users is essential in building support for the strategy and may help encourage behaviour change.

3.5.2 Bottom Up Approach

An alternative approach is to work 'bottom up', starting with an analysis of what can be achieved within available resources. This involves evaluating the scale of the problem e.g. the number and type of crashes and injuries, and identifying the impact countermeasures are likely to have e.g. reducing the likelihood and/or severity of a serious injury crash. The total reduction in the number of deaths and serious injuries that can be prevented is an estimate of the overall benefits of the program. While this approach may appear less challenging than the top down approach, it is more likely to give a realistic estimate of what can be achieved within current resource constraints, including funding. In reality, target setting is likely to involve elements of 'top down' and 'bottom up'. It is also likely to commence with a consideration of what is currently being achieved and what are the simplest, quickest and least expensive ways to achieve more.

Austroads (2015) acknowledges that road agencies seeking certification to ISO 39001 or developing a safety management system, would undertake the following six steps, following a basic plan-do-check-act model for continuous improvement.

1. Identify the impact the road agency can have on road safety, map that impact across interested parties, and determine the organisational scope of a road safety management system (refer clause 4 of ISO 39001).
2. Establish leadership commitment by adopting a long-term vision to eliminate death and serious injury and providing resources to establish, implement, maintain and continually improve the road safety management system towards these ends. Establish, document and communicate Road Traffic Safety (RTS) policy, and assign organisational responsibilities (refer clause 5 of ISO 39001).
3. Determine risks and opportunities through assessment of current performance and identify the road safety performance factors which are relevant to the agency. Set objectives and targets for each performance factor and develop action plans (refer clause 6 of ISO 39001).
4. Implement and operate the road safety management system and ensure that sufficient capacity is provided for the objectives and targets to be met (refer clauses 7 and 8 of ISO 39001).
5. Monitor and evaluate RTS road safety, conduct internal audits and periodic reviews of the RTS management system to identify opportunities for continual improvement (refer clause 9 of ISO 39001).
6. Improve the road safety management system on a continual basis following review of RTS performance, and of the RTS management system itself (refer clause 10 of ISO 39001).

3.6 Guiding Principles

Recognition of road safety and incorporation of the Safe System approach in strategic and corporate plans sets up an organisation to integrate road safety into core business practices. Essentially, a whole of organisation approach enables the Safe System approach to be addressed in all relevant areas, including traffic, assets, planning, vegetation management, fleet management, transport planning, health, and community services (WALGA 2012).

Local road safety programs and activities are likely to be more sustainable and receive better support from local government if there is a commitment to road safety in the council's general plan or strategic statement along with a reporting mechanism which puts road safety objectives and progress towards their achievement before council. This will require the support of elected representatives as well as council officers.

Each local government organisation needs to determine the strategic and risk-based approach that will best address the local road safety issues and needs of the community within the system of supports available.

Austroads (2018b) sets out the best practice principles for each of the six key stages in the development of road safety programs. The first of these stages 'Strategic Direction' contains eight best practice principles, as follows:

- The highest-level strategic documents are based on Safe System principles and set ambitious targets and aspirational outcomes for road safety. The minimum level for these aspirations is often set by national or state policy.
- Safe System principles, targets and outcomes need to cascade down through Action Plans, Implementation Plans, Policies, Procedures and Design Guidelines. Consistency in messaging is required as those involved in the delivery of road safety tend to work at one stage of the process and focus on the guidance related to that specific task e.g. geometric designers reference design standards / guidelines and do not necessarily seek out guidance from higher-order documents.
- Safe System principles should be embedded at an organisational level – not just within road safety teams.
- Funding and safety targets need to be considered jointly when setting the strategic direction. Aspirational safety targets should drive funding levels; however, those targets may need to be constrained to reflect the safety benefits that can be achieved within available funding.
- The road safety targets should be achieved across all Safe System pillars as opposed to achieved by pillars working in isolation. This will often lead local government to a reliance on other agencies in the Safe System collaboration.

- External factors (including macro-economic) are responsible for approximately half of the change in road safety fatalities. A process needs to be developed for assessing road safety infrastructure program performance independent of these external factors.
- Each road safety program should set specific safety targets that can be measured. Some programs will have the potential to be more effective than others.
- Programs, projects and countermeasures may not be fully Safe System compliant and it should be recognised that in many cases countermeasures 'that are moving towards a Safe System' are entirely appropriate.

Adopting a vision or target is a critical element. International best practice recognises the setting of targets or aspirational visions because it assists in communicating the importance of road safety; it encourages and motivates the organisation and stakeholders to act; and holds the managers of road networks accountable for achieving positive results. Recent research has found that jurisdictions that set aspirational goals and targets perform better in reducing road trauma than those that did not set targets (WALGA 2012).

Via their RoadWise program, the Western Australian Local Government Association (WALGA) has led the way in developing and promoting the Safe System to local government in WA. Their *Safe System Guiding Principles for Local Government* publication (WALGA 2012) promotes a whole-of-council approach to implementing Safe Systems. WALGA sees the Safe System approach as:

> *...a major shift from the road users to those who design, build and maintain the transport system. For road authorities, including Local Governments, planning and developing a safe transport system means looking beyond set standards and moving past the traditional role of constructing and maintaining roads; it means using Safe System treatments and countermeasures so that when people do make mistakes on the road network the outcome is less likely to result in death or serious injury. Along with the construction and maintenance of roads, Local Governments can influence road safety outcomes across each of the Safe System cornerstones through their responsibilities as a road authority, planning authority, employer and fleet operator.*

The WALGA guide promotes six guiding principles for councils to adopt on the path to developing a Safe System approach for their road network and eliminating death and serious injury in their community. These principles are shown in Figure 3.2. These principles acknowledge the various initiatives to consider when implementing a Safe System, which include all relevant areas of road safety. The outer circle shows the Safe System foundation initiatives overlapping the six principles. While each principle primarily relates to one initiative, this is an integrated approach, therefore each principle addresses more than one foundation.

Figure 3.2: WALGA Safe System guiding principles for local government

The implementation of a Safe System can be seen as a journey with different individual paths that may have different starting points but ultimately seek to arrive at the destination of trauma-free roads. The experience of pioneering Safe System countries offers lessons about common success factors (ITF 2016):

- **Create a sense of urgency**: A paradigm shift requires a sense of urgency of taking action, and in a radically different way, out of a desire to achieve substantially better results.
- **Take a bottom-up approach**: A Safe System needs the involvement of an informed and committed community of stakeholders. In many countries it has been them who have demanded better road safety outcomes from system designers. The top down approach is needed in the sense that influential leaders can initiate institutional change, but a sustainable Safe System is built on shared responsibility among all stakeholders.
- **Try out new tools**: A Safe System way of looking at road safety gives birth to new ideas. Often these highlight the limitations of the traditional ways of viewing the road safety problem and lead to effective innovative solutions.
- **Create public demand for more road safety**: Convincing citizens of the potential of a Safe System can increase public demand for road safety, which can subsequently help to engage politicians, policy makers and system designers.
- **Make the four Safe System principles the foundation** to guide the development of road safety policy and strategy, and ensure that they are not negotiated away.
- **Let data drive road safety policy**: Road safety targets, benchmarking and in-depth studies of road safety crashes help to identify priority action areas and the measures that will most effectively deal with them. Collecting relevant data on road safety performance across the elements of a Safe System is thus critical.

- **Communicate road safety facts effectively**: Where information about road safety is shared effectively, different advocates, the media and community members begin to ask questions and demand safer roads, speeds and vehicles from system designers. Introducing relevant facts and questions into the public debate in a strategic manner can be an effective way for change leaders to build community demand for a Safe System.
- **Focus on outcomes by setting targets**: Road safety should be managed for results to drive change. Targets provide this focus on results and drive performance. They also help to communicate effectively around road safety.
- **Use Safety Performance Indicators**: Fully transparent and accountable monitoring of safety performance using valid and reliable indicators of outputs, intermediate outcomes and final crash outcomes across all the components of a Safe System is important.
- **Ensure effective governance and management structures**: Effective co-ordination contributes to successful implementation of shared responsibility. The ISO 39001 Road Traffic Safety Management standard provides a good basis for organisations to systematically identify safety risk and provides a "how to" implementation guide for organisations to implement a Safe System thus supporting the guiding principle of shared responsibility.

3.7 Safety Performance Indicators

The ITF (2016) identifies that Safety Performance Indicators (SPI) can be highly effective in determining road safety policies and interventions. They constitute an essential tool for diagnosing problematic areas, for understanding the processes leading to road crashes, and for helping stakeholders to understand how they can contribute to improved road safety.

It is important that Safety Performance Indicators focus not only on the final crash outcomes (i.e. people killed and seriously injured) but also intermediate outcome indicators that are thought to contribute and also measure the outputs being delivered to address the outcomes. For example in the case of people being killed in crashes while unrestrained, the final outcome measures are the number of people killed and seriously injured in crashes not wearing a seatbelt, an intermediate outcome indicator is the number of people driving not wearing a seatbelt and output measures would include the number of vehicles fitted with seatbelt reminder systems and the number of infringements issued by police.

To determine whether intermediate outcomes are relevant they need to be readily measurable. Indicators should offer an accurate and reliable reflection of the state of each intermediate outcome and be measured on a regular basis to allow monitoring their evolution over time. Ideally, one should obtain a good overview of the performances for the different system components. The indicators should be evidence based, especially regarding their connection to final outcomes and Safe System principles. In most cases, their measurement requires the organisation of surveys, based on adequate sampling methods, to ensure representativeness of the sample with respect to the state of the particular problem investigated. For example, the trends in the population use of seatbelts relies on observational, roadside studies that can be then extrapolated and generalised to describe the trend in the overall population (ITF 2016).

To have a complete assessment of the road safety performance, SPIs should be defined and selected so that no element of the system should be omitted as far as this is possible. The set of indicators selected should be as comprehensive as possible in reflecting the “health” and effectiveness of a Safe System.

Examples of basic and relevant SPIs for the elements of a Safe System, based on experiences from some countries include:

- **Safe Roads SPI:**
  - Percentage of vehicle-kilometres driven on median-separated roads with a speed limit above 80 km/h
  - Percentage of intersections that have primary safe system treatments applied
  - Percentage of road infrastructure projects that are subject to a Safe System Assessment

- **Safe Speeds SPI:**
  - Percentage of vehicles driving within speed limits
  - Percentage of road network where the speed limit is aligned with the safe and appropriate speed
  - Length of residential street network where a Local Area Traffic Management (LATM) scheme has been implemented
- **Safe People SPI:**
  - Percentage of drivers and passengers in passenger cars using seat belts
  - Percentage of cyclists wearing a helmet
  - Number of policies that are revised to embed safe behaviours when driving for work related activities
- **Safe Vehicles SPI**:
  - Percentage of vehicle-kilometres driven by passenger cars of the highest ANCAP safety rating
  - Percentage of vehicle-kilometres driven by motorcycles equipped with Anti-lock Braking Systems (ABS)
  - Percentage of contracts that mandate contractors to use 5 Star vehicles.

3.8 Problem Analysis

Regardless of whether the development of a road safety management plan proceeds 'top-down' or 'bottom-up', problem analysis is a critical step. Problem analysis involves developing a detailed appreciation of the road safety issues in the area covered by the plan.

With the transition to a Safe System, problem analysis is no longer best informed by crash analysis, which effectively operates on the premise that crashes need to have occurred at a location before remedial action is investigated and taken. Given the theory and knowledge that we now have, efforts should be made towards adopting a network wide risk-based approach and systemically modifying all locations with similar risk attributes in the network over the long term.

The growing list of weaknesses associated with basing problem analysis on crash history alone, includes:

- Crash history is a poor indicator of underlying risk in lower volume areas.
- It is a reactive approach that does not align with the ethical philosophy of the Safe System approach.
- Under-reporting is often highest amongst the most vulnerable road users e.g. pedestrians and cyclists.

That said, crash analysis remains extremely important for understanding the key safety issues locally, which then inform the shape and direction of the road safety management plan. For the identification of key issues, crash analysis should be at a high-level, and not drill down to a road or intersection at this stage in the process. Figure 3.3 shows high-level crash analysis from New Zealand based on crash data from 2014 - 2018.

Figure 3.3: High-level crash analysis from New Zealand

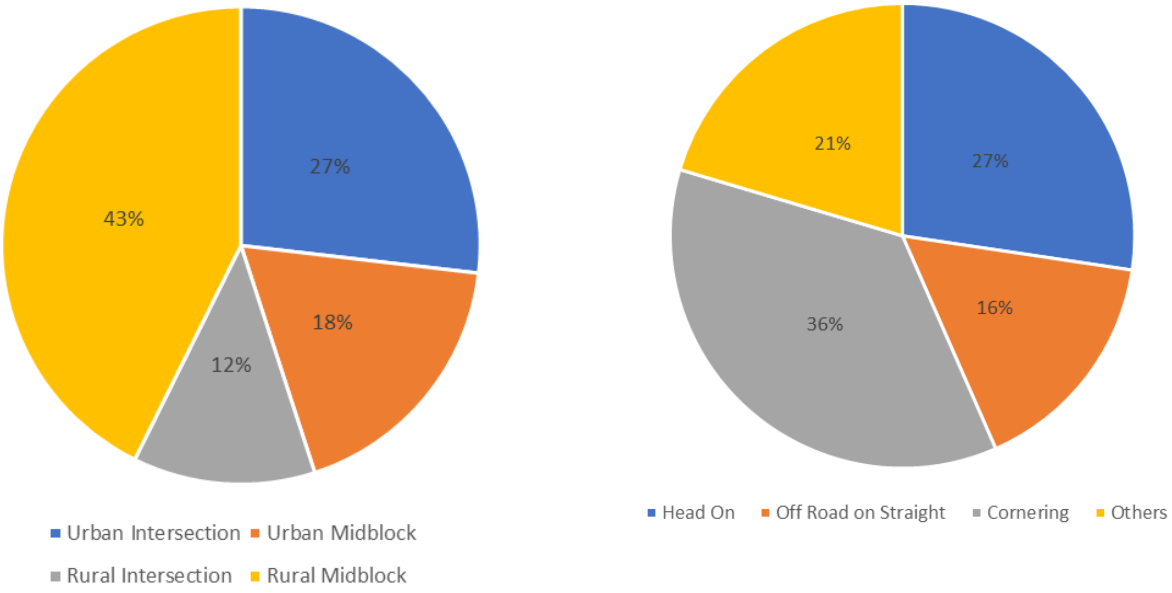


Figure 3.3 shows that the majority (43%) of death and serious injury crashes in New Zealand occur at rural midblock locations. Rural midblock locations therefore become a focus area strategically. Drilling down one level, we find that the majority of rural midblock death and serious injuries occur from cornering crashes i.e. loss-of-control on curves. Focusing on targeted safety improvements at high-risk curves therefore becomes a priority action, which is the case as noted in Section 2.5.

Austroads (2019e) provides a summary of the key road safety issues identified for regional and remote Australia. In addition to issues identified from crash data, the following issues were identified through a literature review and stakeholder consultation:

- increased risk of crash and injury at higher speeds and disparity between speed limits and the quality of the road and existing infrastructure
- higher burden of trauma among Aboriginal people
- high incidence of older, less crashworthy vehicles that increases the risk of serious injury in the event of a crash
- high levels of driver fatigue
- slower post-crash emergency response.

Austroads (2018b) sets out the best practice principles for each of the six key stages in the development of road safety programs. The second of these stages 'Risk Identification' contains five best practice principles, as follows, as follows:

- Risk analysis needs to be completed at a network level, including local roads, for the purposes of prioritising investigation and investment decisions.
- Risk analysis methods that use a combination of crash history and proactive estimates of risk informed by road, roadside and adjacent land use features are the best approach for predicting future high-risk locations.
- Risk analysis methods based on crash history need to be modified to an equivalent risk value so that risk is not inferred on the basis of high-severity outcomes or unadjusted clusters of crashes alone.
- Risk analysis methods set by the funder should demonstrate how/why the selected methods will achieve the ambitious targets and aspirational outcomes of the highest-level strategic road safety documents.
- Risk needs to be understood from both a 'Collective' and 'Personal' perspective.

Austroads (2018b) goes on to state that that Collective Risk (a density measure of risk) is highly correlated with traffic volume. As a result, smaller jurisdictions with lower traffic volumes found it difficult to compete for funding from the Federal Blackspot Program compared to larger States. Interestingly, few jurisdictions (including the Federal Blackspot Program) take exposure into account in their risk metrics, even though it is the exposure-based risk metrics (such as Personal Risk) that are highly correlated with Star Ratings and Infrastructure Risk Ratings (IRR). Personal Risk provides the basis for appreciating the scale of potential reduction in deaths and serious injuries whereas Collective Risk represents the scale of the existing problem.

Australia and New Zealand have developed some of the more sophisticated risk-based assessment techniques available globally to inform the development of road safety management plans, including tools such as AusRAP and KiwiRAP, the Australian National Risk Assessment Model (ANRAM) and New Zealand's suite of 'High-Risk' guides. An overview of these can be found in Austroads Research Report AP-R560-18 *Towards Safe System Infrastructure: A Compendium of Current Knowledge* (2018a).

It is acknowledged that some local government organisations will not have the capacity or capability to undertake network-wide risk analysis, particularly proactive risk analyses. This is where higher order government organisations have an important role to play in assisting local government to understand risk across their networks. In New Zealand, the NZ Transport Agency has produced risk metrics that cover every road in the country and distributed these to local government so they can make well-informed decisions regarding the key safety issues and the interventions that can be introduced to improve safety outcomes. More information about this can be found in the Safer Journeys Risk Assessment Tool User and Implementation Guide.

Austroads *Guide to Road Safety Part 7: Road Network Crash Risk Assessment and Management* (2006) introduces the concepts of risk assessment and risk management in the road safety network context. However, it should be noted that much of the material presented in this guide no longer represents best practice, and therefore should not be relied upon to inform the development of a risk-based approach in isolation from more contemporary practices.

4. Developing Interventions for Local Government

4.1 Overview

Austroads (2018b) sets out the best practice principles for each of the six key stages in the development of road safety programs. The third of these stages 'Countermeasure Identification and Development' contains six best practice principles, as follows:

- Risk analysis information needs to be shared with those tasked with identifying and developing countermeasures. Direction should also be provided around where to focus efforts.
- Those tasked with identifying and developing countermeasures should have a strong understanding of Safe System principles and implementation.
- Understanding the system failures that resulted in fatal and serious injuries across all pillars, and the reasons behind these, is critical to countermeasure development. This may include organisational behaviours.
- Countermeasures should be developed at a network and corridor level to support consistency for road users. This can be achieved by developing stereotype standards and performance targets that vary by road classification.
- Countermeasures should generally be developed from a top-down rather than bottom-up perspective, focusing on maximising the reduction in deaths and serious injuries whilst still returning a positive financial case.
- Projects should go through a Safe System Assessment (see Section 4.2) at the time of countermeasure development.

Austroads (2016b) identifies a range of road safety treatment measures suitable for local government road environments via a review of Australian, New Zealand and international practice and research literature. In establishing how well the identified road safety treatment options incorporate the Safe System approach and contribute to the of elimination of death and serious injury on the road network, reference has been made to the *Safe System Infrastructure: National Roundtable Report* (Turner et al. 2009). This report identifies primary and supporting Safe System treatment categories.

Primary Safe System infrastructure/treatments are those that have the potential to deliver near zero death and serious injury outcomes and are considered best practice Safe System solutions. Many primary treatments are high-cost, and local governments may not be in a financial position to always implement such treatments

Supporting treatments generally provide incremental improvements towards achieving a Safe System. These treatments have been widely used in the past decade and are useful tools in an incremental approach to crash reduction. They are usually at a lower cost than primary treatments, but it will generally take multiple incremental treatments to reach the equivalent crash reduction.

Austroads (2016b) provides an overview of the ways that local governments can contribute to safety under the Safe System approach, as shown in Table 4.1. Austroads (2019f) outlines further countermeasures relating to each Safe System factor for regional and remote areas.

Table 4.1: Contributions of local government road safety to the Safe System approach

Safe System Factor	Local Government Contribution
Safe Roads and Roadsides	• provide appropriate roads and road lighting to fulfil traffic function • conduct traffic and transport planning to manage infrastructure provision into the future; ensure adequate provision for vulnerable road users and heavy vehicles • conduct road safety audits of new and existing facilities • identify blackspots, problem routes and areas, and develop plans to eliminate them over time • develop asset management plans to maintain safe conditions with regard to road surface, signs and delineation • manage vegetation in the roadside environment • develop pedestrian management plans • establish processes for reporting and acting on road safety hazards • support older road users through attention to lighting, signage and delineation.
Safe Speeds	• create low speed road environments • initiate local speed reduction campaigns • deploy movable vehicle speed feedback displays to reinforce speed limits • evaluate and communicate benefits of low speed road environments. Where it is the responsibility of local government to manage speed limits, they can also review limits in response to changes in the function, design, safety and use of roads. Where responsibility for setting speed limits is outside of the jurisdiction of local government, local government can act as advocate to the relevant road authority for reduced speed limits.
Admittance to and exit from the System	• support the parents and mentors of learner drivers and learner drivers through a combination of education and practical experience. • provide support and programs to assist new migrants gain a license. • provide support and options to help transit users from the system.
Education and Information for Road Users	• identify road safety issues specific to the community and develop targeted education campaigns • support alcohol, speed, and restraint and helmet use enforcement through media releases and education campaigns in partnership with the community • ensure council staff are aware of road safety issues, blackspot locations and other local casualty crash location patterns • educate the community about proposed road safety works and infrastructure changes. • develop and deliver cycling, motorcycling and mobility device skills training.
Legislation and Enforcement	• support and encourage enforcement activities through media releases and education campaigns • develop enforcement programs using by-laws officers for high risk locations, e.g. parking at schools; coordinate enforcement with education and engineering programs • monitor and enforce vehicle registration as part of routine parking enforcement activities.
Safe Vehicles	Council fleet: • have a safe driving policy in place that covers purchase of vehicles with good safety characteristics, fitness to drive, work and driving hours, and driver training • monitor fleet accident data; align safe driving with other OH&S policies. Local residents: • distribute information about infant and child restraints through clinics and health centres • distribute information about the safety benefits of buying cars with higher safety ratings and keeping cars well-maintained • engage the community to take ownership of the problem and finding solutions.
Understanding Crashes and Risks	• collate information on road safety hazards • act as advocate for improvements on all roads affecting the community, especially local roads • investigate accident locations in partnership with other stakeholders • support direct action by community organisations to reduce high risk behaviours.
Planning	• include road safety requirements in guidelines for developments • develop policies for cycle and pedestrian safety to ensure they will be considered in new developments or changes to land use • use developer contributions to fund road safety projects • include road safety in all council plans • include road safety audit as part of the planning and approval process.

4.2 Developing Safe Roads and Roadsides

There are many Austroads, national, state and territory documents that are designed to help practitioners identify interventions that improve the safety of road and roadside environments. Those developed more recently move away from a conventional approach of focusing on crash reduction associated with an intervention, to one that guides practitioners towards interventions that are aligned with a Safe System.

In some situations, local government may not be able to immediately deliver best practice primary Safe System treatments because of financial constraints, conflicting road user needs, or the environment. Where this is so, local government may instead be better positioned to make incremental improvements towards achieving Safe System outcomes through use of supporting treatments (Austroads 2016b).

The purpose of this section is to inform local government practitioners of contemporary interventions that are available to achieve or move towards Safe System outcomes for specific situations.

4.2.1 Primary Treatments

Primary treatments effectively remove situations from the road and roadside environment that enable death or serious injuries to occur. A list of primary treatment options collated from various Austroads reports are presented in Table 4.2. Practitioners are encouraged to refer to the following reference documents for further information:

- Austroads Research Report AP-R518-16 *Safe System Roads for Local Government* (2016b)
- Austroads Research Report AP-R509-16 *Safe System Assessment Framework* (2016a)
- Austroads Research Report AP-R560-18 *Towards Safe System Infrastructure: A Compendium of Current Knowledge* (2018a)

Table 4.2: Primary Treatment Options to create Safe Roads and Roadsides

Median Treatment Options	Run-off Road Treatment Options	Major Intersection Treatment Options	Minor Intersection Treatment Options	Cyclist Treatment Options	Activity Centre Treatment Options
Wide median with flexible barrier	Appropriate clear zone and flexible roadside barriers	Grade separation	Roundabout	Dedicated off-road cycle lanes	Shared spaces
Wide median (constructed)	Roadside hazard barriers	Roundabout	Road closure	Off-road shared path	Very low speed environment / limit, especially at intersections and crossing points
Narrow flush median (wide centreline) with barrier	Very low speed environment / limit	Low speed environment / limit	Raised platform	Copenhagen style cycle lane	
One-way traffic			Low speed environment / limit	Kerbside cycle lane	
Very low speed environment / limit				Cycle friendly C-Roundabout	
				Segregation using planters, wands and armadillos	
				Very low speed environment / limit, especially at intersections	

These documents present primary and supporting treatment options for different road safety issues with Austroads (2016b) describing each intervention in some detail.

Austroads Safe System Assessment Framework (2016a) recommends that practitioners wanting to resolve high-risk issues should approach treatment selection in order of priority, starting at Primary Treatments. If followed, this hierarchical approach to treatment selection will result in the net Safe System gain compared to the simple selection of conventional solutions.

The Safe System Assessment Framework goes further to recommend that Supporting Treatments should be separated into those that move towards better Safe System alignment (compatible with future implementation of Safe System options) and those that do not affect future implementation of Safe System options, and the treatment selection hierarchy applied in that order. An example of the treatment selection hierarchy for addressing run-off road issues is shown in Table 4.3.

Local government practitioners are also encouraged to use Austroads Road Safety Engineering Toolkit, which can be accessed at www.engtoolkit.com.au to test and evaluate road and roadside interventions.

In 2019, the NZ Transport Agency released a Standard Safety Intervention Toolkit https://www.nzta.govt.nz/resources/standard-safety-intervention-toolkit/. The toolkit is relevant to both state highway and local government road networks and provides guidance for road practitioners of all types and levels of professional experience, including road safety and transport engineers, asset managers, town planners, civil designers and community road safety officers.

Table 4.3: Run-off road treatment options in a Safe System context

Hierarchy	Treatment	Influence (E = exposure L = likelihood S = severity)
Safe System options ('primary' or 'transformational' treatments)	• Flexible roadside and median barriers (or equally/better performing future equivalent) • Very high quality compacted roadside surface, very gentle to flat side slopes and exceptionally wide run-off areas • Very low speed environment/speed limit.	S S L, S
Supporting treatments which move towards better Safe System alignment (compatible with future implementation of Safe System options)	• Wide run-off areas, with well-maintained shallow drainage and gentle side slopes • Wide sealed shoulders with audio-tactile edgeline • Lower speed limit.	S L L, S
Supporting treatments (does not affect future implementation of Safe System options)	• Non-flexible safety barrier • Consistent design along the route (i.e. no out-of-context curves) • Consistent delineation for route • Skid resistance improvement • Improved superelevation • Audio-tactile centreline • Audio-tactile edgeline • Vehicle activated signs.	S L L L L L L L
Other considerations	• Speed enforcement • Rest area provision • Lane marking compatible with in-vehicle lane-keeping technology.	L, S L L

Source: Austroads 2016a

4.2.2 Local Government Safety Treatments

Austroads (2016b) details a suite of cost-effective infrastructure treatments for local government roads. This includes treatments to improve safety for:

- Vulnerable road users i.e. pedestrians and cyclists, through the introduction of cycling facilities and pedestrian crossings.
- Right turning movements at intersections, through the introduction of turn restrictions and mini roundabouts.
- Rural roads, through delineation enhancements such as audio-tactile line marking, curve chevron markers and raised reflectorised pavement markers.

Many of these cost-effective treatments can be efficiently delivered through mass-action programs that target high-risk corridor and intersection locations.

4.3 Developing Safe Speeds

Speed limits on much of Australia and New Zealand's road network are higher than the Safe System speeds noted in Section 2.2.1. Whilst there is a growing acknowledgement and acceptance of 30 km/h and 40 km/h speed limits in urban town centres, a substantial paradigm shift is still required, especially in rural areas.

In 2018, France changed the speed limit on all rural single carriageway roads from 90km/h to 80km/h. Interim analysis of the change showed:

- Average actual speeds of light vehicles dropped immediately with a mean speed reduction of 3.9km/h
- Approximately 116 fewer people (10%) died on these roads compared to the rolling 5-year average
- Average journey time loss was around one second per kilometre overall, but improved on 34% of the surveyed network journey

This demonstrates the effectiveness of widespread speed limit change on safety outcomes.

New Zealand is moving in the right direction, having recently updated its Land Transport Rule: Setting of Speed Limits in 2017 to give effect to its Speed Management Guide developed to deliver travel speeds that are safe and appropriate for the function, design, safety and use of each road. Safe and appropriate speeds are determined based on a combination of land use, functional road hierarchy as well as reactive and proactive risk metrics.

In Queensland, the Department of Transport and Main Roads has recently updated their Manual of Uniform Traffic Control (MUTCD) Part 4: Speed Controls to include both reactive and proactive risk metrics in the technical procedures to establish speed limits.

Austroads (2018a) includes a fact sheet detailing what the industry knows about the role of speed in harm minimisation. This is reproduced below in Table 4.4.

Table 4.4: The role of speed in harm minimisation

What do we know?

- Speed management is at the core of a forgiving road transport system
- Impact speed is a primary determinant of injury outcome
- Travelling speed also influences vehicle controllability and crash likelihood
- The risk of loss of control and injury increases with travelling speed
- In a 60 km/h speed limit zone, the risk of involvement in a casualty crash doubles with each 5 km/h increase in travelling speed above 60 km/h
- Reducing rural speeds by 5 km/h is likely to reduce rural casualty crashes by about 30%
- Reducing urban speeds by 5 km/h is likely to reduce urban casualty crashes by 26%
- Reducing urban speed limits would lead to major reductions in pedestrian and cyclist injury
- Speeds limits have usually been regarded as a trade-off between desired mobility function and other competing demands including safety
- The understanding of the relationship between speed and injury outcomes will continue to be refined over time
- Low speed thresholds exist (20 km/h) when taking into account both fatal and serious injury
- Aspirational impact speeds aligned to Safe System performance are:
  - 30 km/h where pedestrians and cyclists interact with traffic
  - 50 km/h where cars may collide at right angles at intersections
  - 70 km/h where cars can collide head-on
- The effect of reducing speed limits on travel times is commonly over-estimated
- Road users can be poor at assessing risk on the road especially in relation to speed so infrastructure elements to support road user behaviours are required.
- Any way in which planning, road design and traffic management can guarantee safe speeds at facilities will be highly beneficial (e.g. raised pedestrian crossings) and aligned with harm minimisation principles
- Small changes in speed can have large benefits so any reductions are better than nothing at all
- Speed management has the potential to deliver the highest injury reductions at the lowest cost when compared to other safety interventions; however this can only be regarded as a primary treatment if reductions are achieved down to survivable levels
- Road function and speed management are inextricably linked; the best features of self-explaining road design are likely to maximise the ability to achieve harm minimisation outcomes in the context of “Movement and Place” considerations.

Source: Austroads 2018a.

As noted above, speed management has the potential to deliver the highest injury reductions at the lowest cost when compared to other safety interventions. This makes speed management measures a highly attractive intervention option, particularly for local government who are unlikely to have the financial resources of state or national governments to undertake as many Safe System infrastructure interventions.

Speed management is much more than legal speed limits and signs. Speed limits are clearly important for establishing legal maximum operating speeds that users are allowed to travel on roads; however, changes in speed limit alone are unlikely to achieve target operating speeds without other measures, such as physical measures or enforcement.

Local Area Traffic Management (LATM) schemes are a key tool for local government in creating safe and liveable road environments. The primary target of LATM is to change driver behaviour, both directly by physical influence on vehicle operation, and indirectly by influencing the driver’s perceptions of what is appropriate behaviour in that street. The objective is to reduce traffic volumes and speeds in local streets to increase amenity, liveability, and improve safety and access for all road users. Austroads *Guide to Traffic Management Part 8: Local Area Traffic Management* (2016c) includes a section on the selection of devices commonly used by local government in the delivery of LATM schemes.

It is important to appreciate that guidelines and legal instruments for setting speed limits vary by jurisdiction throughout Australasia. Generic guidance can be found in Section 6: Speed Limits, of Austroads *Guide to Traffic Management Part 5: Road Management* (2019b). Other useful Austroads resources to assist local government with speed management activities include:

- Austroads Research Report AP-R587-19 *Road Risk Assessment, Case Studies and Engagement Guidance for Speed Management* including the Infrastructure Risk Rating (IRR) www.irrtool.com (2019c)
- Austroads Research Report AP-R514-16 *Achieving Safe System Speeds on Urban Arterial Roads: A Compendium of Good Practice* (2016d)
- Austroads Research Report AP-R449-14 *Methods for Reducing Speeds on Rural Roads: Compendium of Good Practice* (2014)

4.4 Developing Safe People

As noted in Table 4.1, there are several ways in which local government can contribute to the Safe People pillar of the Safe System, as shown in Table 4.5.

Table 4.5: Updated contributions by local government – Safe People Pillar

Safe System Factor	Local Government Contribution
Admittance to and exit from the system	• support the parents and mentors of learner drivers and learner drivers through a combination of education and practical experience. • provide support and programs to assist new migrants gain a license. • provide support and options to help transit users from the system.
Education and information for road users	• identify road safety issues specific to the community and develop targeted education campaigns • support alcohol, speed, and restraint and helmet use enforcement through media releases and education campaigns in partnership with the community • ensure council staff are aware of road safety issues, blackspot locations and other local casualty crash location patterns • educate the community about proposed road safety works and infrastructure changes. • develop and deliver cycling, motorcycling and mobility device skills training.
Legislation and enforcement	• support and encourage enforcement activities through media releases and education campaigns • develop enforcement programs using by-laws officers for high risk locations, e.g. parking at schools; coordinate enforcement with education and engineering programs • monitor and enforce vehicle registration as part of routine parking enforcement activities.

At a national level, there is one action identified as local government responsibility that relates to the Safe People pillar. This comes from *Australia's National Road Safety Action Plan 2018-2020*, Critical Action J: Remote road safety – identify and implement key interventions (Transport and Infrastructure Council 2018), which states:

> *All jurisdictions will work together to better address road safety in remote areas, consistent with the Transport and Infrastructure Council's National Remote and Regional Transport Strategy; with particular attention to: tailored solutions (e.g. access to driver licensing, training and education); unlicensed driving; vehicle safety including use of seatbelts and child restraints; speed management; targeted speed reductions in advance of engineering treatments; and gateway and threshold treatments for high speed to low speed transition zones. There is scope for greater consideration of whole of government approaches to remote transport issues, such as alternative community transport options.*

As noted earlier in this guidance, local government road safety management plans need to give effect to higher-order documents, such as the National Road Safety Strategy and Action Plans. Therefore, incorporating Safe People actions should be a fundamental cornerstone of road safety management plans for all local government organisations in Australia with remote roads. Austroads *Guide to Road Safety Part 5: Road Safety for Regional and Remote Areas* (2019d) and Austroads *National View on Regional and Remote Road Safety* (2019e) present a suite of road safety interventions and strategies suitable for implementation in rural and remote areas of Australia.

4.4.1 Workplace Health and Safety

Workplace Health and Safety (WHS) laws in Australia are generally harmonised and similar principles apply in New Zealand. While there is some variation between jurisdictions, generally, a person conducting a business or undertaking (PCBU) must ensure the health and safety of workers and other persons while workers are at work. In context, this means that PCBUs must do all that is reasonably practicable to manage the risks associated with the use of vehicles, both on public roads and on private property. A PCBU can be an individual (e.g. sole business owner/operator) as well as a corporate entity.

Local government organisations are captured in this definition, as many council staff are required to drive as part of their duties, and all councils operate a vehicle fleet. This provides an opportunity to ensure safe operation of a council's own staff and vehicles, and to provide leadership to other organisations and the broader community in improving standards. Central to this endeavour is to have a safe driving or similar policy in place. The policies cover a range of issues, including fitness to drive, appropriate training for drivers, mobile phone and driving hours policies, and a commitment to purchase safe vehicles, based on Australasian New Car Assessment Program (ANCAP) results (Australia New Car Assessment Program, 2019). Councils are required to have such policies to meet their occupational health and safety obligations as employers. Under the chain of responsibility requirements, they must apply these principles and practices to contractors as well. In New Zealand, the responsibilities of businesses under the Health and Safety at Work Act 2015 (New Zealand Government, 2015) include ensuring the health and safety of workers when they are driving for work, and providing safe vehicles. The *Vehicles as a Workplace: Work Health and Safety Guide* (Austroads, 2019b) provides guidance for dealing with road traffic hazards in line with workplace health and safety legislation. A summary of the key road traffic safety hazards identified in Austroads (2019b) include:

- inadequate journey planning
- roads providing inadequate protection
- vehicles providing inadequate protection
- speed in excess of safe exposure thresholds
- unauthorised drivers
- unsafe drivers
- non-use or misuse of personal protective equipment.

Local government practitioners may find the 'Road Safety and Your Work: A Guide for Employers' guide published by the Transport for NSW, Centre for Road Safety helpful in translating legislative requirements into practice. This guide provides workplaces with information about key road safety issues and risks, and ways to help employers and their workers get around safely while using the road.

4.5 Developing Safe Vehicles

Vehicles providing inadequate protection is identified as a key road traffic safety hazard by Austroads (2019b). As highlighted in Section 4.4, local governments have responsibilities to provide safe vehicles through their role as an employer. Local governments can also contribute to the safety of vehicles in the wider community.

As an employer and vehicle fleet operator, local governments can contribute to the Safe Vehicles pillar through vehicle purchase and maintenance policy and grey fleet management. Safe driving policy should include purchase of vehicles with good safety characteristics. The Australasian New Car Assessment Program (ANCAP) results provide safety ratings to inform the purchase of safe vehicles (Australia New Car Assessment Program, 2019). The *Vehicles as a Workplace: Work Health and Safety Guide* (Austroads 2019b) discusses how the rapid development of vehicle technology means that organisations need to stay up to date with the latest ANCAP ratings and consider further features not included in the ratings, such as lane departure and speed limit warnings. Austroads (2019b) also provides guidance on maintenance of roadworthiness, including assessment of vehicle modifications. The National Road Safety Partnership Program (NRSPP) provides a *Guide to the Development of a Safe Vehicle Purchasing Policy* (2015).

In addition to light vehicles, local governments can also increase the use of safer heavy vehicles either through their own fleet, or through contractual arrangements for suppliers or construction activity in urban areas, in particular.

In addition to purchased vehicles, local governments also use Grey Fleets. The term 'Grey Fleet' describes vehicles that are used for work which are not directly provided by the organisation that employs the driver (Austroads 2019b), including personal vehicles, leased vehicles and client vehicles. Grey Fleets pose further challenges for local government safe vehicle management because they can pose different safety risks and there can be difficulties in enforcing/adhering to safe driving policies. The *Grey Fleet Safety Management Guide* (NRSPP 2017) provides guidance for organisations to develop and implement a Grey Fleet policy.

In addition to their role as an employer and fleet operator, there are several methods through which local governments can contribute to safe vehicles for local residents (Austroads 2016b):

- distribute information about infant and child restraints through clinics and health centres
- distribute information about the safety benefits of buying cars with higher safety ratings and keeping cars well-maintained
- engage the community to take ownership of the problem and finding solutions.

Further recommendations to contribute to safe vehicles for local residents in rural and remote areas are provided in Austroads (2019e), including exploration of dedicated on-selling of government used vehicles to these areas.

There are also opportunities for local governments to enforce safe vehicle requirements. For example, council parking wardens in New Zealand have the ability to issue infringements for offences relating to vehicle safety, such as having an unregistered or unlicensed vehicle, not having a current warrant of fitness and having bald tyres (Community Law n.d.). Other opportunities include:

- Sponsoring safe vehicles for learner driver support programs, such as the L2P learner driver mentor program in Victoria,
- Promoting parents make available the safest car in the household for their P driver, and
- Mandating contractors use 5 Star vehicles.

4.6 Community Road Safety

As described in Section 1.1, community road safety differs from local government road safety in that it includes arrangements in which local government assists or encourages rather than leads. Table 4.6 illustrates the difference between local government and community approaches to the Safe System. Although community road safety can be considered wider than local government road safety, it has been included in this guidance because of its role in local government road safety. Separate guidance for community road safety has been identified as a need for Austroads.

Table 4.6: Comparison of local government and community contributions to the Safe System approach

Safe System factor	Local government	Community
Safe speeds	Manage speed limits on local roads; review limits in response to changing land use and traffic; create low-speed environments; initiate local speed campaigns; deploy movable speed feedback displays to reinforce speed limits; evaluate benefits of low speed environments.	Provide local advocacy in relation to speeds on local streets; participate in speed reduction campaigns, possibly including movable speed feedback displays. Police have a critical role in enforcing speed limits, investigating crashes where excessive speed has been a factor and in providing comment and community education.
Safer roads and roadsides	Provide appropriate roads and road lighting to fulfil traffic function; conduct traffic and transport planning to manage infrastructure provision into the future; ensure adequate provision for vulnerable road users and heavy vehicles; conduct road safety audits of new and existing facilities; identify blackspots and other deficiencies and develop plans to eliminate them over time; develop asset management plans to maintain safe conditions with special regard to road surface, signs and delineation; manage vegetation in the roadside environment; develop pedestrian crossing management plans; establish processes for reporting and acting on road safety hazards; support older road users through attention to lighting, signage and delineation.	Lobby for actions to improve safety on local roads and roadsides; make council aware of road safety problems; participate in some aspects of the audit and review process (e.g. trucks, motorcycles, bicycles).
Safer vehicles	Have a safe driving policy in place that covers purchase of vehicles with good safety characteristics, fitness to drive, work and driving hours, and driver training; monitor fleet accident data; align safe driving with other OH&S policies; distribute information about infant and child restraints through clinics and health centres.	Develop awareness of ANCAP and used car safety ratings; encourage the community to purchase vehicles with the best safety features it can afford; promote the acquisition and use of protective equipment such as seat belts, infant restraints and helmets; Police have a role in enforcing restraint use and checking vehicle roadworthiness.
Admittance to the system	Support programs to assist the disadvantaged obtain full licence; support the parents and mentors of learner drivers and learner drivers through a combination of education and practical experience.	Participate in programs to assist disadvantaged people obtain full licence, provide advice and support for people no longer able to drive well; provide practical help for novice drivers to achieve new supervised driving requirements. Police have a role in checking for unqualified and disqualified drivers, and in detecting impaired drivers.
Education and information for road users	Identify road safety issues specific to the community and develop targeted education campaigns; support alcohol, speed and restraint and helmet use enforcement through media releases and education campaigns in partnership with the community; ensure council staff are aware of road safety issues and blackspot locations; educate the community about proposed road safety works and infrastructure changes.	Participate in campaigns targeted at local safety issues and supporting enforcement, particularly through local opinion leaders and media; take road safety messages to groups who are not responsive to mainstream media.
Understanding crashes and risks	Collate information on road safety hazards; act as advocate for improvements on all roads affecting the community, especially local roads; investigate accident locations in partnership with other stakeholders; support direct action by community organisations to reduce high risk behaviours.	Make available local knowledge of high risk locations and activities, and local knowledge of high risk groups in the community and their behaviour patterns; provide insights into their motivation, values and social context; advocate programs and actions to address these problems; participate in programs to counter high risk behaviours e.g. designated driver programs, driver reviver stops and coordinate them with enforcement.

Safe System factor	Local government	Community
Legislation and enforcement	Support and encourage enforcement activities through media releases and education campaigns; develop enforcement programs using by-laws officers for high risk locations e.g. parking at schools; coordinate enforcement with education and engineering programs.	Police are responsible for nearly all enforcement which is related to road safety. Community generally has a role in campaigns to support enforcement; act as an advocate for appropriate legislation and levels of enforcement; provide feedback to state/national government on programs; provide local publicity for and endorsement of new programs; integrate enforcement activities with local plans; publicise and support enforcement programs.
Planning	Include road safety requirements in guidelines for developments; develop policies for bicycle and pedestrian safety to ensure they will be considered in new developments or changes to land use; use developer contributions to fund road safety projects; include road safety in all council plans; include road safety audit as part of the planning and approval process.	Make council aware of the road safety issues that will emerge through new developments and suggest possible ways to resolve them; raise road safety as an important environmental and social issue at community forums to discuss developments; lobby council and state/national government for changes to current practices.
**Although not specifically acknowledged in the Safe System approach, it is essential that Safe System principles be followed in planning and approval processes if they are to be reflected in the road system.*		

Source: Austroads 2009

A review of community road safety programs for Austroads (Austroads 2002) identified the following objectives for community road safety:

- **Creating an informed community**. It is important to develop an awareness of road safety issues and to develop an understanding of the nature of the problems and possible solutions. This is important not simply from the point of view of changing individual behaviour, but for creating a climate of opinion where effective countermeasures gain local support. Local programs are important in raising awareness and understanding by reference to local examples which drivers encounter on a regular basis. The creation of informed views amongst the public helps ensure support for the right countermeasures which are likely to be effective in particular situations, and avoids naïve countermeasures with high face validity, but which are not supported by evidence.
- **Mobilising resources to tackle road safety issues at a local level**. One of the key objectives of local road safety programs is to assist local stakeholders in road safety – largely the local representatives of state or national bodies, such as road authorities, police, ambulance and health services – to focus efforts in a coordinated way. It is also important to involve the larger employers, industry groups and local groups such as service clubs and organisations representing road users in planning and service delivery. Local programs can also be effective in mobilising resources, including help in kind, volunteers and money from the local community and businesses.
- **Promoting effective action at a local level**. Local road safety programs aim to ensure effective action at the local level. Since the most pressing road safety problems are shared by all communities, an important part of this consists in applying state-wide or nationwide programs with local relevance, e.g. by media statements which highlight local aspects of the speeding or drink driving problem. To some extent, actions which tackle specific local issues which have not yet resulted in casualty crashes may be justified. Failure to address high profile local issues, even if they are perceived problems which have not so far resulted in casualties, may adversely affect the credibility of the program as a whole. Local programs also have a role in encouraging good practice, partly by making ideas and findings more widely available to key stakeholders and the community in general.
- **Integrating activities**. There is scope at the local level to make sure activities and organisations are mutually supportive, e.g. by ensuring stakeholders who primarily support one activity do what they can to support other aspects of the plan by lobbying or distributing publicity. The most important aspect of integration is capacity building and the formation of social capital which emerges as mutual confidence and trust from the experience of working together.

Since the time of the Austroads review, there have been far-reaching developments in the way governments in developing countries seek to deliver services to their constituents. There has been growing recognition of the value of the community in promoting welfare-enhancing behaviours and social networks, and the value of the services communities are able to provide for themselves. Community road safety seems well-suited to embrace these developments. Although Australia is in the early stages of these developments, there is an emerging expectation that community road safety will take on community engagement and capacity building as objectives. In New Zealand, an active community-focused program has been in place since the early 1990s.

Advantages of local government involvement in community road safety programs initiated, managed and delivered at the local level have several advantages, including:

- Local knowledge can be important in identifying problem locations on the road system. As road safety engineering becomes less reactive and more proactive, identifying high risk locations where serious crashes have not yet occurred is likely to become more important.
- Local government has strong links into the community and well-established community networks.
- Community groups can mobilise resources for road safety purposes in a way which would not be possible with larger programs.
- Community groups can have an important advocacy role in raising local issues with all levels of government.
- Community programs can impart greater relevance to state or national programs by relating them to issues or locations with which the community is familiar.
- Community programs can engage with individuals and groups in the community that larger programs have difficulty reaching, including indigenous people and migrants where language and culture may pose significant challenges.
- Community programs can generate feelings of participation and ownership which assist in the uptake of messages.
- Community programs can have a high degree of acceptance because they are seen to address local issues directly (Austroads 2009).

Methods for involving the community in the development of road safety management systems and implementation plans is described in Section 5.

5. Implementation

Austroads (2015) identifies that the implementation of a road safety management system demands the continued and sustained application of the following critical road safety management functions, including coordination, funding and resource allocation, awareness/competence and communication/promotion. These key implementation functions are discussed below.

- **Effective coordination of activity both within the road agency itself and with external stakeholders**. Any road agency will have a series of activities relating to the safety of its users which need to be delivered by others and which require a variety of stakeholders to exchange information in order to achieve the best safety results.
- **Allocating resources to achieve the organisation's objectives and targets**. ISO 39001 considers resources to include 'human resources and specialised skills, organisational infrastructure, technology and financial resources' needed to establish, implement, maintain and continually improve the road safety management system. Safety resources therefore need to be regularly reviewed and systems put in place to best allocate the current available resources and raise additional resourcing to further improve performance, including the contracting resource that will ultimately deliver and maintain the physical infrastructure.
- **Ensuring staff awareness and competence in implementing the road safety management system**. As the road safety management system is being implemented it will be important to engage staff on the road safety management system and its impact upon their role within the road agency. For some staff, this engagement and awareness will need to be augmented (to varying degrees) by specific training in new or improved safety processes.
- **Regular communication and promotion of the road safety management system and related activity**. Implementation of the road safety management system should tie directly with the road management maintenance and improvement functions of the road agency, and so avoid the common problem of safety being considered as largely a communications and promotion related activity. ISO 39001 refers directly instead to these tasks as being about supporting improved road safety results by engaging with internal and external stakeholders about *'the need for a long-term focus on … results and the means by which they can be achieved'*. The communications function therefore has a deeper strategic and not just an operational function.

For Councils wanting comprehensive planning for sustained institutional capacity across all key areas, it is recommended to conduct a Road Safety Capacity Review. The World Bank guide for such reviews can be accessed online (Bliss and Breen 2013).

WALGA (2012) defines six key Safe System foundation initiatives crucial to support the successful implementation of the strategy objectives. The six foundation initiatives are described below in further detail. Each of the categories are explained and examples given from a Local Government perspective.

- **Research, data and setting targets** informs the development of goals and objectives to establish agreed actions for the initial, intermediate and final road safety outcomes, this includes:
  - Use of research results to identify potential interventions
  - Research projects that inform best practice
  - Provision of evidence and data to underpin policies, strategies and identify knowledge gaps
  - Use of research and data to set targets

- **Capacity building** is the continuous and dynamic process of strengthening knowledge, skills and abilities within an organisation or individual to enhance their ability to adapt to change, examples include:
  - Informal, incidental and reflective learning
  - Formal professional development
  - Supportive social and organisational structures
- **Leadership, commitment and community support** is the guidance, support and engagement of the community in effective road safety, this includes:
  - Creating a positive political environment
  - Understanding the road safety vision
  - Role models within the community
  - Facilitation of community engagement in road safety activities
  - Influencing public opinion
- **Partnerships and alliances** are the formation of formal and informal groups to advance a common interest, as well as the active progression of mutual objectives between relevant organisations, through activities such as:
  - Formation of networks to communicate information and knowledge
  - Progression of the 'shared responsibility' for road safety
- **Coordination** is the alignment of interventions and management functions at all levels, including:
  - Synchronised delivery between National, State and Local Governments
  - Synchronised delivery of activities between metropolitan, regional and remote areas
  - Development of internal organisational strategies, policies and communications
- **Monitoring and reporting** are the systematic and continual measurement of outcomes, the prioritisation of issues, and the identification of countermeasures, as well as any assistance to better identify successes or barriers, examples include:
  - Communication of results and trends with road safety partners
  - Increased accountability and creating support for road safety
  - Reporting effective results for continuous improvement

Some of the key implementation principles are describes further in the following sub-sections.

5.1 Strategic Partnerships

Two of the roles for local government identified in Section 1.4, managing its own road system and planning decisions, are essentially its direct responsibility, and are carried out either by council staff directly or by contractors working under direction. However, even for these functions local government should take account of local preferences and priorities. Where road safety issues have been worked through to a road safety strategy and plan, based on consultation, and endorsed by further community consultation, then preferred directions for the community should be clear.

Local Government can be captured by quite parochial issues. The challenge is harnessing the momentum generated by these issues and establish safety as a co-requisite for success. A metropolitan council for example might desire a flourishing commercial sector. A rural council for example might desire the efficient movement of produce. Each example can be a platform for why road safety is critical.

In terms of lobbying, local government is likely to do this more effectively if it can call on the support of community groups to endorse its position.

However, when it comes to engaging with the community, partnerships become particularly important, for the following reasons:

- efforts to reach particular target groups in the community depend on specialised organisations and social networks they develop (e.g. senior citizens, disabled)
- stakeholder organisations (especially the police) have the power to enforce aspects of safe road use
- volunteers are necessary for the delivery of some aspects of road safety
- sponsorship may be necessary to achieve satisfactory funding levels for some initiatives.

5.2 Shared Responsibilities from Safe System Philosophy

Shared responsibility is one of the guiding principles of the Safe System philosophy. Within a Safe System everyone takes an individual and shared role in road safety. The burden of road safety responsibility no longer rests solely with the individual road user. Rather, system managers have a primary responsibility to provide a safe operating environment for road users and ensuring that the system is forgiving when people make mistakes.

While a transition to a Safe Systems approach is currently underway, a lack of organisational leadership for safety within a road agency may mean that the agency retains an outdated philosophy of blaming road users for crashes. Gaining endorsement from the organisation leadership is a critical early step in the road safety management system development process, but one that can readily be overlooked if undertaken as an isolated task within the transport department. The importance of organisational leadership is discussed in Section 3.

Local government has critical responsibilities in the Safe System as a road authority, a planning authority, an employer and fleet operator, and as a community leader. Acknowledging this shared role and promoting it within organisations is an important initial step in adopting and implementing a sustainable Safe System approach. Local government can work collaboratively with other stakeholders to achieve the best possible road safety outcomes. Working with road safety partners at a local level can include consulting and collaborating with other local governments, community leaders, government agencies, public and private organisations, professional bodies, user-groups, and the local community. Local government also play a role in emphasising to other organisations, and the community, the importance of shared responsibility for delivering interventions that achieve desirable road safety results (WALGA 2012).

5.2.1 Who are the Stakeholders?

IPWEA (2006) identifies that there are generally six groups of stakeholders with an interest in local road safety issues, each of whom should be involved in the development and delivery of road safety management systems or plans to varying degrees.

1. **Council.** Council staff and the elected representatives are the group who should be most closely involved at all stages in the development of a road safety management system and plan. However, as noted in Figure 3.1, it is apparent that elected representatives and Council Leadership should be considered separately from Council staff in terms of defining roles and necessary involvement in the development of the road safety management system and plan.

2. **Partner agencies.** There are several organisations with a direct responsibility or interest in road safety, including State and National Government, Police, Health Services, Automobile Clubs and Insurance Agencies to name a few.
3. **Service providers.** These include all those organisations whose services have some associated road safety implications or responsibilities. They include chambers of commerce; driving schools; hotels; the media; public transport providers; retirement villages; schools; services clubs; sport, recreation and entertainment venues; and other businesses. These groups would not normally be involved in the development of a road safety management system but can be more efficiently utilised at the action level when the specifics of implementing strategies are devised.
4. **Road user groups.** Local community groups with an identified focus on road safety issues can provide a very valuable contribution to the planning process. As a general principle they should primarily be involved in the identification of issues and to a lesser extent the development of countermeasure strategies. Most councils will already have established links with these groups, many of whom will represent the interests of particular road user group e.g. trucking association, bicycles, walking, motorcycling, etc.
5. **Special-needs groups.** Groups such as young children, older people, people with a disability, etc. often have special road safety needs. Council community development workers normally have well-established links with these groups and their representative organisations. The planning process should be devised to ensure the needs of these groups are addressed.
6. **The general community.** The community should be kept informed about road safety issues and new initiatives through council communications and local media. This enables individuals to choose a higher level of involvement if they have a particular interest.

5.2.2 Coordination with the Lead Agency

Coordination with state and national lead agencies is critical for the implementation of road safety at a local level. The lead agency plays a dominant role in most of the institutional management functions for road safety; in others it plays a guiding, encouraging or catalytic role.

Achieving road safety results requires long-term governmental ownership, leadership and political will. The World Bank and OECD recommend that all countries should commit to ensuring an effective road safety management system and, in particular, to review and seek to achieve a strong results-focus through their institutional management arrangements and resolve any capacity weaknesses. This focus requires clear identification of: a lead agency/department; the core group of government ministries and agencies to be involved; their roles and responsibilities defined; high-level strategic review of performance; definition of a long term Safe System goal, and the interim performance targets in terms of institutional outputs and intermediate and final outcomes to be achieved within a time-defined strategy. It requires high-level championing across society.

The limits to improved road safety performance are shaped by the road safety management system operating in a country. This system determines the results being sought and produces the interventions to achieve them. The limits to a country's road safety performance are constrained by its institutional capacity to implement efficient and effective interventions, and the subsequent results may fall short of what is technically feasible with any particular set of road safety interventions.

The lead agency takes responsibility for the development of the national road safety strategy and its results focus. It is engaged in the delivery of and supported by strong horizontal intergovernmental coordination arrangements; good vertical coordination of national, regional and local activity; coordination of the necessary delivery partnerships between government stakeholders, the professional, non-governmental and business sectors and Parliamentary groups and committees; a comprehensive legislative framework; sustainable sources of annual funding and a rational framework for resource allocation; high-level promotion of road safety strategy across Government and society; regular monitoring and evaluation and strong research and technical support.

5.3 Capacity Building and Resources

Having the resources to deliver road safety outcomes is a key issue facing many local government organisations in Australia and New Zealand.

5.3.1 Capacity Building

The concept of capacity building was developed in the health promotion area and refers to a continuing process rather than a defined goal. Capacity building refers to three distinct processes – the development of a social and organisational infrastructure, delivery of a sustained program through a network of agencies rather than a single agency, and the capacity to identify emerging issues and formulate appropriate responses to them (Hawe et al. 2000).

Capacity is a capability acquired by the system as a result of networking and partnering. A useful way to think of this is in terms of the whole being greater than the sum of its parts – in this case the capacity of the system to deliver, sustain and adapt to change is greater than the component activities that have been undertaken to date.

Capacity building is the continuous and dynamic process of strengthening knowledge, skills and abilities within an organisation or individual to enhance their ability to adapt to change, examples include:

- Informal, incidental and reflective learning
- Formal professional development
- Supportive social and organisational structures

WALGA (2012) states that building capacity is achieved by improving individual skills, strengthening community action and empowering organisations to take responsibility for road safety, this occurs through:

- Activities that strengthen individual knowledge, skills and abilities, via informal, incidental and reflective learning, along with formal professional development, at all organisational levels.
- Actions such as engaging with community members, key groups and local partners or stakeholders.
- The empowerment of organisations by placing road safety on the agenda, and
- Providing resources to contribute to better road safety outcomes.

Building an organisation's ability to deliver desired road safety outcomes is an essential element of the Safe System approach and will play a pivotal role in achieving sustainable road safety improvements. The successful implementation of a safe system approach requires skilled, knowledgeable and competent stakeholders who are able to identify and respond to Safe System requirements. This includes not only the resources within an organisation, but external resources that are required to deliver, implement and maintain the physical infrastructure.

Achieving a Safe System requires a greater level of awareness and understanding of road safety problems and solutions. Improved road safety educational and professional development opportunities assist relevant stakeholders to gain the required knowledge and understanding of a Safe System approach. The more informed Local Governments are about local road safety issues and the Safe System approach, the more likely it is that evidence-based and sustainable solutions are identified and implemented across the road network.

For Local Governments seeking to adopt a Safe System approach, increasing skills, knowledge and evidence-based research about best practice road safety across all levels of their organisation is an important task. Building Safe System capacity is facilitated through professional development opportunities, including those leading to recognised qualifications; participation in Safe System knowledge transfer; and involvement in research and pilot projects.

For comprehensive planning to build and sustain institutional capacity across all key areas, it is recommended to conduct a Road Safety Capacity Review. The World Bank guide for such reviews can be accessed online (Bliss and Breen 2013).

5.3.2 Resources

Austroads (2009), provides the following advice on resources that can help local government implement road safety plans, as well as techniques for mobilising these resources.

Resources for Implementing a Plan

- **Resources within the community**. While various forms of support are available from external bodies, local road safety programs essentially rely on resources from within the community itself. Some of the most important of these are staff of the various local government and state or national government agencies which are available within the community already. In their case, it is largely a question of pooling their efforts to address problems and coordinating those efforts with the efforts of volunteers.
- **Volunteers**. Much of the input from local organisations will be in the form of volunteer time in delivering programs or serving on committees. Many volunteers have assisted local councils and/or community groups through their presence at stalls during community festivals or other activities such as staffing Driver Reviver operations or delivering leaflets. In other cases, it may involve local businesses taking on responsibility for programs as an adjunct to their normal commercial operations, e.g. hospitality venues which support designated driver programs, or service stations which promote vehicle safety checks.
- **Contributions in kind**. Contributions in kind are a way in which councils and businesses can make effective contributions to local road safety programs. Use of facilities and having staff assist in program development or delivery probably account for most of the help in kind. Other forms of help in kind include printing and other materials, provision of prizes, and donating food and drink to support road safety events.

Mobilising Resources

- **Stakeholder organisations**. Stakeholder organisations are the most critical to organise, but this seldom causes problems. These organisations have some responsibility for road safety outcomes, so participation in a strategy or cooperating with other organisations is very much in their interest as it helps them discharge their duties more effectively. Some resistance may be experienced, particularly in local government circles, as there is suspicion that local road safety programs are a way in which state or national government can shift responsibility and costs onto local governments and communities.
- **Other local organisations**. Other local organisations, such as service clubs, have no direct stake in road safety outcomes, but are motivated by acting in the community good. Road safety is only one of the worthy activities they are likely to take on, and so road safety needs to compete with other activities. Giving prominence to these activities as essential elements of a road safety strategy may be an effective way of retaining commitment, provided recognition for effort and dedicated service is acknowledged. Managing organisations that donate in money or in kind can be challenging, as they are likely to want as much publicity for their organisation as possible. Firm governance may be required to ensure that all activities contribute to the road safety strategy's objectives in a coordinated manner.
- **Local media**. Local media is both a resource to be mobilised, and an effective tool for mobilising other parts of the community. Road safety generally gets good coverage from local media, as the issues can be given a very local perspective and potentially have a direct effect on the readership or audience. Establishing a good relationship between the media and the group responsible for implementing the plan or managing the program is essential. Having one spokesperson who is 'the face of road safety' for the community also helps. A regular stream of newsworthy stories with a strong local flavour, and preferably with suitable visuals, will maintain the relationship. Mention in the local media of the groups and individuals who contribute to the road safety program is an effective way of giving them recognition and strengthening their commitment to the activities they deliver.

- **The community**. The community itself is an important resource to mobilise. While many volunteers who help with activities do so as part of a local organisation, others participate in local road safety programs as individuals. It is also important to mobilise community opinion in favour of the program as this builds support from local government, provides social support for volunteers and stakeholder organisations, and creates a climate of support for initiatives that the community might otherwise resist.
- **Advocacy**. Effective advocates who can persuade decision-makers and stakeholder organisations of the merits of road safety are essential for road safety at all levels of government, but they are particularly important for programs at the local level where the essential communications are face to face and personal factors carry a lot of weight. Encouraging community groups to develop their skills as advocates is an important aspect of capacity building.

5.4 Program Development and Delivery

Like the development of a road safety management plan, the development of a program of road safety activities can take a top-down or bottom-up approach.

The top-down approach involves developing a program based on activities that give effect to the safety performance indicators set out in the strategy. Projects that are expected to deliver safety benefits but do not directly contribute to safety performance indicators receive lesser priority. In contrast, the bottom-up approach typically involves selecting projects that have the best cost effectiveness metric, such as deaths and serious injuries saved per dollar investment.

The top-down approach is best aligned with the Safe System approach; however, highly cost-effective projects should not be excluded from a program simply because they do not contribute to stated safety performance indicators. A balanced top-down and bottom-up approach is likely to represent the best way forward for local government. Examples of top-down and bottom up projects are shown in Table 5.1.

Table 5.1: Examples of top-down and bottom-up safety projects

Top Down Approaches	Bottom Up Approaches
• Area-wide speed management • Local Area Traffic Management (LATM) • Median barrier implementation based on functional road classification • Converting rural priority intersections to roundabouts based on conflicting flow • Safe route planning for all schools • Corridor based approach to treating high-risk curves	• Safety improvements to an intersection with a poor crash history • Removal of roadside hazards at the site of a fatal crash • Installation of a red-light camera at an intersection with a history of red-light running crashes

The examples show that top-down approaches are typically delivered proactively in response to the future vision of the network whereas the bottom-up approach is typically reactive to addressing issues with an established crash problem.

Where programs are developed using a bottom-up approach, it is recommended this is done using a risk-based approach at a network level. Further guidance on this type of approach is presented in Austroads *Guide to Road Safety Part 7: Road Network Crash Risk Assessment and* Management (2006).

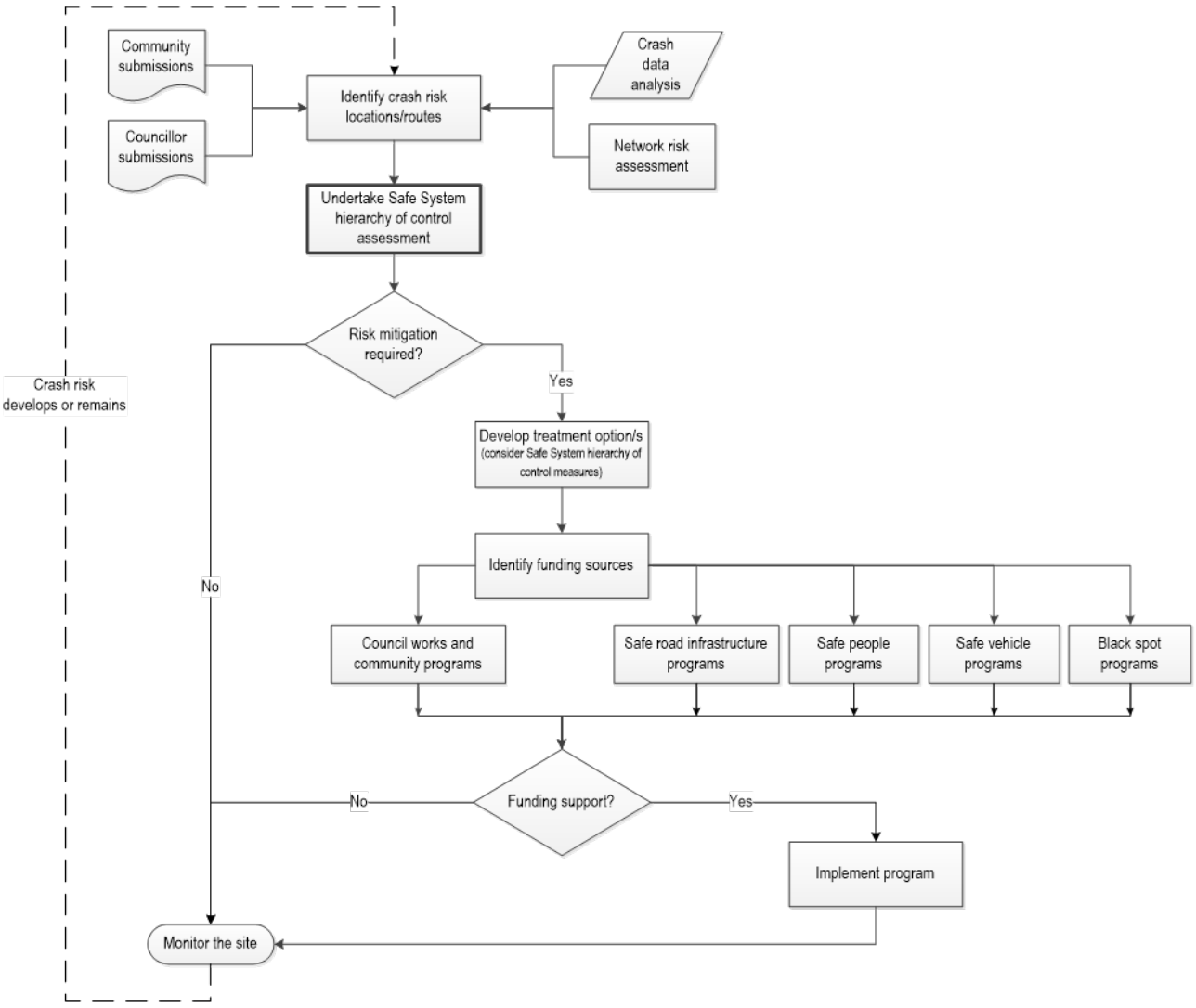
Austroads (2018b) sets out the best practice principles for each of the six key stages in the development of road safety programs. Six best practice principles are identified in the fourth stage ‘Program Development and Approval’, as follows:

- Funding allocation within the program needs to reflect both the scale of problem and level of investment required to reduce risk. A clear rationale should be provided for the funding of sub-programs.

- Program approval should be based upon meeting the program objectives, desirably based on deaths and serious injuries saved, recognising the need for a higher cost/low efficiency projects and lower cost/higher efficiency projects and the need for the overall program to represent value for money (BCR).
- Interim and innovative solutions should be encouraged and actively facilitated.
- Safety benefits should not be traded off against other transport costs, such as travel time.
- Where practicable, programs should explore the opportunity to maximise the economies of scale through themed treatments or spatial clustering.
- KPIs should reflect the program objectives, but desirably be based on deaths and serious injuries saved.

Austroads (2016b) introduces the Safe System Hierarchy of Control tool as a risk management framework for developing road safety programs. Figure 5.1 provides an overview of how the assessment framework fits into the context of delivering road safety programs.

Figure 5.1: Overview for managing and delivering road safety on local roads



The four levels within the Hierarchy of Control framework are generic in nature and permit application to any risk scenario. Table 5.2 presents the generic levels of risk control in a road safety-based context. The effect of control for each level is outlined and examples of the types of treatments that fit the objectives of each level are provided.

Table 5.2: Comparison of local government and community contributions to the Safe System approach

Hierarchy	Risk Control Method	Effect of Control	Examples
1	Remove the risk	Remove the hazard from the road and traffic environment	• Remove a tree or utility pole from the roadside area • Grade separated pedestrian crossings • Fully separated cycleway.
2	Reduce the risk	Replace one hazard with another, less severe and more controllable, hazard Physically separate road users from the hazard to minimise road user interaction with it, or modify the design of the road infrastructure to reduce road user interaction with the hazard and/or assist road user control	• Road safety barrier • Roundabout (replacing priority controlled cross or T-intersection) • Wide median or verge area with or without a safety barrier • Traffic signal control pedestrian crossings • Off-road cycleway • Increase lane and sealed shoulder width • Improve delineation of the carriageway • Provide pedestrian crossing with refuge island • On-road cycleway and shared zones • Improve Australian New Car Assessment Program (ANCAP) rating of vehicle fleet.
3	Change road user behaviour	Provide warning/advice to seek appropriate behaviour	• Curve warning/speed advisory signs • Reduced speed limit and school zone alert signing • Vehicle safety features such as speed alerts, lane departure warning, blind-spot monitoring, etc. • Enforcement, education and training.
4	Protect the road user	Use equipment to protect road users from death/injury	• Seat belts, anti-lock braking system (ABS), electronic stability control (ESC), automatic emergency braking (AEB) • Pedestrian airbags and bonnet designs • Replace a rigid lighting pole with a frangible pole.

Consultation with local government in New Zealand, identified that developing a road safety program was one of the most common challenges for local government. A range of different issues were identified, although common themes related to the need for safety driven projects to be prioritised against other programmed activities, which resulted in a number of potential obstacles for delivery, including:

- often safety projects are prioritised less highly than other projects according to individual local government priorities,
- local government programs are subject to internal approval processes and political influence, both of which can create delay and result in programs including activities with little safety benefit, and
- local governments noted that the fact that operating with fixed internal budgets meant they were unable to respond in an agile way to new challenges. Often relatively small scale and low-cost measures could not be funded because they were not programmed.

These challenges are symptomatic of an organisation lacking leadership and direction with road safety management and could readily be addressed by following the guidance and principles set out in Section 2 and Section 3.

5.5 Funding

Adequate funding of road safety initiatives is imperative to achieving road safety results. As Austroads (2018b) notes, funding allocation within the program needs to reflect both the scale of the problem and the level of investment required to reduce risk. However, this would rarely appear to be the case, especially at a local government level where road safety projects compete with other transport and infrastructure improvement projects.

For local government organisations with limited budgets, activities included in the road safety program must be highly cost-efficient. One of the best ways to achieve this is to focus on low-cost, high-effectiveness treatments that have extensive network coverage. Examples include changing speed limits, audio-tactile line marking (ATLM), corridor delineation enhancements and maintenance activities that improve safety outcomes, such as resurfacing.

Austroads (2009) identifies three primary sources of funding for road safety.

- **Local governments' own resources**. There are three main ways in which local governments' own funding contributes to road safety programs. The biggest potential contribution in monetary terms is when safety is given a higher priority in the way in which funding is spent on maintaining and developing the road asset, and in influencing planning decisions. The second way is through direct funding of road safety activities, including the development of a road safety strategy and funding (either in whole or in part) a professional road safety officer. The third way is when road safety issues are dealt with by other branches of local government, e.g. provision of advice about child restraints through mother and baby clinics, or the involvement of youth workers with road safety projects.
- **National and state program resources**. Funding is generally available through programs directed towards local road safety programs, funded by the state or national government, or possibly through the third-party injury insurers. Access to these funds often depends critically on the quality of the submissions and the extent to which they coincide with the objectives of the granting body. The state or national government officers whose job it is to support local road safety programs have an important role to play in training and coaching local road safety program stakeholders in the preparation of proposals.
- **Sponsorship**. Sponsorship is often an effective way of attracting funding from businesses. Sponsorship is likely to work best if there is ongoing recognition for their contribution e.g. by use of the company name or logo on materials, and an opportunity to present themselves as good corporate citizens. Major players in the local economy are the most obvious source of funding, but smaller businesses may also be interested in sponsorship for a variety of reasons, including publicity, pursuit of particular business objectives, or good corporate citizenship.

There will be other sources of funding available in most jurisdictions. In Victoria, the Transport Accident Commission (TAC) has grant programs available for local government and the community to access funding for road safety improvements.

6. Monitoring and Evaluation

Austroads (2015 and 2018b) consistently identify that monitoring and evaluation of projects and programs receives least attention compared with other parts of project and program development and delivery process.

6.1 Importance and Purpose

Monitoring and evaluation are integral to the sustained effectiveness of a road safety management system. Assuming leadership direction within the organisation generates a clear picture of what safety results are being targeted, and activities are directed to improving those results within an overall management system, the monitoring of the activity and the evaluation of the results that have been achieved are vital to consider how safety can be further improved.

Monitoring and evaluation need to be prioritised so that the conclusions can be used to support the next cycle of improvement. As in many aspects of a road safety management system, monitoring and evaluation can start at a relatively simple level and build in complexity over time. This includes monitoring final safety outcome measures (fatalities, injuries, crashes), monitoring intermediate safety outcome measures (related to safety performance indicators), and the actual delivery of interventions. While monitoring the progress with regard to overall fatalities and serious injuries is important, tracking performance based on specific SPIs is even more critical in order to be able to adapt strategies and action plans at an early stage where necessary. The analysis then provides the starting point of a new Plan-Do-Check-Act cycle.

6.2 Evaluation Principles

Monitoring and evaluation of safety performance is best considered during the planning phase of developing and improving a road safety management system, through an iterative approach which aligns specific safety issues with performance measures and with data collection and analytical processes (Austroads 2015).

A structured monitoring and evaluation program does not require analysis of fatalities and serious injuries. The field of road safety research is sufficiently developed so that monitoring intermediate outcomes that have been targeted during the planning process (such as mean speeds), and delivery of projects designed to impact on those outcomes (such as speed limit reductions), are equally important. The implementation of a road safety management system reinforces the importance of evaluating the effectiveness not only of interventions, but management systems designed to improve the performance of interventions. However, where a monitoring and evaluation program has been completed, it has rarely been used to its full potential to modify crash reduction factors or to optimise the overall program.

Austroads (2018b) sets out the best practice principles for each of the six key stages in the development of road safety programs. The last of these stages ‘Monitoring and Evaluation’ contains five best practice principles, as follows:

- Monitoring and evaluation should be a requirement of all programs, and consider process evaluation, short-term indicators, longer-term risk reduction outcomes and the performance of the wider program.
- Evaluation of projects and programs should validate the risk reduction prediction.
- Results from monitoring and evaluation need to be shared to optimise the delivery of programs over time.
- Evaluation needs to account for external factors (including macro-economic factors) and regression to the mean.
- The monitoring and evaluation of programs to be assessed against the outcomes identified at the outset of the program.

As noted in Section 3.5.1, ongoing monitoring and evaluation are an essential part of the process to discover what impact the safety program is having and whether the targets set out in the strategy are likely to be met. The results of monitoring and evaluation enable adjustments to the program to bring it closer to meeting the targets specified in the strategy.

Measuring and evaluating the precise effects of specific interventions on the number of deaths and serious injuries requires skill and effort. Rather than waiting for sufficient time to pass to do a before and after study of crash frequency and severity, an alternative is to measure an intervention's effect based on intermediate outcomes through safety performance indicators (ITF 2016). An example of this is if a project was to address run off road crashes on rural roads or intersection crashes on urban roads, the evaluation could be based on how many metres of roadside barrier have been installed, or how many intersections have been treated to physically reduce speed, conflict points and angles of deflection. Over time data can be collected to measure the progress that has been achieved and build the case for further investment or otherwise. More information on Safety Performance Indicators can be found in Section 3.7.

Evaluation needs to be built into programs from the development stage. Program logic models, causal chains and evaluation frameworks are useful tools for planning and conducting evaluations of road safety strategies and programs as they help to guide the data that will need to be collected for evaluation. The evaluations of an RSIP needs to account for potential confounding factors and regression to the mean. Ideally, they would incorporate measurement of outcomes which link the mechanisms of change to the ultimate outcomes as outlined in a program logic model (Austroads 2018b).

Monitoring of site prior and post installation is vital to having appropriate data needed to undertake evaluation methods. Different evaluation and review processes can be used, more complex evaluation schemes are applicable for certain situations but in most part, evaluations fall into process evaluation and outcome evaluation. The monitoring and evaluation programs need to be assessment against the outcomes identified at the outset of the program. Details on monitoring and evaluation approaches are provided in Austroads (2012) and Austroads (2015). There is also the GOSPA (goals, objectives, strategy, programs, actions) framework developed by Monash University as a comprehensive evaluation framework.

Outcome evaluation generally investigates before and after studies to determine the overall positive and negative outcomes from safety intervention/s. One of the biggest challenges in this step is having enough data before and after the installation to determine reliable evaluations. Therefore, it is quintessential that outcome evaluation needs to be built into programs from their inception. Careful consideration when analysing data also needs to be taken, variability such as regression to the mean and insufficient amount of crash numbers could affect statistical accuracy.

The Austroads report *An Introductory Guide for Evaluating Effectiveness of Road Safety Treatments* (2012) provides detailed methods for how individual projects can be assessed, including best practice for a range of evaluation methods including cross-sectional studies, before-after studies, and Empirical Bayes.

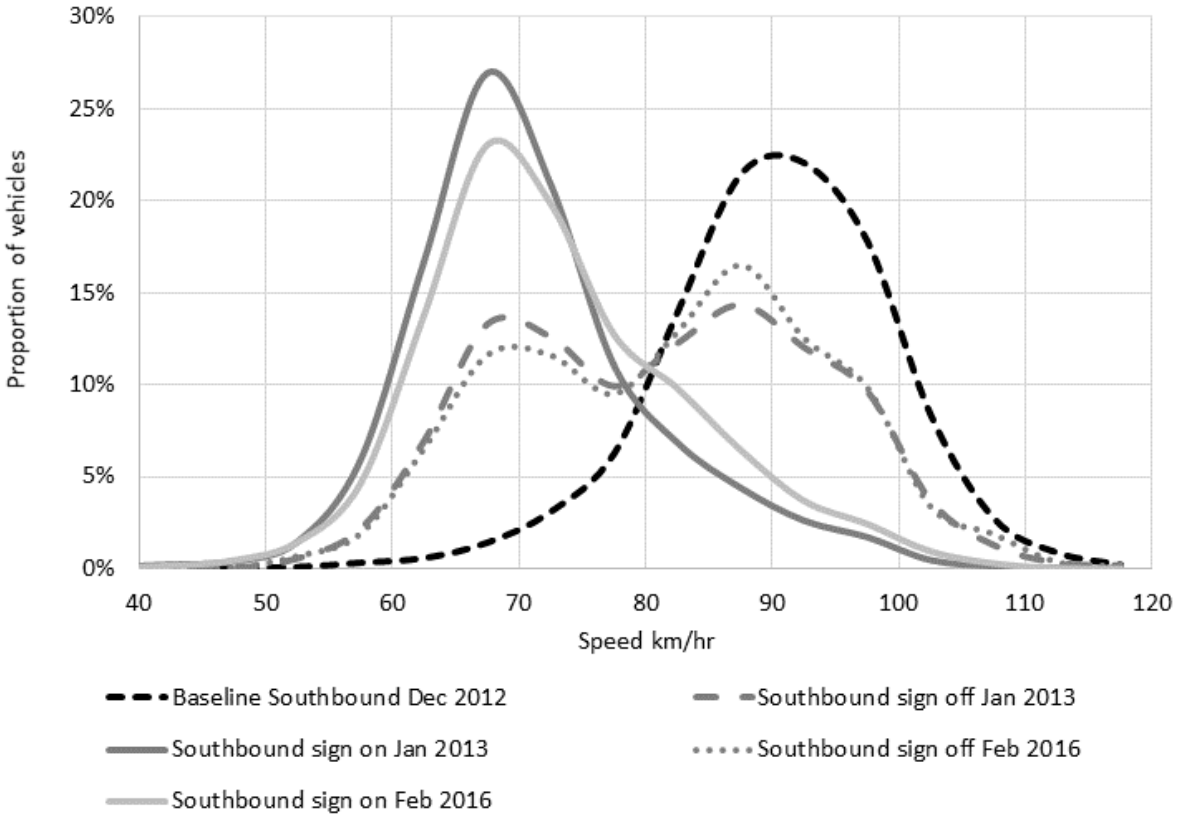
6.3 Case Study

The evaluation of ten Rural Intersection Active Warning System (RIAWS) installations in New Zealand, provides an excellent example of an evaluation process based around behavioural change. RIAWS involves electronic variable speed limits (VSL) or 'Slow Down' signs on the intersection approaches, which are triggered by the presence of side-road and right-turning traffic, and when traffic clears the signs turn off. The evaluation by Mackie et al. (2016) used a suite of measures to assess and evaluate the effectiveness of the VSL on through road vehicle speeds, including:

- Visual observation of RIAWS
- Sign performance and utilisation
- Point Speed of major road vehicles
- Vehicle counts
- Motorist perceptions of RIAWS
- Minor road vehicle gap selection (i.e. Post encroachment time – PET)
- Crash data.

An example of motorists' behavioural response to RIAWS is shown in Figure 6.1, informed by before and after speed distribution profiles.

Figure 6.1: Speed distributions at RIAWS location



This evaluation is especially beneficial because it can be conducted shortly after the implementation of a project and used to gauge the longer-term safety efficacy without waiting several years to evaluate the change in crash numbers. In this instance, the change in speed distribution profile shows the RIAWS is highly effective at modifying behaviour in a way that will lead to fewer crashes and/or crashes of lower severity because of reduced travel speeds.

7. Useful Information Sources

The NZ Transport Agency (NZTA) has prepared material promoting the Safe System approach across local government disciplines. The New Zealand Safer Journeys Strategy seeks to promote roles and responsibilities for delivering a safe road network. Material outlining the role that land use planners, engineers, system designers, and the community have under a Safe System approach is freely available from the Safer Journeys website (www.saferjourneys.govt.nz/resources).

This project contributes to the understanding and application of the Safe System by local government through the development of a practical road safety issue/site assessment framework that builds on existing processes and knowledge readily available to practitioners.

To assist leadership of change for improved road safety, Austroads published an information pack containing answers to commonly asked questions such as 'How can speed management improve road safety' (Austroads 2019f). The publication is available on the Austroads website (https://austroads.com.au/publications/road-safety/ap-c105-19).

National strategies

- **Australia** – The National Road Safety Strategy, 2011–2020
  www.roadsafety.gov.au/
- **New Zealand** – Safer Journeys 2010–2020
  www.saferjourneys.govt.nz
- **New Zealand** – Road to Zero 2020–2030 (for public consultation)
  www.transport.govt.nz/multi-modal/keystrategiesandplans/road-safety-strategy/

State and territory strategies

- **New South Wales** –*Road Safety Strategy 2012–2021*
  www.roadsafety.transport.nsw.gov.au/aboutthecentre/strategies/nswroadsafetystrategy/index.html
- **Victoria** – Towards Zero 2016-2020 Road Safety Strategy
  www.roadsafety.vic.gov.au/strategy/victorias_road_safety_strategy.html
- **Queensland** – *Safer Roads, Safer Queensland: Queensland's Road Safety Strategy 2015-2021*
  www.tmr.qld.gov.au/Safety/Road-safety/Strategy-and-action-plans.aspx
- **Western Australia** – *Towards Zero: Road Safety Strategy 2008–2020*
  www.rsc.wa.gov.au/About/Role-of-the-Commission/Towards-Zero-Strategy
- **South Australia** – *Towards Zero Together: South Australia's Road Safety Strategy 2020*
  www.dpti.sa.gov.au/towardszerotogether/road_safety_strategies
- **Tasmania** – *Towards Zero* – Tasmanian Road Safety Strategy 2017-2026
  www.transport.tas.gov.au/roadsafety/towards_zero
- **Northern Territory** – *Towards Zero Road Safety Action Plan 2018-2022*
  https://roadsafety.nt.gov.au/about
- **Australian Capital Territory** – *ACT Road Safety Strategy 2011–2020*
  www.justice.act.gov.au/safety_and_emergency/road_safety/act_road_safety_strategy_and_action_plans

Mode specific strategies

- **Australia** – National Heavy Vehicle Safety Strategy (Setting the Agenda 2016-2020) www.nhvr.gov.au/about-us/corporate-documents
- **New South Wales** – NSW Motorcycle Safety Strategy https://roadsafety.transport.nsw.gov.au/aboutthecentre/strategies/nswmotorcyclesafetystrategy/index.html

Local government practitioners should make themselves aware of any relevant implementation plans that accompany these strategies. The NSW Road Safety Plan 2021 is an example of one such implementation plan https://towardszero.nsw.gov.au/sites/default/files/2018-02/road-safety-plan.pdf.

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