Guide to Road Safety Part 6

Managing Road Safety Audits

Austroads

Guide to Road Safety Part 6: Managing Road Safety Audits

Sydney 2019

Guide to Road Safety Part 6: Managing Road Safety Audits

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Abstract

Guide to Road Safety Part 6: Managing Road Safety Audits provides guidance on the procurement, management and conduct of road safety audits. It aims to:

- inform practitioners new to road safety audit principles and concepts (especially project clients and project managers) and encourage the conduct of audits and other assessments to maximise their benefits
- ensure practitioners are aware of up-to-date operating environments and contexts (e.g. the Safe System approach to road safety), and recent developments in predictive risk assessments.

The Guide emphasises the responsibilities of road and transport agencies and key players such as project managers, project sponsors and auditors to maximise alignment with Safe System principles by integrating them into the road safety audit process. This can be achieved by:

- relating possible crash forces to tolerable levels of the human body when identifying hazards and assessing fatal and serious injury risks
- categorising road safety audit findings and/or treatment options by their Safe System alignment.

Keywords

Road safety audit, Safe System, Safe System Assessment Framework, road safety engineering, road safety management, risk assessment, treatment options, crash risk, crash severity, exposure, audit team, auditor, project manager

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Guide to Road Safety Part 6: Road Safety Audits has been reissued as *Guide to Road Safety Part 6A: Implementation of Road Safety Audits*. It is expected that this will be a short-term measure, with a consolidation of Guide to Road Safety Part 6 and Guide to Road Safety Part 6A planned to remove any ambiguity, inconsistency or duplication in the texts. The consolidated guide will provide additional guidance on dealing with emerging technical and governance issues, knowledge transfer in auditing and the Safe System solutions and the training and accreditation of auditors.

Where there is duplication or discrepancy between Guide to Road Safety Part 6 and Guide to Road Safety Part 6A, Part 6 will take precedence.

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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:

- Roads and Maritime Services New South Wales
- Roads Corporation 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, Regional Development and Cities
- Australian Local Government Association
- New Zealand Transport Agency.

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Summary

Road safety audit (RSA) as a concept and technique has been in existence since the mid-1980s. There exists compelling evidence that procuring and conducting audits in a timely and disciplined manner has been, and remains, a highly effective and proactive way of identifying safety-related risks and hazards so that they can be mitigated, with the ultimate intention of preventing fatal and serious injury crashes from occurring. Conducting RSAs and implementing audit recommendations have saved many lives and therefore remain fundamental components of many road agencies' network safety strategies.

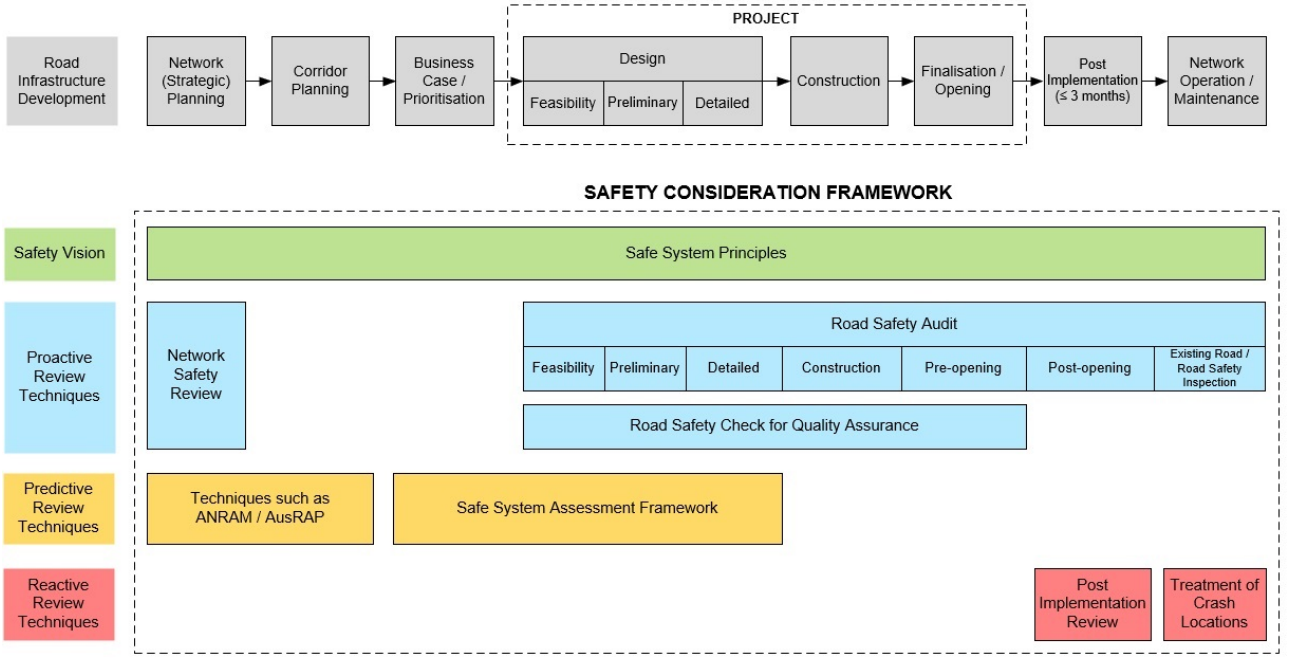
While Austroads guidance on the conduct of audits has evolved over time, its previous issue was nearly a decade ago in 2009. It has been recognised that practitioner awareness of, and expertise in auditing and its road safety and operational context have substantially changed in that time. Most notable has been the emergence of the Safe System approach to road safety and, more recently, the evolution of crash predictive models and tools for conducting road safety risk assessments.

This document provides clients, project managers and project sponsors with information on current practice in the procurement and management of the RSA process. It complements the 2009 Guide, which will be reissued with a revised title of *Guide to Road Safety Part 6A: Implementation of Road Safety Audits.*

The objectives of this Guide are to:

- raise the awareness of practitioners new to the principles and concepts (especially project clients and project managers) relating to RSAs and promote/encourage the conduct of audits and other assessments in order to maximise their benefits
- ensure that practitioners have an awareness of up-to-date operating environments and contexts (e.g. the Safe System approach to road safety) and recent developments in predictive risk assessments.

With the emergence of a number of tools, processes and procedures to reduce road trauma, it is important to demonstrate, as shown in the diagram below, both the traditional and modern approaches to road safety management.



Note: It is recognised that an integrated approach to road safety management strategy would utilise the proactive, predictive and reactive components of road safety review techniques, and as such, the diagram shows a simplified version of how the many techniques can be classified.

Both Australia and New Zealand have made commitments to the adoption and implementation of the Safe System approach through the *National Road Safety Strategy 2011-2020* and *Safer Journeys: New Zealand's Road Safety Strategy 2010–2020*, respectively. For any project, there is a responsibility on the road agency and project manager to maximise the adoption of the Safe System principles by integrating them into RSA practice.

The Safe System integration can be achieved by:

- relating possible crash forces to tolerable levels of the human body before fatal and serious injury (FSI) occurs (regardless of the likelihood) when identifying and assessing FSI risks
- categorising audit findings and treatment options (if provided) by their Safe System alignment.

Section 3.3 describes a process to incorporate the Safe System understanding of crash severity, road user exposure and crash likelihood into the RSA process. Alternatively, if a Safe System Assessment is undertaken as part of the infrastructure development project, the outcome can also satisfy this requirement.

The Guide clarifies the roles, responsibilities, independence and relationships of the client team, project sponsor, project manager, audit team and audit team leader. It also provides advice on the important factors in managing an audit, including the brief, meetings, responding to the audit, closing out the audit and record keeping.

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1. Introduction

There is a good level of awareness throughout Australia, New Zealand and internationally of road safety audit (RSA) as a proactive technique for identifying and treating road-safety-related risks and hazards on roads and roadsides for all users. However, local policies and practices in procuring, managing and conducting audits vary between jurisdictions at all levels of government, and between the public and private sectors, leading to sub-optimal road safety outcomes. A number of influences can be identified, with the most significant of these being a lack of clarity in, and understanding of:

- the objectives, definition and benefits of an RSA – which indicates that clear statements are required of what a RSA is, and is not, and why organisations undertake them in practical terms (including the benefits and returns) (Section 2)
- how audits and other tools fit within the project cycle and network-level road safety management strategies – which indicates that better guidance of what can/should be audited, and when and how to reflect this within a local RSA policy are also required (Section 3)
- the most pressing issues with regard to the procurement, commissioning and undertaking of audits and emerging risk assessment tools (Section 4).

Both Australia and New Zealand have commitments to the adoption and implementation of the Safe System approach through the *National Road Safety Strategy 2011-2020* (Australian Transport Council 2011) and *Safer Journeys: New Zealand's Road Safety Strategy 2010–2020* (Ministry of Transport 2010), respectively. To honour this commitment, road safety processes and procedures, including RSAs, must be implemented to ensure a high alignment with Safe System principles.

1.1 About this Guide

Previous Austroads guidance on the conduct of RSAs was published nearly a decade ago (Austroads 2009), and it has been recognised that practitioner awareness of and expertise in RSA and the road safety and operational context have changed since then.

However, it is important to note that most of the underlying principles, and much of the previous guidance on how to conduct an RSA, remain valid, and it has therefore been decided to retain and reissue the earlier document, retitled *Guide to Road Safety Part 6A: Implementation of Road Safety Audits*.

This current document assumes the title *Guide to Road Safety Part 6: Managing Road Safety Audits* and has the specific objectives of:

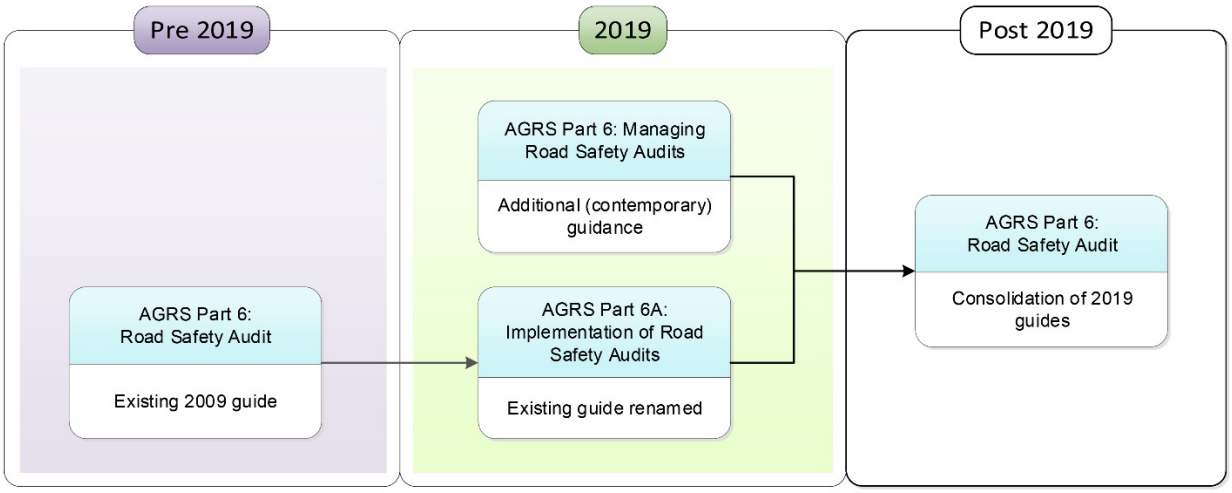
- raising the awareness of practitioners new to the principles and concepts (especially project clients and project managers) relating to RSAs and promoting/encouraging the conduct of audits and other assessments to maximise their benefits
- ensuring that practitioners have an awareness of up-to-date operating environments and contexts (e.g. the Safe System approach to road safety), and recent developments in predictive risk assessments.

Where any duplication or discrepancy is apparent between this Guide and Part 6A, the content of this document will take precedence.

Extensive consultation took place with practitioners and industry in the development of this latest Guide. A succinct output was favoured, supported by background information in appendices and through referencing to other documents. The consultation process also identified items for future consideration, along with local examples of good practice. It is understood that the intention is to consolidate the two documents into one in the future, supported by local case studies.

Figure 1.1 illustrates the process for consolidating the Guides.

Figure 1.1: How current and future Austroads guidance will be consolidated



2. What is an RSA and Why Undertake Them?

2.1 Definition of RSA

A road safety audit is a formal, robust technical assessment of road safety risks associated with road transport projects.

Road safety audits:

- are completed by independent and qualified audit teams
- are completed by applying Safe System principles while seeking to ensure that roads will operate as safely as practicable by eliminating fatal and serious injury crash potential (see Sections 3 and 4)
- consider the safety of all road users (unless specified within the audit brief[1])
- can be conducted on proposed or existing roads.

The objective of a road safety audit is to identify foreseeable hazards for all road users. The road safety audit process provides a reasonable, but not absolute, hazard identification method for all road users with a particular focus on the reduction in fatal and serious injuries.

A road safety audit **is not**:

- an opportunity to redesign or make changes to a design with no apparent link to a safety issue
- a technical check on the design elements or the application of design standards (this should be carried out independently of the road safety audit e.g. as part of the design quality assurance process).

2.2 Why Undertake an RSA?

Quite simply, RSAs save lives and prevent injuries.

Evidence exists that conducting audits in a timely and disciplined manner remains a highly effective **proactive** way of identifying safety-related risks and hazards of road designs for existing and proposed infrastructure so that they can be mitigated, with the ultimate aim of providing a road system free of death and serious injury.

Maximum safety benefits are obtained from RSAs at the design stages of new projects (i.e. prior to setting out and construction, when amending a design drawing is more cost and time effective) through an independent assessment of safety risks. Detecting and mitigating safety risks and hazards immediately prior to and after the opening of a proposed road to traffic, is still extremely valuable. However, mitigation/remedial measures are typically more expensive, and both time delays and poor public relations can result in some cases.

The typical risks and hazards detected during the various stages of audits are set out in the existing RSA guidance (Austroads 2009). A reporting template based on an example for Western Australia is also provided in Appendix E.

1 Although in practice most road safety audits require consideration of all road user groups, increasingly what are called 'thematic road safety audits' are being commissioned which involve a focus on one or more, typically vulnerable, road user groups e.g. pedestrians, cyclists, and on-road public transport users.

Current thinking is that RSAs are an effective tool for minimising any remedial work and corrective actions within a project's lifecycle. As such, developing policies and practices which integrate RSAs and other risk assessment tools throughout the network management process will reduce the whole-of-life costs. It is also considered that implementing such an approach will assist road agencies in demonstrating that the organisation is fulfilling its obligations (i.e. its duty of care to the road users on its network) and will ultimately reduce legal vulnerability in the event of litigation following an incident where defective infrastructure is alleged.

As indicated, the future consolidated *Guide to Road Safety Part 6: Road Safety Audit*, is expected to contain local case studies, and benefit-cost analyses to support and encourage the on-going commissioning and undertaking of RSAs, together with other proactive and predictive risk assessment tools.

2.3 How to Perform an RSA?

Detailed guidance and worked case studies showing how to perform an audit are provided in the previous Guide (Austroads 2009). While the evolution of audits in response to the Safe System philosophy is provided briefly in Section 3.2, the integration of the Safe System principles into the audit process, as a result of this Guide, is now required by:

- relating possible crash forces to tolerable levels, regardless of the likelihood, when identifying hazards and assessing FSI risks
- categorising RSA findings and treatment options, if provided, by their alignment with the Safe System.

Until the future consolidated Guide is published, road safety auditors are given freedom on how to go about meeting this requirement. Section 3.3 describes a process to incorporate the Safe System understanding of crash severity, road user exposure and crash likelihood into RSA practice. Alternatively, if a Safe System Assessment (SSA), as outlined in Section 3.4 and Appendix B, has been undertaken as part of the infrastructure development project, the outcome can also satisfy the requirement for Safe System integration.

2.4 When to Undertake an RSA? (Developing a Local Audit Policy)

There is typically no mandatory requirement to conduct RSAs for all road infrastructure projects. Their undertaking is primarily included in development requirements, project specifications or a jurisdictional audit policy.

While it is desirable for RSAs on proposed roads or road upgrades to be undertaken whenever possible or practicable, during the design and construction and pre-opening phases, resource and cost implications mean that in practice, their conduct (number and phasing), nearly always needs to be commensurate with the complexity and circumstance of the project.

The stages and number of RSAs should be documented and defined in each road agency's local policies. In the absence of policy direction, audits should be undertaken based on risk. Project size can be a simple proxy for risk; however, this may not consider the specific characteristics of the project. At an absolute minimum, it is recommended that an audit should be undertaken at the preliminary or detailed design stage on all public infrastructure projects, including those related to private land use developments. Exemptions to this approach should be fully justified and documented. Nevertheless, the ultimate requirement for when to undertake an audit is to be determined by local policy.

As an example, these principles are shown in Table 2.1, which compares the RSA requirements in three Australian jurisdictions based on their policy documents as of October 2018 (Main Roads Western Australia 2015, Queensland Department of Transport and Main Roads 2008, VicRoads 2011). It is noted that policy requirements may have changed and should not be interpreted as current policy. Additionally, such requirements are primarily for projects on higher-order roads and not necessarily for local roads.

Appendix G provides an example of an RSA policy document which could be considered and adapted by a road agency.

Table 2.1: Comparison of policy requirements for RSAs in Queensland, Victoria and Western Australia

Jurisdiction	Project value criteria	RSA stage					
		Feasibility	Preliminary	Detailed	Construction/ Roadworks	Pre-opening	Post-opening
Qld	• All projects, value ≥ $5m	✓	✓	✓	✓	✓	–
	• 20% of all projects, $0.5m ≤ value < $5m	*	✓	✓	✓	✓	–
	• 20% of all projects, value < $0.5m	–	–	✓	–	✓	–
Vic	• All projects, value ≥ $10m	✓	✓	✓	✓	✓	✓
	• All projects, $0.5m ≤ value < $10m	**	**	**	**	**	**
	• All projects, value < $0.5m	***	***	***	***	***	***
WA	• Road upgrade projects, value ≥ $10m	****	✓	✓	*****	✓	–
	• Road upgrade projects, $1m ≤ value < $10m	–	✓	✓	*****	✓	–
	• Road upgrade projects, $0.1m ≤ value < $1m	–	–	✓	*****	✓	–
	• Blackspot project, value ≥ $0.1m	–	–	✓	*****	✓	–
	• Blackspot project, value < $0.1m	–	–	✓	*****	–	–

Notes:

** Feasibility stage audits are not always needed as long as the project has been independently checked for road functions, project consistency and suitability for intended road user groups.*

*** Audits should be undertaken at one of the design stages after risk factors have been thoroughly considered.*

**** Risk factors should be considered when determining the stages of audit to be carried out.*

***** Feasibility design stage road safety audits are not required to be conducted on Main Roads WA projects. A similar assessment is conducted under the Road Safety Management System (ROSMA) framework.*

****** Suitability and compliance audits are conducted in accordance with Main Roads WA Traffic Management for Works on Roads Code of Practice.*

3. How does an RSA Fit within Project Cycles in a Network-level Road Safety Strategy?

This section provides a concise and practical illustration of how RSAs (and other tools) 'fit' within project cycles in a network-level road safety management strategy. It recognises the Safe System as a major shift in road safety management. As RSAs are one of the most well-known and widespread road safety processes, integrating Safe System principles into audits is a critical step in ensuring the design of safe roads and forgiving roadside infrastructure with a safe and credible operating speed environment for any road transport network or initiative.

3.1 Principles in Network-level Road Safety Management Strategies

Road safety practitioners emphasise the need to consciously plan to achieve road safety and have traditionally set out to consider and address all crash types and severities (e.g. minor, serious and fatal injury) through a blend of reactive and proactive/predictive approaches, where:

- **reactive** policies and associated activities focus on the analysis of crashes which have occurred to prevent the same/similar crash mechanisms and severities from occurring again at that same location Activities within this category traditionally include crash investigation and the identification and treatment of crash locations[2] (Austroads 2015a).
- **proactive** policies and associated activities focus on identifying and/or predicting risks and hazards at a location with the potential to result in crashes. The aim is to mitigate (eliminate or reduce) the risks such that foreseeable FSI crashes do not occur at a location. The commissioning and conduct of an RSA of a design plan or at an operational location falls within this category.

  Mass action treatment programs on existing homogeneous lengths of road would also fall within this category. The development of predictive tools, including most recently the Australian National Risk Assessment Model (ANRAM), as summarised in Austroads (2018b), now permits fatal and serious crash risk profiles to be determined. These techniques enable the identification of locations where certain crashes can be reasonably expected to occur and allow mitigation to take place before the crashes occur.

This traditional approach continues to serve road agencies well and has evolved significantly with time, but more up-to-date principles of road safety management now exist. Therefore, rather than looking at all types and severities of crashes, the focus now is on eliminating and preventing fatal and serious injury crashes. This concept is often linked to an aspirational, longer-term target of achieving zero fatalities or serious injuries across a road network[3] guided, as already noted, by the Safe System approach to road safety.

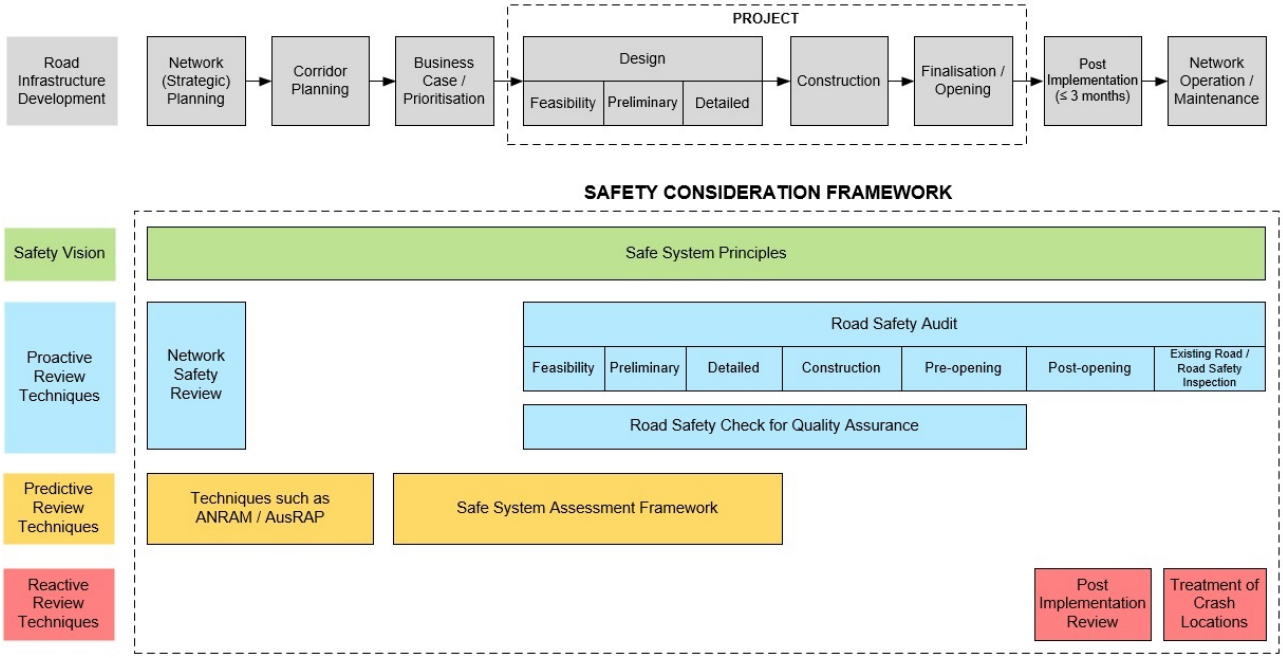
Over the last decade, Austroads has researched and published extensively on the principles of how to deliver a Safe System, culminating with the publication of *Towards Safe System Infrastructure – A Compendium of Current Knowledge* (Austroads 2018b). Extracts from the compendium are included in Appendix A .

It is important to note that the traditional and modern approaches can complement each other, and this is reflected in the compendium where the conduct of RSAs and adoption of a risk assessment tool known as the Safe System Assessment (SSA) within a Safe System Assessment Framework (SSAF) is recommended. Extracts from the compendium are included in this section and in Appendix B to assist in awareness of the SSA and SSAF.

Figure 3.1 illustrates the many approaches to network- and project-level road safety management, showing reactive, proactive and predictive safety review techniques and how they can interrelate.

2 Often also called blackspot engineering or treatment of blackspots.
3 For example, Vision Zero or Towards Zero campaigns.

Figure 3.1: Approaches to network- and project-level road safety management



Note: It is recognised that an integrated approach to road safety management strategy would utilise the proactive, predictive and reactive components of road safety review techniques, and as such, the diagram shows a simplified version of how the many techniques can be classified.

The diagram[4] illustrates the following processes:

- The top row components (grey boxes) set out a typical approach to road infrastructure development – with network-level decisions (e.g. the planning of a network and corridors within it) preceding and influencing project-level processes (i.e. from design to construction and to opening) and then on-going operational and maintenance demands.
- The top components are then aligned vertically with the following road-safety-related activities:
  - the application of a safety vision (green boxes) – and the Safe System approach, which applies throughout the process
  - proactive (blue boxes) – network safety reviews, road safety audits and road safety checks
  - predictive (orange boxes) – risk assessment models/tools, including the Australian National Risk Assessment Model (ANRAM) and SSAF
  - reactive (red boxes) – including post-implementation reviews and treatment of crash locations (blackspot engineering).
- The typically adopted stages of audits are shown in Figure 3.1 (and are defined in Austroads 2009)[5].
- Design stage audits and SSAs are shown independently, but can also be applied concurrently, and have been found to complement each other. Further information on SSAs is provided in Section 3.3 and Appendix B.

4 The output from ongoing Austroads projects (e.g. SAG6041: Scoping of Road Safety Management Tools, SAG6050: Online Survey of Road Safety Practices and SAG2016: Translating Safe System Infrastructure Research into Practice) may provide more clarity on the interrelationship between the proactive, predictive and reactive techniques.

5 RSAs of existing roads are known as Road Safety Inspections by some jurisdictions. These should not be confused with routine, cyclic visual (often driven) inspections of roads to detect maintenance defects, which are also called Road Safety Inspections by some jurisdictions. It is intended that this situation be clarified in more detail in the future consolidated Guide.

3.2 Evolution of the RSA Process Resulting from the Safe System Approach

While RSAs are proven to reduce road trauma, they have traditionally focused on a safety-in-design approach, and in identifying risks and hazards associated with all crash types and severities. However, the current management approach prioritises eliminating fatal and serious injury (FSI) crashes, which recognises the limits of the human body to withstand crash forces, and human fallibility.

Practical and anecdotal evidence is that many of the planning and network decisions that affect road safety have already been made, even prior to conducting RSAs at the earliest design stages, often without inputs from a road safety and traffic management specialist. This contrasts with Safe System principles, which can be applied throughout the network lifespan (using tools such as the SSA). In order to embrace the Safe System approach, there are three main options available:

1. Modify the RSA objectives and processes in some way to incorporate the Safe System principles.
2. Replace RSAs with techniques (such as SSA) more consistent with the Safe System approach.
3. Optimise the uptake of RSAs and Safe System principles and tools (such as SSA).

Option 1 is further discussed in Section 3.3. Option 2 is considered a transition to Option 3 where SSA and RSA can be carried out in parallel or in combination at certain stages in the network lifespan. The recommended scenario is Option 3 and is discussed further in Section 3.4.

It is acknowledged that many jurisdictions and individual clients may have concerns about the capacity and capability of available resources to implement the changes. Further consideration of this issue will be provided in the future consolidation of the Guide.

3.3 Embedding Safe System Principles in RSA Practice

For any project, there is a responsibility on the road authority to maximise alignment with Safe System principles. This can be achieved by applying the principles to the existing RSA processes. The focus of the audit will be to consider key crash types that may lead to fatal or serious injuries and kinetic energy generation and their management (whereby critical speed thresholds, also known as Safe System speeds, are introduced, as identified in Appendix A). The predominant crash types that result in deaths and serious injuries in Australia and New Zealand (Austroads 2016, Marsh & De Roos 2016, Tate & Brodie 2014) are:

- head-on (crashes that occur when one vehicle crosses onto the opposing side and impacts another vehicle, including head-on crashes at intersections)
- intersection (crashes at intersections including side-impacts involving vehicles from adjacent directions and turning vehicles)
- run-off-road (crashes that occur when a vehicle leaves the carriageway without impacting another vehicle, including run-off-road crashes at intersections)
- vulnerable road user (crashes involving pedestrians, cyclists, motorcyclists, the elderly, children and people with special needs).

Rear-end crashes are also an important cause of serious injury based on an analysis of all injuries from road crashes in Australia and New Zealand between 2001 and 2010 (Austroads 2015b).

The following key questions should be raised for each of the safety risks or hazards identified. An affirmative response reflects a high severity risk, and as such is the focus of the subsequent risk assessment:

- Is it possible to have a head-on crash at a speed greater than 70 km/h?
- Is it possible to have an intersection (right-angle) crash at a speed greater than 50 km/h?
- Is it possible to have a run-off-road (side impact with a rigid object) crash at a speed greater than 40 km/h?
- Is it possible to have a vulnerable road user (e.g. pedestrian, cyclist and motorcyclist) crash at a speed greater than 30 km/h?

A ranking or scoring system (e.g. high/medium/low) that considers crash severity, crash exposure and crash likelihood can be developed to rate the risks identified in an RSA considering Safe System principles. An example from Western Australia is provided below.

> The additional annotation "**IMPORTANT**" shall be used to provide emphasis to any road safety audit finding that has the potential to result in fatal or serious injury or findings that are likely to result in the following crash types above the related speed environment: head-on (>70 km/h), right angle (>50 km/h), run off road impact object (>40 km/h), and crashes involving vulnerable road users (>30 km/h), as these crash types are known to result in higher severity outcomes at relatively lower speed environments.
>
> The exposure and likelihood of crash occurrence shall then be considered for all findings deemed "**IMPORTANT**" and evaluated based on an auditors professional judgement. Auditors should consider factors such as, traffic volumes and movements, speed environment, crash history and the road environment, and apply road safety engineering and crash investigation experience to determine the likelihood of crash occurrence. The likelihood of crash occurrence shall be considered either "**VERY HIGH**", "**HIGH**", "**MODERATE**" or "**LOW**" and this additional annotation shall be displayed following the "**IMPORTANT**" annotation on applicable findings.
>
> *Source: Main Roads Western Australia (2015, Section 3).*

3.4 Safe System Assessment (SSA)

The SSA is an assessment tool which considers and quantifies the degree of alignment of a design or concept with Safe System principles with the objective of minimising fatal and serious injury (Austroads 2016). It is also sometimes referred to as a measure of Safe System compliance.

The SSA is founded on the Safe System Assessment Framework (SSAF) that has a Safe System Matrix as its 'engine room'. This ensures consistent consideration of major crash types and prompts an assessment of the three components of risk management as they apply to each crash type, namely **crash severity, road user exposure** and **crash likelihood**.

When SSAs are undertaken at the early planning and design stages, the need for feasibility stage RSAs (and to a lesser degree preliminary design stage) is lessened. It is possible that an SSA can replace a feasibility or preliminary design RSA. If that is the case, the SSA should follow the key principles of undertaking RSAs as outlined in Section 4, including, utilising an independent and qualified team, providing a detailed brief, undertaking commencement and completion meetings, responding to the report findings and recommendations and closing the loop.

It is also important for the subsequent RSAs undertaken at the later stages in the project development and network management cycle to refer to the earlier SSA findings. This is to ensure that the project has not been adjusted or new design features have not been included to lessen alignment with Safe System principles.

More detail and sources for further guidance on the SSA are included in Appendix B.

3.5 Treatment Options

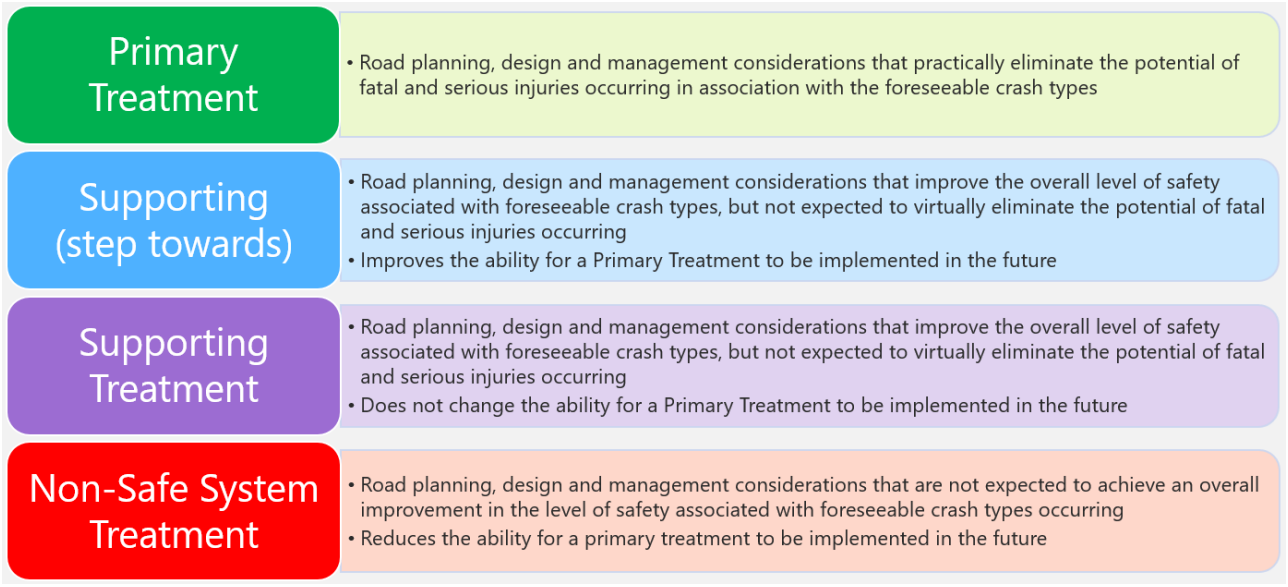
Most jurisdictions and project managers request the audit team to provide RSA recommendations (often in the form of physical infrastructure treatments) to eliminate or reduce the risks identified. It is essential that the treatment option(s) recommended are clearly identified and designed to mitigate a specific risk. Further guidance and options are provided in Austroads (2016) and practitioner tools such as the Road Safety Engineering Toolkit[6].

6 Refer to http://engtoolkit.com.au/.

It is important to ensure that implementing a countermeasure will not create further crash risk(s) as a result. In other words, treating a particular risk must not set out to make an overall situation worse.

It is also important to distinguish treatments that provide a high alignment with Safe System outcomes from those that assist in delivering general safety improvements. As shown in Figure 3.2, a hierarchy of primary and supportive treatment options has been developed (Austroads 2018a). If recommended treatment options are provided in an audit report, the treatments should be categorised into the four Safe System categories.

Figure 3.2: Hierarchy of primary and supportive treatment options



Source: Austroads (2018a).

Austroads guidance provides a comprehensive list[7] of treatment options for various key crash types and whether the option affects severity, exposure or likelihood. Examples of treatments to eliminate and mitigate pedestrian crashes are shown in Table 3.1.

7 While the list of treatments is well regarded, it should not be seen as exhaustive, and other treatments can often be identified. Additionally, the identification and adoption of innovative treatments is encouraged, with formal evaluation and monitoring.

Table 3.1: Examples of pedestrian treatments based on treatment hierarchy

Hierarchy	Treatment	Influence (E = exposure, L = likelihood, S = severity)
Safe System options (primary treatments)	• Separation (footpath) • Separation (crossing point) • Very low speed environment, especially at intersections or crossing points	E L L, S
Supporting treatments (compatible with future implementation of Safe System options)	• Reduce speed environment/speed limit • Pedestrian refuge • Reduce traffic volume	L, S L E, L
Supporting treatments (does not affect future implementation of Safe System options)	• Pedestrian signals • Skid resistance improvement • Improved sight distance to pedestrians • Improved lighting • Rest-on-red signals	L L L L L, S
Other considerations	• Speed enforcement	L, S

Note: The objective of the treatment hierarchy is to apply the primary treatments in a systematic, targeted way. Where it is not possible to apply these, or in the short term, other solutions should be used, working down through the options.

Source: Austroads (2018b).

4. Key Issues in Road Safety Audits

The topics discussed in this section were identified by the project working group as requiring greater clarity and awareness in order to improve the uptake, quality and consistency of RSAs. Many of these issues will also apply to the conduct of emerging risk assessment tools such as SSAs.

4.1 Clearly Defining Roles and Responsibilities in the Process

4.1.1 Roles, Responsibilities and Relationships

Participants in the RSA process can be generally divided into two groups:

- The **client team** (the primary target audience of this Guide) – represents the organisation that commissions a transport infrastructure development project, most typically a state or local road transport agency. The client team can identify a **project sponsor** that is ultimately responsible for the financing of the project delivery and as a result often represents the asset owner or asset manager. The **project manager** is responsible for procuring, administering and managing the RSA component of the project, which includes
  - drafting and issuing an audit brief
  - identifying and commissioning an audit team
  - liaising with the project designer and the audit team
  - keeping the project sponsor informed, especially with respect to any concerns
  - seeking specialist input, where required, from other disciplines (e.g. strategic planners, network operators, safety engineers, traffic management engineers, asset managers), either within their own organisation or procured externally, including in the implementation of the Safe System
  - considering and responding to the audit findings
  - closing out the RSA by
    - implementing agreed actions to address the identified risks, or otherwise accepting the ownership of that risk if there is no action or treatment being implemented
    - monitoring the performance of the RSA process, including
      - the application of the local policy
      - the conduct of the audit
      - the implementation of findings
    - keeping and retaining records of the audit and its findings.

  With larger, complex projects commissioned by the public sector or development banks, the client team's project manager can be an externally appointed professional.
- The **audit team** – consisting of at least two members who understand the Safe System approach and meet the requirements of the local RSA policy in terms of professional scope, knowledge, skills and experience (as a minimum, experience in road safety engineering or crash investigation, and knowledge of road design or traffic engineering principles), which often includes a formal accreditation requirement. An **audit team leader** is appointed and is ultimately responsible for the undertaking of the audit and its completion, which includes liaison with the client team. Refer to Appendix C for an example of the definition of roles from Western Australia.

Private land-use developments often involve the design and provision of proposed roads or modification of existing roads. While in such instances the developer is effectively the client for the RSA process, involvement of delegates from the road transport authority (e.g. road safety engineer or consent specialist) is recommended so that the audit findings are responded to from the perspective of the ultimate asset owner.

4.1.2 Independence of an RSA

What constitutes the independence of audit teams and the process in general, and how to ensure this, have been the subject of recent consideration and debate. This is because the integrity of the audit team must be safeguarded so that it is capable and unhindered in providing objective, impartial and credible judgement in the conduct of an RSA. Potential risks if auditors are not independent and/or have a vested interest can be as follows:

- Risks and hazards are ignored or not properly identified (in terms of exposure, likelihood and severity) and subsequently mitigated.
- Unethical behaviour, breaches of confidentiality and malpractice are not reported.
- Explanations are accepted without checking.
- Undeserved positive feedback is given.
- Records are falsified, incomplete or not kept.

While the concept of auditors being independent of the design team is recognised, in practice, the following signs of dependence can exist in the relationship between the audit team and the client team, which should be recognised and addressed:

- The audit team promotes certain positions held by the project manager or project sponsor/developer.
- The audit team applies limited professional scepticism due to over sympathy.
- The audit team is requested or pressured to effectively design/re-design countermeasures in response to preferred treatment recommendations.

In the context of a public infrastructure project (undertaken by a government agency), the relationship between the project manager and the audit team leader is of particular importance. This is because of the central role the project manager plays in representing the interests of the client organisation (road transport agency) in the project development lifecycle and, at the same time, engaging with the audit team leader in a transparent and unbiased manner. It follows that a public-sector project client/sponsor should typically ensure that it has the final say or a right of veto over the appointments within the audit team. As well as supporting the independence principles of audits, this ensures that crash risks are responded to from the perspective of the ultimate asset owner and given the duty of care they ultimately assume. The principles discussed in this paragraph allow auditors employed within a road agency to be deployed on that agency's road network, for example, when conducting audits or inspections of existing roads.

Independence requirements can be set in both ethical codes-of-conduct in audit guidelines or local policies, with an example provided in Appendix D.

4.2 Preparing an Effective Brief

Preparing an effective brief, including a clear statement of the audit scope and the desired outputs, is critical in the process of procuring and managing audits. The audit brief needs to set out:

- general information
  - stage (timing) of the audit (e.g. preliminary design, pre-opening)
  - project location and descriptions
  - contact details of the client and audit teams
- project background
  - list of relevant documents (e.g. plans, drawings and visualisation)
  - list of previous audits, SSAs and corrective action reports
  - key road and traffic characteristics (e.g. volumes, speed environment and crash data)

- project requirements
  - a clear requirement that the audit should be carried out with a focus on Safe System principles
  - an instruction to carry out the audit in accordance with a recognised guidance document (e.g. Austroads 2009) and/or local policy
  - on-site inspections to cover relevant road conditions and/or specific road user groups (e.g. thematic audits)
  - timeframe and milestones (including provision for commencement and completion meetings)
- specific considerations
  - out-of-scope items (e.g. issues related to interface with adjacent land use and rail corridor, structural integrity, personal security and network operation considerations)
  - audit team composition and particular expertise (e.g. additional expertise required in human factors or a vulnerable road user group)
  - use of control data, namely evidence-based sources such as Austroads guidelines and research publications, to support the audit findings
  - whether recommendations for treatment options to address issues are required; if so, the recommendations are to be presented in accordance with their alignment with Safe System principles (see Section 3.5).

A template of the typical brief should be developed to ensure consistency in engaging the audit team. Refer to Appendix E for an example from Western Australia.

4.3 Running an Effective Commencement Meeting

A formal meeting[8] has been found to be the most efficient way for the client team to instigate communication with the audit team. The objectives of the commencement meeting are as follows:

- to confirm the purpose and scope of the audit
- to discuss the process, including the roles and responsibilities and timeframe
- to formally provide the audit team with a hard and/or electronic copy of the brief and associated documents, and an opportunity for discussion and clarification
- to confirm any further requirements, including time periods for inspection (at night, during school holiday or off-peak hours) and consideration of weather conditions.

With input from the project sponsor and the design team, the project manager is responsible for organising such a meeting and ensuring that any key issues and constraints are properly discussed and agreement/actions recorded. It is also possible to hold the meeting at the site/location, which allows the participants the chance to drive and/or walk through the site and gain a better understanding of the immediate areas of interest and any adjacent areas.

4.4 Responding to Findings/Completion Meeting

When considering the results of an audit, it is critical for the project manager to consider each finding, the importance assigned to it and its alignment with the Safe System principles. For each finding, the project manager must document the rationale and decision-making process in all the decisions ultimately reached. In doing so, the project manager may seek input from the design team and specialist advisors. Any contentious or outstanding issues should be identified for discussion during an interactive completion meeting.

8 Ideally face-to-face or using other communication techniques.

From a contractual perspective, the completion meeting is typically one of the last deliverables of the audit team. It is, therefore, important for the project manager to have a good understanding of the findings and recommendations, and the factors and principles behind them e.g. the link between the identified risk and its FSI crash potential and Safe System compliance of the countermeasures.

A collective response from the client team on the findings can be provided to the audit team by the project manager. This includes both agreed items and outstanding issues, which are open for discussion and clarification with the audit team.

An interactive, open meeting is preferred and on no account should the audit team members be unreasonably requested or put under any pressure to withdraw or modify any findings.

4.5 Closing Out the RSA

This is an identified area of high importance and where practice may potentially be poor. There are three general options for a client in responding to an audit finding and the associated recommendation/s:

1. **Accept the finding and recommendation in its entirety** – the next step is straightforward and involves documenting the proposed action(s) in a corrective action report and implementing the agreed changes accordingly.
2. **Accept the finding and recommendation in part only** – the project manager reaches this decision by undertaking a local context and risk assessment, considering
   a. outcomes from the audit team
   b. the project sponsor and designer's assessment of the risk
   c. severity of the harm and effectiveness of the suggested treatments (including improving on the recommendation)
   d. cost and effectiveness of potential alternative treatments.

   Often, due to constraints, only certain aspects of the risk can be addressed through the implementation of the selected treatment(s) in stages (e.g. short, medium and long term). As such, the project manager is required to recognise and document the residual risk associated with the design or certain elements of the road network.
3. **Reject the finding and take no action** – a project manager may decide to reject the finding and take no action but should do so cautiously. In these circumstances, it is the project manager's responsibility to justify and document the decision with supporting rationale and evidence.

Guidance on the keeping of risk registers to formally log unaddressed risks and issues identified during audits is likely to receive further consideration in the future consolidation of the RSA guidance. Formally recording unaddressed risks is a much more positive outcome than having a number of audit reports that are not being closed out and ultimately ignored.

4.6 Record Keeping and Reviewing Treatment Performance

It is an important responsibility of the project manager and/or asset owner to keep records of:

- the status of audit projects (e.g. initiated, in progress and completed)
- findings and the responses from the client team
- action items, including timing and responsible parties
- how the treatments perform in addressing the safety risks identified.

A minimum retention period for the records should be decided by the organisation to ensure that documentary evidence can be produced should there be any issues involving duty of care and future litigation[9].

4.7 Continual Improvement and Monitoring of Audit Practices

As with any strategy, policy and plan, a formal mechanism for the evaluation of and continual improvement in audit practice should be encouraged. An example from New South Wales is provided in Appendix F to show how this can be achieved.

4.8 Encouraging Engagement in and Adoption of Audits, the Safe System Concept and SSA

Figure 4.1 shows key steps in ensuring that audits and associated concepts (e.g. the Safe System) and tools (e.g. SSA) become embedded within an organisation. Establishing a formal policy and procedures (including level of resources, organisational responsibility and detailed process for initiating and conducting audits) is followed by defining steps to raise awareness among key stakeholders (including project managers, designers, planners and consultants).

Figure 4.1: Key steps to embed RSA in road infrastructure planning, design and implementation

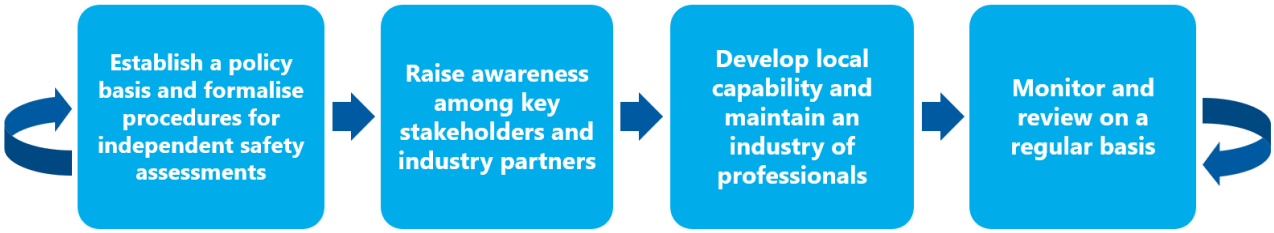


Figure 4.1 also includes a consideration of making audits and/or Safe System assessment techniques (e.g. SSAs) a mandatory requirement through legislation (as opposed to relying on contractual requirements and/or good practice). This approach is supported by other sources (e.g. African Development Bank 2014, Belcher, Proctor & Cook 2015 and Institution of Highways & Transportation 2008), which also suggest that such measures will improve the uptake of audits and enable the development of the relevant professions and professional institutions.

4.9 Knowledge Transfer, Training and Accreditation of Auditors

It is important to note that the development, promotion and undertaking of knowledge transfer in RSA, SSA and Safe System principles, and the training and accreditation of auditors and assessors are the subjects of ongoing work by Austroads. Each jurisdiction has different methods in place to enable this, and further Austroads work will be undertaken to provide best-practice guidance in this area.

9 A seven-year document retention period is most typically adopted.

5. Conclusions

This update of the *Guide to Road Safety Part 6: Managing Road Safety Audits* (Austroads 2009) provides guidance to client teams in commissioning and managing audits as well as introducing Safe System principles into the process, primarily through the consideration of providing a forgiving road environment and the SSA method.

Austroads (2009) will remain the 'how to' document for road safety auditors but will be retitled *Guide to Road Safety Part 6A: Implementation of Road Safety Audits*. Where this Guide and Part 6A are in conflict, this document will take precedence. The intention is to consolidate Part 6 and Part 6A in the future, as well as to provide further guidance, including auditor training and accreditation.

The SSA process emerges as one of the leading techniques in integrating the Safe System approach and maximising the alignment with its principles. Regardless of the extent of overlap between SSA and RSA, the latter approach as it currently stands will need to continue evolving to better suit the needs of road users, and to work towards the goal of zero deaths and serious injuries.

In summary, it is critical to highlight the message that not undertaking audits and other risk assessment methods constitutes an important opportunity lost.

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Appendix A The Safe System Approach to Road Safety

A.1 Opening Summary

Austroads (2018b) states:

> *The Safe System approach is regarded as international best practice in road safety and provides an outcome whereby death and serious injury are virtually eliminated amongst users of the road system. Safe System is the management and design of the road system such that impact energy on the human body is firstly avoided or secondly managed at tolerable levels by manipulating speed, mass and crash angles to reduce crash injury severity.*

A.2 Key Principles

The Safe System philosophy and principles are a paradigm shift in road safety management, road transport management, road design and traffic management (Austroads 2017a, 2017b, 2019, Bliss & Breen 2013). By acknowledging that road users will inevitably make mistakes, and when they do, they should not be penalised with death or serious injury, it follows that road designers and operators have a shared responsibility to take appropriate actions to ensure that road crashes do not lead to fatal or serious injury outcomes.

The human body can only tolerate limited kinetic energy exchange before death and serious injury occurs. It is, therefore, critically important to design and maintain a forgiving road environment and infrastructure by taking into account human vulnerabilities and optimising all parts of the road system so that if one part fails, other parts are still there to protect people from FSI crash outcomes. Safe System principles trigger a need to consider all the pillars of the road transport system (i.e. roads and roadsides, speeds, vehicles, users and post-crash care) in an integrated manner, as shown in Figure A 1

Figure A 1: Representation of the Safe System

Source: Austroads (2018b).

It follows that the practice of RSA should now be aligned with the Safe System principles with consideration of all road user groups. This also recognises that the Safe System approach has been adopted by governments in Australia and New Zealand within their road safety strategies. Commitment is required from road and transport agencies in collaboration with the industry and local bodies to develop Safe System capability, and maintain professional expertise in current thinking, especially with respect to solutions and the emergence of autonomous vehicles.

The RSA process should predominantly (but not exclusively) consider the kinetic energy management of road infrastructure under the safer roads and speeds pillars. In other words, audits seek to ensure the design and implementation of forgiving road and roadside infrastructure with a safe operating speed environment.

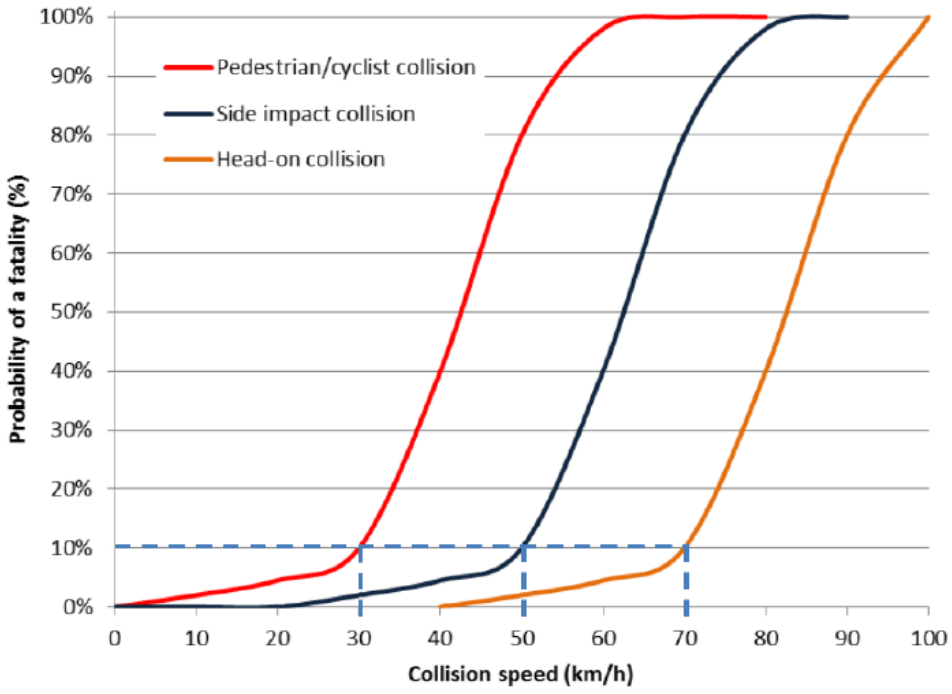
Excessive and inappropriate speed is often the main contributing factor to road crashes in terms of both likelihood and severity (Global Road Safety Partnership 2008). Critical speed thresholds, often known as Safe System speeds, are introduced and cannot be overemphasised in harm minimisation.

Austroads (2018b) states:

> *Often referred to as the Safe System Speeds, the following aspirational operating speeds are as follows:*
>
> - *30 km/h – Where there is the possibility of a collision between a vulnerable road user and a passenger vehicle*
> - *50 km/h – Where there is the possibility of a right angle collision between passenger vehicles*
> - *70 km/h – Where there is the possibility of a head on collision between passenger vehicles*
> - *≥100 km/h – Where there is no possible side or frontal impact between vehicles or impacts with vulnerable road users.*
>
> *An extension often added to the above scenarios is a 30 km/h threshold for a passenger vehicle in a side impact with a tree or pole. Note that at present there is only limited evidence on cyclist and motorcyclist injury thresholds and an assumption is often made that their injury potential is the same as the pedestrian curve.*

Figure A 2 shows the relationships between collision speed and the probability of a fatality.

Figure A 2: Relationships between collision speed and probability of a fatality



Source: Austroads (2018b).

It is worthy of note that the Austroads compendium on the Safe System reflects most recent research, which, through crash analysis, appears to identify lower speed thresholds for the probability of **serious** injury for the same, and an extended range of, key crash types (Austroads 2018b).

As well as speed (and resultant energy), the impact angle as an influencing factor is also stressed, given that low-angle, merge-type impacts (say 20–30º) are considerably more survivable than, for example, head-on and right-angle (90º) impacts.

It follows that the separation of largely non-compatible road user types, or designs that provide for appropriate speeds and/or impact angles should an incident occur, will be safer than many traditional designs and will result in a greater alignment with the Safe System principles (also sometimes referred to as Safe System compliance).

An indicative numerical measure of Safe System alignment can be obtained using an Austroads developed tool, the Safe System Assessment Framework (SSAF), which is covered in Appendix B.

Appendix B Safe System Assessment Framework Summary

B.1 Opening Summary

Austroads (2018b) states:

> *The Safe System assessment framework was developed by Austroads for use by practitioners wishing to include Safe System objectives in the development of all levels of road infrastructure and traffic management projects. The development of this framework was based on a review of literature, workshops, and internal discussions within the project team. Two key objectives of the framework were that it should be capable of assessing a wide variety of project types and be utilised at any stage across the lifespan of a project, and that it includes all pillars of the Safe System. It was envisaged that the framework be applied to all project types, covering the planning, design, operation, maintenance and use of the road network.*

B.2 Key Principles

The Safe System Assessment Framework (SSAF) and its use are detailed in previous reports (Austroads 2016 and 2018b).

The SSAF is a proactive/predictive assessment framework which can be used as a practical tool to determine how well a design or concept aligns with Safe System objectives. With numerical output results, several iterations of the assessment can be undertaken to consider modifications to an original design.

The SSAF has been adopted by a number of state road agencies to assess the alignment of conceptual and preliminary designs with Safe System objectives.

Safe System assessments (SSA) typically involve:

- identifying the purpose and objectives for the project
- deciding on the scale and depth of the assessment
- setting the context, including identifying the function of the road, the speed environment, main road user types, and likely vehicle composition (see Table B 1)
- applying the Safe System Matrix within the SSAF (effectively its engine), which enables major crash types to be assessed in relation to key sources of risk: crash severity, exposure (traffic and vulnerable road user volumes) and likelihood (see Appendix B.3 for more detail).

Austroads (2016) provides case studies illustrating the application of the SSAF.

The depth of assessment and analysis in an SSA is scalable, and should reflect the project size, complexity and risk of FSI crashes. Some jurisdictions also require the assessments for large projects to be undertaken by an expert team that is independent of the design team.

Table B 1: Template for setting the project context

Prompts
• What is the reason for the project? Is there a specific crash type risk? Is it addressing specific issues such as poor speed limit compliance, road access, congestion, future traffic growth, freight movement, amenity concerns from the community, maintenance/asset renewal, etc. • What is the function of the road? Consider location, roadside land use, area type, speed limit, intersection type, presence of parking, public transport services and vehicle flows. What traffic features exist nearby (e.g. upstream and downstream)? What alternative routes exist? • What is the speed environment? What is the current speed limit? Has it changed recently? Is it similar to other roads of this type? How does it compare to Safe System speeds? What is the acceptability of lowering the speed limit at this location? • What road users are present? Consider the presence of elderly, schoolchildren and cyclists. Also, note what facilities are available to vulnerable road users (e.g. signalised crossings, bicycle lanes, school zone speed limits, etc.). • What is the vehicle composition? Consider the presence of heavy vehicles (and what type), motorcyclists and other vehicles using the roadway.

Source: Austroads (2016).

B.3 The Safe System Matrix

The Safe System Matrix considers key crash types: run-off-road, head-on, intersection, other (typically rear-end and side-swipe), pedestrian, cyclist and motorcyclist crashes. Different elements of the matrix, along with examples of road attributes associated with risk generators, are shown in Table B 2.

As part of the assessment, a score is allocated to each cell of the matrix based on available information. This is typically based on subjective assessment by teams of road safety experts. Scores of between zero (0) and four (4) are provided at each cell. A score of zero (0) indicates a full alignment with the Safe System objective for that component of risk of a given crash type. The higher the score, the further the project is from a Safe System condition – a score of four (4) would be for the most unfavourable safety condition for the given context. Scores should be allocated considering the factors of interest shown in Table B 2 and the scoring guidance provided in Austroads (2016) which includes a sample scoring matrix.

Table B 2: Safe System assessment framework for infrastructure projects

	Run-off-road	Head-on	Intersection	Other	Pedestrian	Cyclist	Motorcyclist
Exposure	AADT; length of road segment	AADT; length of road segment	AADT for each approach; intersection size	AADT; length of road segment	AADT; pedestrian numbers; crossing width; length of road	AADT; cyclist numbers; pedestrians	AADT; motorcycle numbers; length of road segment
Likelihood	Speed; geometry; shoulders; barriers; hazard offset; guidance and delineation	Geometry; separation; guidance and delineation; speed	Type of control; speed; design, visibility; conflict points	Speed; sight distance; number of lanes; surface friction	Design of facilities; separation; number of conflicting directions; speed	Design of facilities; separation; speed	Design of facilities; separation; speed
Severity	Speed; roadside features and design (e.g. barriers)	Speed	Impact angles; speed	Speed	Speed	Speed	Speed

Source: Adapted from Austroads (2016).

In addition to the score, comments are provided relating to each of the cells. This helps to record the rationale for the score, and to identify the specific issues of concern. This is very helpful in resolving the key residual risk factors for each project.

Once a score is provided in each cell for the exposure, likelihood and severity rows, the product of each column is calculated and entered in the final row, labelled 'product'. The purpose of this multiplicative approach is that if a score of zero (0) has been given for any component of a crash type (i.e. exposure, likelihood or severity), that crash type receives a total of zero (0) and is eliminated from the score (as it has reached a Safe System condition). The maximum score for each crash type column is 64. Table B 3 shows an example assessment to illustrate the approach and does not represent the final designs implemented.

Practical experience is that a design with the crash type score of less than 16 can be considered highly-aligned with the Safe System for that crash type (e.g. run-off-road or head-on scores in Table B 3). A design can be considered moderately-aligned between 16 and 32, and poorly-aligned above 32.

Table B 3: An example of a Safe System Assessment

	Run-off-road	Head-on	Intersection	Other	Pedestrian	Cyclist	Motorcyclist
Exposure	4	4	4	4	4	1	4
Likelihood	1	1	3	3	3	4	3
Severity	2	2	3	1	4	4	4
Product	**8/64**	**8/64**	**36/64**	**12/64**	**48/64**	**16/64**	**48/64**
Total SSA score				**176/448**			

The sum of the scores for each crash type is then added to calculate the total SSAF score. This score is out of a possible 448 and represents the safe speeds and safe roads and roadsides pillars' contribution to the Safe System for the project. The closer the total score is to zero (0), the more the project in question is aligned with the Safe System objective. Attention to minimising individual crash type scores is still needed.

As a rule-of-thumb, total SSAF scores of:

- less than 112 are considered highly-aligned
- 112 to 224 are considered moderately-aligned
- above 224 are considered poorly-aligned.

Consistency of Safe System alignment across all crash types needs to be considered (e.g. a project can be well-aligned with the Safe System for passenger and heavy vehicles, but poorly-aligned for vulnerable road users).

As noted previously, the scores obtained are indicative of Safe System alignment for the design (mitigation option) being considered at that location. This means that while scores obtained from design iterations at a single site can be compared and the iteration with the lowest score (the most aligned design) selected, the scores obtained from two or more different locations should not be directly compared or used for prioritisation.

B.4 Consideration of Other Pillars in the Safe System

The Safe System approach demands that each of its five pillars should work together to help produce as safe an outcome as possible. The SSA matrix routinely considers the safe roads and speeds pillars and therefore, the other three pillars are assessed given that they can have a strong bearing on safety outcomes at a location. Table B 4 provides some prompts for the additional pillars and associated issues to be considered during an assessment.

Table B 4: Additional Safe System components for consideration in infrastructure projects

Pillar	Prompts
Safe road users	• Are road users likely to be alert and compliant? Are there factors that might influence this? • What are the expected compliance and enforcement levels (alcohol/drugs, speed, road rules, and driving hours)? What is the likelihood of driver fatigue? Can enforcement of these issues be conducted safely? • Are there special road uses (e.g. entertainment precincts, elderly, children, people with disability or mobility difficulty, on-road activities, motorcyclist route), distraction by environmental factors (e.g. commerce, tourism), or risk-taking behaviours?
Safe vehicles	• What level of alignment is there with the ideal of safe vehicles? • Are there factors that might attract large numbers of unsafe vehicles (e.g. farm machinery)? Is the percentage of heavy vehicles too high for the proposed/existing road design? Do recreational motorcyclists use this route? • Are there enforcement resources in the area to detect non-roadworthy, overloaded or unregistered vehicles and thus remove them from the network? Can enforcement of these issues be conducted safely? • Has vehicle breakdown been catered for?
Post-crash care	• Are there issues that might influence safe and efficient post-crash care in the event of a severe injury (e.g. congestion, access-stopping space)? • Do emergency and medical services operate as efficiently and rapidly as possible? • Are other road users and emergency response teams protected during a crash event? Are drivers provided the correct information to address travelling speeds on the approach and adjacent to the incident? Is there reliable information available via radio, VMS etc.? • Is there provision for e-safety (i.e. safety systems based on modern information and communication technologies, C-ITS)?

Source: Adapted from Austroads (2016).

Appendix C Example of Roles and Responsibilities in the Audit Process

Definition of roles in the audit process in Western Australia

Main Roads Western Australia (2015) defines the following roles in the RSA process:

Audit Team *means a team that shall comprise at least two people, independent of the design team, comprising members appropriately experienced and trained in road safety engineering or crash investigation with knowledge of current practice in road design or traffic engineering principles who undertake the road safety audit.*

Audit Team Leader *means the person with appropriate training and experience with overall responsibility for carrying out the audit and certifying the report. An Audit Team Leader practising in Western Australia must be an IPWEA/Main Roads Accredited Senior Road Safety Auditor.*

Audit Team Member *means an appropriately experienced and trained person who is appointed to the Audit Team and who reports to the Audit Team Leader. An Audit Team Member practising in Western Australia must be an IPWEA/Main Roads Accredited Road Safety Auditor.*

Audit Team Trainee *means an individual that has successfully completed a recognised Road Safety Audit training course within 5 years who accompanies the Audit Team to gain experience of the road safety audit process.*

Independent Mentor *means an Audit Team Leader with appropriate training and experience who is employed by an organisation independent of the Trainee Audit Team Leader.*

Trainee Audit Team Leader *means an Audit Team Member with appropriate training and experience who is independently mentored by an Audit Team Leader to meet the requirements to apply for accreditation as an Audit Team Leader.*

Specialist Advisor *means a person approved by the client who provides independent specialist advice to the audit team, such as, road maintenance advisors, traffic signal specialists, police advisors and individuals with specialist local knowledge.*

Appendix D Independence of the Audit Team

Independence of the audit team in the UK

In the following extract, the TLRN is the Transport for London Road Network. The client organisation and design organisation referred to are represented by a project sponsor and a designer, respectively, in this guidance with a project manager as the main conduit for better integration and interaction.

6.1 It is fundamental to the auditing process that no member of the RSA Team has had any design involvement with the measures being audited and will maintain this independence throughout the Audit process. The Client Organisation must be satisfied as to the independence and competence of the Audit Team to undertake the RSA. The use of personnel from previous RSA work does not guarantee their suitability to undertake future Audits on the TLRN.

6.2 The requirement for the RSA Team's independence does not preclude direct contact between the RSA Team, Client Organisation and Design Organisation. There may be times where there is clear benefit in allowing this to happen; for example in clarifying the Audit Brief. Alternatively, direct contact may be unavoidable if the RSA Team Organisation and Design Organisation are one and the same. It is of paramount importance, however, that the RSA Team maintains its independence. The Client Organisation and Design Organisation must not in any way influence the outcome of the Audit by discussing any design considerations or issues with the RSA Team.

6.3 Neither the Client Organisation nor the Design Organisation shall petition the RSA Team to change the content of the RSA report.

6.4 The Audit Team Leader may find it pertinent to document and store on file any important discussions between the Client Organisation, Design Organisation and the RSA Team.

6.5 The RSA Team is not permitted to go beyond making recommendations in broad terms. In making detailed recommendations the RSA Team may be seen to be taking on design responsibilities and hence, lose its independence from the design process.

Source: Transport for London (2014).

Appendix E Examples of RSA Brief and Report Templates

E.1 Brief Template

This example has been adapted from the brief used by Main Roads Western Australia.

ROAD SAFETY AUDIT BRIEF

The completed brief was sent to: Audit Team Contact Name

Audit Team Organisation

Audit Team Organisation Contact Details

Audit Team Organisation Contact Details

[insert organisation name] is committed to the Safe System approach to road safety. This Road Safety Audit (RSA) is to be conducted in accordance with Safe System principles. Each potential crash identified is to be assessed on the likelihood (including exposure) and severity of the crash. If the severity of the crash is identified as exceeding tolerable levels (regardless of minimised likelihood) this should be highlighted in the report. Guidance on tolerable levels can be found in *AP-R509-16 Austroads Safe System Assessment Framework.*

Recommendations presented in this RSA report should identify their level of alignment with Safe System principles as documented in AP-R509-16.

A. To be completed by the Client / Design Team	
Road Safety Audit Stage	Stage 3 - Detailed Design
Project Location:	Describe project location including its extents e.g. Marmion Avenue, Whitfords Avenue to Ocean Reef Road (11.42 – 12.8 slk)
Project Description:	Describe the project e.g. Proposed roundabout, Safety barrier works, Proposed traffic signal controlled intersection including improved pedestrian crossing facilities etc.
Project Number / Task Number: **(Internal MRWA Projects)**	E.g. 21102487 / 400.01
B. Client / Design Team Contact Details	
Organisation / Department:	E.g. Main Roads / Metropolitan Project Delivery
Contact Name:	??
Contact Tel. No.	??
Email Address:	??
Date the Final Audit is Required:	1/01/2015 (min. completion time 10 working days)

C. Previous Road Safety Audits Undertaken				
Previous Road Safety Audit:	Yes:	☒	No:	☐
Road Safety Audit Stage:	Stage 2 - Preliminary Design			
Previous Audit Date:	1/01/2015			
Previous Audit Organisation:	E.g. Main Roads / Road Safety Branch			
Previous Audit Team Leader:	??			
Copy of Audit and CAR Provided:	Yes:	☒	No:	☐
D. Safe System Assessments Undertaken				
Safe System Assessments:	Yes:	☒	No:	☐
Assessment Date:	22/12/2017			
Assessment Organisation:	E.g. Main Roads / Road Safety Branch			
Copy of Assessment Provided:	Yes:	☒	No:	☐
E. Project Information				
Project Objective:	E.g. This project was developed to treat an identified crash problem involving right turn crashes. The proposed roundabout has been designed to minimise the risk of this crash type in the future. **OR** The project was developed to alleviate a congestion problem on the westbound approach to the intersection. The additional lane and traffic signals have been provided to alleviate the problem.			
Speed Limit / Design Speed:	90 km/h / 100 km/h			
Standards, Departures from Standards and Mitigation:	E.g. The project was designed to Austroads Guide to Road Design and Australian Standards. The required Safe Intersection Sight Distance could not be achieved for vehicles exiting Ocean Reef Road due to site constraints. Mitigation measures were provided in the form of traffic calming on the adjoining road. This was provided to ensure vehicle speeds are adequately reduced in the vicinity of the intersection.			
Existing Traffic Flows:	Yes	50,000 AADT Ocean Reef Rd (Aug 2014)		
Forecast Traffic Flows:	Yes	60,000 AADT Ocean Reef Rd (2020)		
Crash Data (5 Years):	Yes	☒	No	☐
Speed Survey Data:	Yes	☒	No	☐

F. List of Documents Supplied			
Document Ref.	**Document Title**	**Scale**	**Date**
TRS/01/10/100 H	Junction Alignment – Signs and Road Markings	1:500	01/01/2015
TRS/01/10/101 G	Junction Alignment – Geometric Design Layout	1:500	01/01/2015

Audit Requested By:	??	**Date:**	1/01/2015

To be Completed by Road Safety Audit Team	
Date Request Received:	1/01/2015
Audit Reference Number:	PTS / RSB / RSA / 2015 / 001
Audit Team Leader:	?

Other requirements:

The Audit team is required to:

- provide a Statement of Independence assuring their independence from the project
- demonstrate their knowledge of the Safe System approach and its application (e.g. via suitable training or a track record of experience in Safe System infrastructure design and assessment)
- be accredited to undertake a Road Safety Audit in [insert jurisdiction].

[insert jurisdiction specific RSA requirements]

E.2 Report Template

This example has been adapted from the report used by Main Roads Western Australia.

Enter the Project Proposal

Road Safety Audit

Stage 2 - Preliminary Design

Audit Ref: PTS/RSB/RSA/2015/001

Prepared for:

Enter Client Details

By:

Enter Road Safety Audit Team Organisation

Report Issue Date: **1/01/2015**

Add Audit Team Organisation Details and Change Logo

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1. INTRODUCTION

1.1 Scope of Audit

A Road Safety Audit is a formal, systematic, assessment of the potential road safety risks associated with a new road project or road improvement project conducted by an independent qualified audit team. The assessment considers all road users and suggests measures to eliminate or mitigate any risks identified by the audit team.

This Road Safety Audit has been conducted following the general principles detailed in *Austroads Guide to Road Safety Part 6: Road Safety Audit* and in accordance with the requirements contained in the [Client Organisation] Policy and Guidelines for Road Safety Audit.

This report results from a [Audit Stage] Road Safety Audit carried out on the proposed [Project Proposal] at [Project Location].

The background and objective of the proposed project is [INCLUDE INFORMATION SUPPLIED BY THE CLIENT IN THE AUDIT BRIEF].

The Audit was undertaken by [Audit Team Leader] of [Audit Team Leader Organisation] with reference to the details provided in the Audit Brief.

The audit comprised an examination of the drawings and other information supplied by [Client Contact and Organisation] as listed in Appendix D.

All the findings described in Section 2 of this report are considered by the audit team to require action in order to improve the safety of the proposed project and to minimise the risk of crash occurrence and reduce potential crash severity.

The audit team has examined and reported only on the road safety implications of the project as presented and has not examined or verified the compliance of the design to any other criteria.

Add Audit Team Organisation Details and Change Logo

1.2 The Audit Team

Auditor No.	Name	Role	Organisation
000000	[ENTER NAME]	Audit Team Leader	[ENTER ORGANISATION]
000000	[ENTER NAME]	Audit Team Member	[ENTER ORGANISATION]
000000	[ENTER NAME]	Audit Team Trainee	[ENTER ORGANISATION]

The audit team visited the site on [DATE] at [TIME]. At the time of the site visit the weather was [ENTER] and the existing road surface was [ENTER WET/DRY].

A night-time site visit was undertaken on [DATE] at [TIME].

1.3 Specialist Advisors

Others present during the daytime / night-time visits were:

Name	Role	Organisation
[ENTER NAME]	[E.g. Police Advisor]	[ENTER ORGANISATION]
[ENTER NAME]	[E.g. Traffic Signal Advisor]	[ENTER ORGANISATION]
[ENTER NAME]	[E.g. Maintenance Advisor]	[ENTER ORGANISATION]

1.4 Safe System Findings

The aim of Safe System Findings is to focus the Road Safety Audit process on considering safe speeds and by providing forgiving roads and roadsides. This is to be delivered through the Road Safety Audit process by accepting that people will always make mistakes and by considering the known limits to crash forces the human body can tolerate. This is to be achieved by focusing the Road Safety Audit on particular crash types that are known to result in higher severity outcomes at relatively lower speed environments to reduce the risk of fatal and serious injury crashes.

The additional annotation "**IMPORTANT**" shall be used to provide emphasis to any road safety audit finding that has the potential to result in fatal or serious injury or findings that are likely to result in the following crash types above the related speed environment: head-on (>70 km/h), right angle (>50 km/h), run off road impact object (>40 km/h), and crashes involving vulnerable road users (>30 km/h), as these crash types are known to result in higher severity outcomes at relatively lower speed environments.

The exposure and likelihood of crash occurrence shall then be considered for all findings deemed "**IMPORTANT**" and evaluated based on an auditors professional judgement. Auditors should consider factors such as, traffic volumes and movements, speed environment, crash history and the road environment, and apply road safety engineering and crash investigation experience to determine the likelihood of crash occurrence. The likelihood of crash occurrence shall be considered either "**VERY HIGH**", "**HIGH**", "**MODERATE**" or "**LOW**" and this additional annotation shall be displayed following the "**IMPORTANT**" annotation on applicable findings.

1.5 Previous Safety Audits

A [ENTER AUDIT STAGE] was undertaken by [NAME OF ORGANISATION] in [MONTH AND YEAR] [AUDIT REF].

The items raised in the [ENTER AUDIT STAGE] safety audit have been addressed with the exception of the items listed below. These items are discussed again in this road safety audit.

Earlier Audit Finding Ref.	Description	Audit Item Ref.
[REF. E.g. 2.1]	[FINDING DESCRIPTION]	[REF. E.g. 2.1]
[REF. E.g. 2.1]	[FINDING DESCRIPTION]	[REF. E.g. 2.1]

Add Audit Team Organisation Details and Change Logo

1.6 Background Data

1.6.1 Crash History

A study of the recent crash history has been conducted in the vicinity of the proposed project for the five-year period to the end of December [ENTER YEAR]. This showed that there were [999] reported crashes within the extracted data which is summarised below:

- [DETAILS OF CRASH TYPE GROUPINGS AND CRASH SEVERITY];
- [DETAILS OF CRASH TYPE GROUPINGS AND CRASH SEVERITY]; and
- [DETAILS OF CRASH TYPE GROUPINGS AND CRASH SEVERITY].

1.6.2 Traffic and Speed Data

A summary of recent traffic data is provided below:

Location	Vehicles per day (% heavy vehicles)	Date	Source
[ROAD NAME] (Site Number)	[NUMBER] (%)	[DATE]	[Traffic Map]

A summary of recent speed data is provided below:

Location	Average Speed (km/h)	85th Percentile Speed (km/h)	Date	Source
[ROAD NAME] (Site Number)	[NUMBER]	[NUMBER]	[DATE]	[Traffic Map]

1.6.3 Appendices

Appendix A – Audit Findings Location Plan
Appendix B – Audit Photographs
Appendix C – Crash Reports
Appendix D – List of Documents Provided for the Audit
Appendix E – Corrective Action Report (CAR)

2. ITEMS RAISED IN THIS [AUDIT STAGE] AUDIT

2.1 Finding – Provide a title for the identified finding including its location e.g. Safe Intersection Sight Distance at the intersection of Ocean Reef Road and Marmion Avenue

Provide a summary of the finding including further clarification of the location if necessary. E.g. There is a tree that partially obscures sight lines to the north for vehicles exiting Ocean Reef Road.

Justification of the finding:

In the first paragraph describe the potential crash outcome related to the finding. E.g. There is a risk that vehicles could fail to give way whilst exiting the intersection which could result in right angle crashes.

Provide further justification of the finding by further explaining the problem and if applicable make reference to appropriate control data to support your finding. E.g. The tree located to the north of the intersection reduces Safe Intersection Sight Distance to 120 m. *Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersection* indicates that Safe Intersection Sight Distance is the minimum distance which should be provided on the major road at any intersection. Using an operating speed of 110 km/h and reaction time of 2.0 seconds the required Safe Intersection Sight Distance is 285 m measured 7 m back along the side road from the conflict point.

Recommendation

Provide your recommendation ensuring that you do not use the terms 'consider' or 'monitor'. E.g. Adequate Safe Intersection Sight Distance should be provided in accordance with Austroads guidelines.

[IMPORTANT | HIGH]

Add Audit Team Organisation Details and Change Logo

3. AUDIT TEAM STATEMENT

I hereby certify that the audit team have examined the documents listed in Appendix D and have inspected the site in undertaking this Road Safety Audit. I also confirm that this audit has been carried out independently of the design team following the general principles detailed in *Austroads Guide to Road Safety Part 6: Road Safety Audit* and in accordance with Main Roads Policy and Guidelines for Road Safety Audit.

The audit has been carried out for the sole purpose of identifying any features of the design which could be altered or removed to improve the safety of the proposal. The identified issues have been noted in this report. The accompanying findings and recommendations are put forward for consideration by the Client for implementation.

Audit Team Leader

[ENTER NAME]
[JOB TITLE]
[ORGANISATION]
[TEL. NO.]
[EMAIL ADDRESS]

Signature

Date

Disclaimer

This report contains findings and recommendations based on examination of the site and/or relevant documentation. The report is based on the conditions viewed on the day of inspection and is relevant at the time of production of the report. Information and data contained within this report is prepared with due care by the Road Safety Audit Team. While the Road Safety Audit Team seeks to ensure accuracy of the data, it cannot guarantee its accuracy.

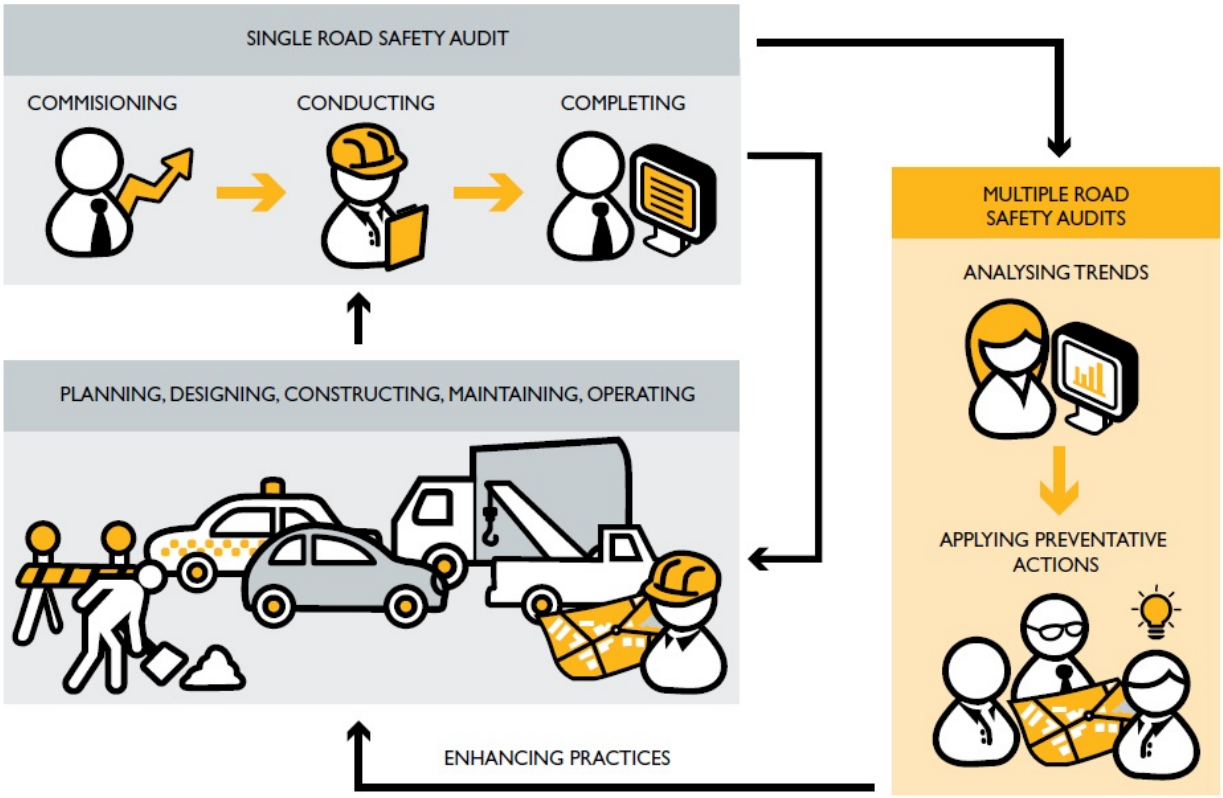
Readers should not solely rely on the contents of this report or draw inferences to other sites. Users must seek appropriate expert advice in relation to their own particular circumstances.

The Road Safety Audit Team does not warrant, guarantee or represent that this report is free from errors or omissions or that the information is exhaustive. Information contained within may become inaccurate without notice and may be wholly or partly incomplete or incorrect. Before relying on the information in this report, users should carefully evaluate the accuracy, completeness and relevance of the data for their purposes.

Subject to any responsibilities implied in law which cannot be excluded, the Road Safety Audit Team is not liable to any party for any losses, expenses, damages, liabilities or claims whatsoever, whether direct, indirect or consequential, arising out of or referrable to the use of this report, howsoever caused whether in contract, tort, statute or otherwise.

Appendix F Illustration of Audits and Road Safety Management Practices

By considering recurring road safety issues raised in multiple RSA reports, areas for improvement can be identified. Corrective actions such as modifying standards and guidelines and improving training courses can be applied to enhance road safety management practices in planning, development, construction and maintenance for road and roadside areas.



Source: Roads and Traffic Authority (2011).

Appendix G Examples of RSA Policy Statements

G.1 State-level Policy

This example has been adapted from VicRoads documents i.e. 2011 RSA policy and 2018 SSA guidelines.

STATEMENT OF POLICY

Road Safety Audit and Safe System Assessment are processes intended to assist in achieving a safer road network through the application of sound road safety practice.

[insert organisation] must carry out Road Safety Audits and Safe System Assessments throughout the planning, design and construction stages of road and bridge projects in accordance with the Austroads Guide to Road Safety Part 6: Road Safety Audit (2009) and Austroads AP-R509-16 – Safe System Assessment Framework.

The Road Safety Audit and Safe System Assessment Policy applies to all projects involving works on [insert road types]. These include projects/works undertaken on the road network by land developers and other organisations, including public transport related works.

DETAILED REQUIREMENTS AND PERFORMANCE STANDARDS AND PROCEDURE

Purpose of Road Safety Audits

Road Safety Audits are undertaken to identify safety issues so that those who are responsible for delivering the particular outcome (conceptual design; detailed plans; constructed works) can take these findings into account and make the necessary amendments.

Purpose of Safe System Assessments

Safe System Assessments are undertaken to ensure that a project has the highest alignment with Safe System principles as possible.

Stages of Audit/Assessment

The number and timing of Road Safety Audits and Safe System Assessments depends on the nature, complexity and risk of the projects. This Policy provides the requirements to determine at what stages Road Safety Audits and Safe System Assessments are required. This Policy refers to the stages of a project when an Audit or Assessment may be required:

- Feasibility
- Preliminary design
- Detailed design
- Roadworks traffic management
- Pre-opening/post opening.

The reasons for selection of an Audit or assessment at a stage of a project, or exemptions to the requirement for Audit/Assessment, should be documented. Audits/Assessments should be undertaken as follows:

Project Cost [values should be reviewed by each organisation]	**Audit Stages Required** [audit stages should be reviewed by each organisation]
> $20.0m	A Safe System Assessment must be undertaken at Feasibility and/or Preliminary Design stage and Road Safety Audits must be undertaken at all other stages
$1m to $20.0m	Risk factors should be considered when determining the stages of Audit and Assessment. In general, at a minimum, Road Safety Audits should be undertaken at one of the design stages.
< $1m	Risk factors should be considered when determining the stages of Audit or Assessment that should be carried out.

Risk factors should be taken into account when determining the stage or stages at which Audits/Assessments will be required. Considerations should be given to the risk factors impact on road user safety, and the potential impact on project delivery and cost if changes are required as a result of an Audit/Assessment. In general, the earlier a Safe System Assessment can be undertaken, the better (refer to Road Safety Audit and Safe System Assessment Procedure).

Road Safety Audit Team

Audit team members must be registered on [insert system]. There must be at least one senior Road Safety Auditor within the team. The team should consist of at least two members.

If a consultant is to be appointed to undertake the Road Safety Audit, they must have the appropriate insurances and quality management system.

It is essential that the team be highly knowledgeable and skilled in all facets of the work being audited, is knowledgeable about the Safe System approach and its implementation and is independent of the project.

Safe System Assessment Team

At the time of release of this policy the formal accreditation for Safe System Assessors is being developed. It is the project or region's responsibility to engage an Assessment team that is independent of the project, has experience in the practical application of the Safe System and with experience using the Safe System Assessment Framework.

While the Assessment team must be independent of the project, they do not necessarily need to be external to [insert organisation].

G.2 Local Government Policy

This example has been adapted from the City of Melville in Western Australia.

POLICY OBJECTIVES

To set out the requirements for conducting Road Safety Audits in [insert organisation].

To improve the safety of the road network and developments in [insert organisation] and ensure measures to eliminate or reduce road environment risks for all road users are fully considered with emphasis placed on fatal and serious crash risk.

To promote the development, design and implementation of a safe road system through the adoption of formal road safety auditing principles and practices.

POLICY SCOPE

This Policy applies to [insert organisation] road infrastructure projects and to qualifying projects that are subject to the Development Application processes.

The Policy applies to all District Distributor, Local distributor and Local Access Roads within the [insert organisation].

DEFINITIONS / ABBREVIATIONS USED IN POLICY

Audit Team means a team that shall comprise of at least two people, independent of the design team, including members appropriately experienced and trained in road safety engineering or crash investigation with knowledge of current practice in road design or traffic engineering principles who undertake the road safety audit.

Audit Team Leader means the person with appropriate training and experience with overall responsibility for carrying out the audit and certifying the report. An Audit Team Leader practising in [insert state or territory] must be an [insert organisation] Accredited Senior Road Safety Auditor.

Audit Team Member means an appropriately experienced and trained person who is appointed to the Audit Team and who reports to the Audit Team Leader. An Audit Team Member practising in [insert state or territory] must be an [insert organisation] Accredited Road Safety Auditor.

Corrective Action Report (CAR) means a tabular summary report prepared by the Audit Team to be completed by the Asset Owner, Project Owner, Project Coordinator or delegated representative to respond to identified findings and recommendations detailed in the audit report.

Crash investigation means an examination of crashes to identify patterns and common trends that may have contributed to crash causation or crash severity. This can include the detailed investigation of a single crash.

Permanent change means any permanent change to the road network, excluding like for like maintenance replacement works and temporary works.

Public road means a road either under the control of [insert organisation], Local Government, or any other road accessible by the public (excludes private roads).

Road Safety Audit means a formal, systematic, assessment of the potential road safety risks associated with a proposed road project or road improvement project conducted by an independent qualified audit team. The assessment considers all road users and suggests measures to eliminate or mitigate those risks.

Road safety engineering means the design and implementation of physical changes to the road network intended to reduce the number and severity of crashes involving road users, drawing on the results of crash investigations.

Road Safety Inspection means a formal examination of an existing road or road related area in which a qualified team report on the crash potential and likely safety performance of the location, (formerly known as an ‘Existing Road Safety Audit’).

Safe System means a road safety approach adopted by National and State Governments to generate improvements in road safety. The Safe System approach is underpinned by three guiding principles: people will always make mistakes on our roads but should not be killed or seriously injured as a consequence; there are known limits to the forces the human body can tolerate without being seriously injured; and the road transport system should be designed and maintained so that people are not exposed to crash forces beyond the limits of their physical tolerance.

Specialist Advisor means a person approved by the client who provides independent specialist advice to the audit team, such as, road maintenance advisors, traffic signal specialists, police advisors and individuals with specialist local knowledge.

POLICY STATEMENT

This policy requires that the following commitments be adopted as part of a strategic framework for the implementation of road safety audit principles and practices in the planning and development of infrastructure within the [insert organisation].

Include road safety audit goals and objectives in our Corporate Plan and Business Management Systems (BMS).

Background

In accordance with the Australian National and the [insert organisation] State Road Safety Strategies this policy adopts a Safe System approach to the delivery of a road safety audit service by placing emphasis on fatal and serious crash risk.

The road safety audit process is an assessment of road engineering projects and as such the Safe System sphere of influence is limited to two of the four cornerstones of the Safe System approach, namely, Safe Roads and Roadsides, and Safe Speeds.

This is to be achieved by focusing the audit process on considering safe speeds and by providing forgiving roads and roadsides. This is to be delivered through the Road Safety Audit process by accepting that people will always make mistakes and by considering the known limits to crash forces the human body can tolerate with the aim to reduce the risk of fatal and serious injury crashes.

A road safety audit is a formal examination of a future road or traffic project in which an independent qualified team reports on potential crash occurrence and severity which may result from the introduction of the project.

Road safety audits are a proactive process to prevent the occurrence of road crashes. The road safety audit process provides project managers with a powerful mechanism to identify potential crash risk in the delivery of infrastructure projects and aims to reduce the risk of trauma and crashes on the road network.

In the implementation of this policy the road safety audit approach to be taken is: that it is not acceptable that any human should die or be seriously injured on the [insert organisation] road network, and specific road safety audit findings shall be highlighted in this regard.

Application

Road safety audits and road safety inspections must be conducted in accordance with the Austroads Guide to Road Safety Part 6: Road Safety Audit, and [insert organisation] complementary checklists and procedures.

The road safety audit process must be completed using the [insert organisation] road safety audit report template provided on the [insert organisation] website.

All road safety audits must be repeated if the project design materially changes, if there are many minor changes which together could impact on road user safety, or if the previous road safety audit for the relevant stage is more than 3 years old. Should a project not begin the next stage in its development within 3 years of the completion of the previous audit, the project must be re-audited. This is to ensure that due consideration is given to the project's interface with the existing road network.

Relevant staff shall be trained in order to fulfil the training and experience requirements to achieve and maintain road safety auditor accreditation.

Where appropriate a reciprocal partnership agreement will be arranged with other local governments to create opportunities for road safety audit teams to include qualified independent team members from partnering local governments.

Road Safety Audit Team

- All road safety audit teams must comprise a minimum of two members.
- All audit teams must be led by a suitably qualified and experienced [insert organisation] Accredited Senior Road Safety Auditor and shall be listed on the Road Safety Audit Portal so that the maximum emphasis is placed on road safety engineering and Safe System principles.
- All audit team members must be [insert organisation] Accredited Road Safety Auditors and shall be listed on the Road Safety Audit Portal.
- Specialist advisors, such as, Police advisors or technical experts can assist the audit team by providing independent specialist advice on particular aspects of a project. There is no requirement for a specialist advisor to be an Accredited Road Safety Auditor. Specialist advisors shall be listed as an 'Advisor' in the audit report and shall not be listed as a team member.
- The audit team shall include a Local Government officer (they can be a specialist advisor).
- Team Leaders/Members shall excuse themselves from participation in the audit if:
  - They have had any involvement in planning, design, construction or maintenance activities for road infrastructure for the project.
  - They perceive any possibility of duress or coercion by their employer or employer's staff in relation to the audit.
- Persons not accredited as a Road Safety Auditor or who do not have relevant specialist skills may still participate as an observer if invited to do so by the Team Leader.

When to Audit

- Blackspot Projects

  Road Safety Audits shall be conducted on all Blackspot funded projects as per State Blackspot Program Development and Management Guidelines.

- Road projects with a project value ≥ $1 million

  All road infrastructure projects that involve a permanent change to the City's road network with an estimated project value > $1 million shall have a road safety audit undertaken at the following 3 stages as a minimum:
  - Stage 2 – Preliminary design
  - Stage 3 – Detailed design
  - Stage 4 – Pre-opening (when the project is substantially complete and prior to opening to the public).

- Road projects with a project value ≥ $150 000 and < $1 million

  All road infrastructure projects that involve a permanent change to the City's road network with an estimated project value ≥ $150 000 and < $1 million shall have a road safety audit undertaken at the following 2 stages as a minimum:

  – Stage 3 – Detailed design

  – Stage 4 – Pre-opening (when the project is substantially complete and prior to opening to the public).

- A detailed design road safety audit shall be carried out on a road project that involves a permanent change to the City's road network with a project value < $150 000 if it is considered complex and/or high risk at the discretion of the Manager Engineering.

Land Developments

Road safety audits shall be conducted on land use developments that intersect the [insert organisation] road network in accordance with the requirements of this policy. The road project value warrants above shall be used to determine audit requirements, with the exception of projects with an estimated project value less than $150 000 that meet any of the following warrants:

- subdivisions of more than 20 lots
- car parks providing access for more than 50 vehicles
- developments that are likely to generate traffic movements in excess of 100 movements per day
- projects that are likely to generate increased pedestrian or cycle movements, or where significant numbers of pedestrians or cyclists are nearby or
- project locations where potential road safety risks are identified by the [insert organisation].

Land use developments that involve a permanent change to the public road network with an estimated project value less than $150 000 that meet any of the above warrants shall have a road safety audit undertaken at the following 2 stages as a minimum:

- Stage 3 – Detailed design
- Stage 4 – Pre-opening (when the project is substantially complete and prior to opening to the public).

The road safety audit shall include the internal road network and parking area within the development.

Existing Roads

Road safety inspections shall be undertaken for existing intersections or road sections where there is a traffic management or road safety concern, at the discretion of the Manager Engineering.

Close out

The Asset Owner, Project Owner, Project Coordinator, or the delegated representative shall complete the Corrective Action Report within one calendar month and arrange for the completed and signed report to be recorded on the City's records system and a copy forwarded to the audit team leader.

The Asset Owner, Project Owner, Project Coordinator, or the delegated representative shall be responsible for the proposed actions and comments resulting from the Corrective Action Report.

Austroads' **Guide to Road Safety Part 6: Managing Road Safety Audits** provides guidance on the procurement, management and conduct of road safety audits. The Guide emphasises the responsibilities of road and transport agencies and key players such as project managers, project sponsors and auditors to maximise alignment with Safe System principles by integrating them into the road safety audit process.

Guide to Road Safety Part 6

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Austroads is the association of Australasian road and transport agencies.

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