A Safe System Assessment Tool for use by Vulnerable Road User Program and Safer Rural Roads Program applicants.

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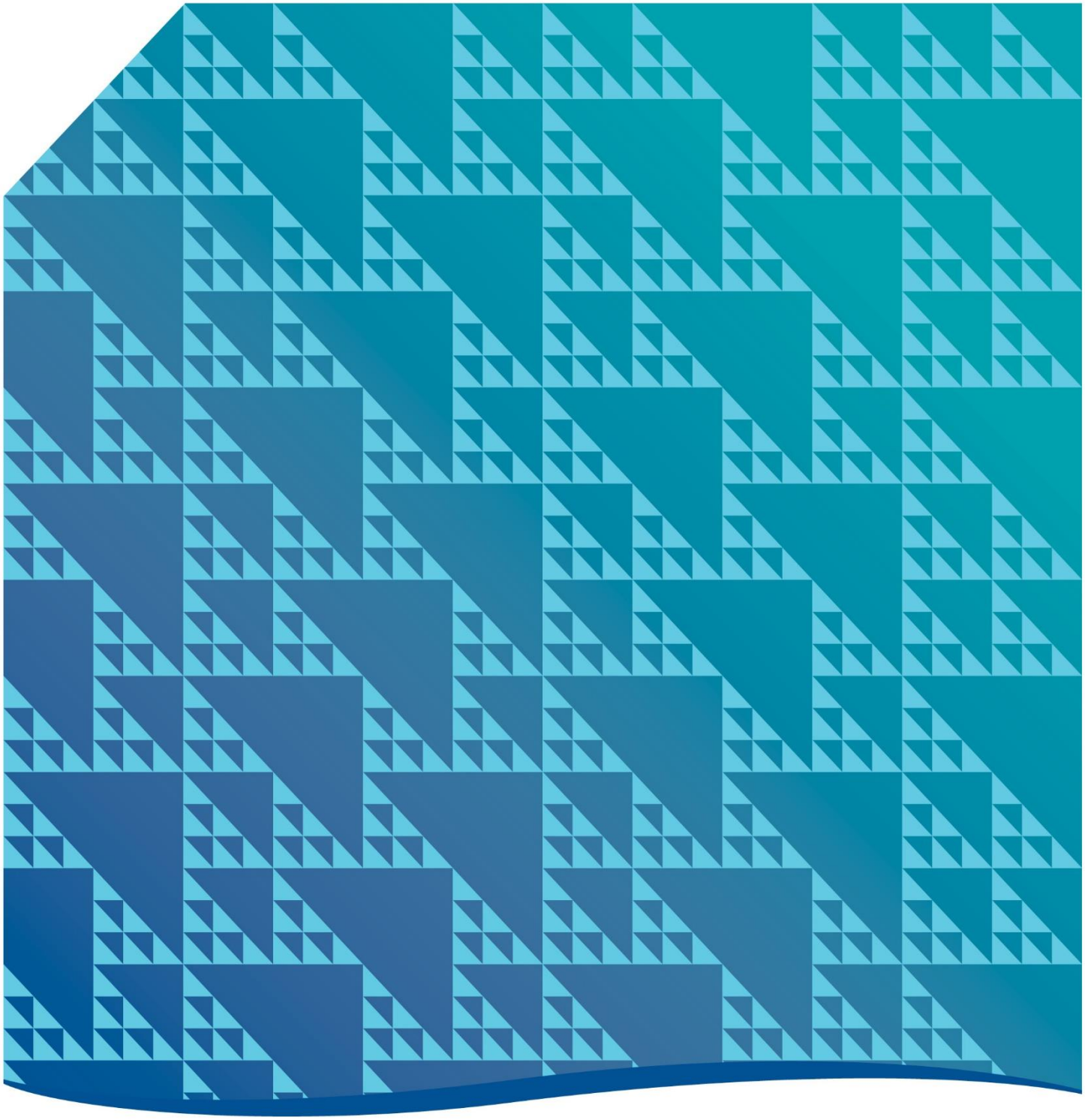
Safe System Self-Assessment Tool - Guide



Department of State Growth

Tasmanian Government

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About this Document

The Safe System Self-Assessment Guidelines (Guidelines) have been developed to assist Vulnerable Road User Program (VRUP) and Safer Rural Roads Program (SRRP) applicants in completing the Safe System Assessment component of the programs' application process.

The Guidelines have been adapted from Austroads' *Safe System Assessment Framework* (2016) and VicRoads' *Safe System Assessment Guidelines v1.1* (2019) for VRUP and SRRP applicant use.

Applicants are encouraged to access the additional information on Safe System Assessments under 'Additional Resources' on page 7.

Safe System Assessments

Safe System Assessments (SSAs) are a tool for evaluating how proposed infrastructure projects align with Safe System principles and the goal of reducing trauma on our roads.

SSAs compare an existing road environment with potential treatment design options to identify areas where the risk of fatal and serious injury crashes is high and where potential changes may improve road safety outcomes.

A Safe System Assessment is recommended to be completed for each funding application under the VRUP and SRRP. For more information about the current round of VRUP and SRRP and associated requirements please see the relevant program guidelines.

Additional Information

For additional information regarding the VRUP, SRRP or SSAs please contact VRUP@stategrowth.tas.gov.au or SRRP@stategrowth.tas.gov.au.

Completing the Safe System Assessment

For the purposes of the VRUP and SRRP application processes, populated copies of the 'Safe System Site Analysis Table Template' and 'Safe System Assessment Matrix Template' from the Safe System Assessment Tool – Templates can be uploaded as evidence of a Safe System Assessment. These templates are available on each program's webpages on the Transport Services website, through the 'Key Links' section.

Applicants may choose to submit alternative evidence demonstrating the completion of a SSA for their project.

The Safe System Site Assessment Table aims to capture the context of a project with respect to the Safe System Principles. The table provides a template with prompts for applicants to complete. The purpose of these prompts is to help ensure that Safe System principles are considered as a part of the assessment.

The Safe System Assessment Matrix (SSAM) aims to analyse different major crash types with respect to the exposure of road users to that crash risk, the likelihood of the crash occurring and the severity of that type of crash should it occur. This process requires the completion of an assessment for the current site environment (pre-intervention assessment) and an assessment of the expected site environment if the project were to be completed (impact assessment).

Explanations of the Safe System Assessment Matrix's elements are included in the following sections.

- Crash Type Definitions
- Scoring Methodology
- Exposure Measures and Typical Likelihood Factors

An example pre-intervention assessment and impact assessment Safe System Matrices are included in the Safe System Assessment templates for reference.

Crash Type Definitions

The table below contains definitions for the different crash types included in the Safe System Assessment Matrix.

Table 1: Crash Types (VicRoads, 2019)

Crash Type	Description
Run-off-road	A crash that occurs when a vehicle leaves the roadway to the left or right without impacting another vehicle. Includes run-off-road crashes at intersections. Does not include crashes involving motorcyclists or cyclists as they are considered separately.
Head-on	A crash that occurs when one vehicle crosses onto the wrong side of the road and impacts head-on with another vehicle. Includes head-on crashes at intersections. Does not include crashes involving motorcyclists or cyclists as they are considered separately
Intersection	Crashes occurring at intersections, including side impacts involving vehicles from adjacent directions, collisions between right turning and opposing vehicles and rear-end crashes. Does not include run-off- road, head-on, pedestrian, cyclist or motorcyclist crashes at intersections (these crash types are considered separately).
Other	Any relevant crash types that are not covered by the specific categories in this table. May include crashes involving vehicles entering or leaving driveways, side swipes, collisions with parked vehicles, loss of control without leaving the carriageway and crashes involving animals.
Pedestrian	All crashes involving pedestrians, including persons boarding or alighting from a vehicle and anyone working on the road or roadside
Cyclist	All crashes involving cyclists.
Motorcyclist	All crashes involving motorcyclists.

Scoring Methodology

There is a level of subjectivity when completing the scoring element of the SSAM with scores depending on the individual(s) undertaking the assessment. As such, scores for a particular project are not comparable with scores of other projects.

In the Safe System Assessment process, exposure and likelihood are considered separately. Definitions of these terms are included below to assist with the completion of the SSAM:

- **Exposure** is the number of road users that have the potential to be involved in the particular crash type.
- **Likelihood** reflects the probability that a road user will be involved in a crash. In some cases, the volume or number of vehicles or type of road users may affect the likelihood of a certain crash type occurring.

The table below provides guidance on how to score each category. Half scores (e.g. 2.5) may be used for likelihood or severity, but are not used for exposure.

Table 2: Adapted from Safe System Matrix Scoring System (Austroads, 2016)

Score	Road user exposure	Crash likelihood	Crash Severity
0	There is no exposure to a certain crash type. This might mean that there is no side flow or intersecting roads, no cyclists, no pedestrians or no motorcyclists.	There is only minimal chance that a given crash type can occur for an individual road user given the infrastructure in place. Only extreme behaviour or substantial vehicle failure could lead to a crash. This may mean, for example, that two traffic streams do not cross at grade or pedestrians do not cross the road.	Should a crash occur, there is only minimal chance that it will result in a fatality or serious injury to the relevant road user involved. This might mean that kinetic energies transferred during a crash are low enough not to cause a fatal or serious injury (FSI), or that excessive energies are effectively redirected / dissipated before being transferred to the road user. Users may refer to Safe System critical impact speeds for different crash types, while considering impact angles and roadside hazards / barriers that are present.
1	Volumes of vehicles that might be involved in a particular crash type are particularly low, therefore exposure is low.	It is highly unlikely that a given crash type will occur.	Should a crash occur, it is highly unlikely that it will result in a fatality or serious injury to any road user involved. Kinetic energies are fairly low during a crash or the majority are effectively dissipated before reaching road user.
2	Volumes of vehicles that might be involved in a particular crash type are moderate, therefore exposure is moderate.	It is unlikely that a given crash type will occur.	Should a crash occur, it is unlikely that it will result in a fatality or serious injury to any road user involved. Kinetic energies are moderate and the majority of the time are effectively dissipated before reaching the road user.
3	Volumes of vehicles that might be involved in a particular crash type are high, therefore exposure is high.	It is likely that a given crash type will occur.	Should a crash occur, it is likely that it will result in a fatality or serious injury to any road user involved. Kinetic energies are moderate, but are not effectively dissipated before reaching the road user

4	Volumes of vehicles that might be involved in a particular crash type are very high or the road is very long, therefore exposure is very high.	The likelihood of individual road user errors leading to a crash is high given the infrastructure in place (e.g. high approach speed to a sharp curve, priority movement control, filtering right turn across several opposing lanes, high speed).	Should a crash occur, it is highly likely that it will result in a fatality or serious injury to any road user involved. Kinetic energies are high enough to cause a FSI crash and it is unlikely that the forces will be dissipated before reaching the road user.

Exposure Measures and Typical Likelihood Factors

The table below provides information on possible ways to measure exposure of road users to different crash types and factors that typically impact the likelihood of different crash types occurring.

Table 3: Exposure Measures and Typical Likelihood Factors (VicRoads, 2019)

Crash Type	Exposure Measures	Typical Likelihood Factors
Run-off-road	Total volume of vehicles (e.g. annual average daily traffic) using the road	• Horizontal and vertical alignment • Pavement condition • Shoulders – width, sealed or unsealed • Number, type and offset to roadside hazards such as poles, trees, steep batters etc. • Presence of barriers, barrier type and position • Speed limit and operating speed • Volume of heavy vehicles • Potential for driver fatigue
Head-on	Total volume of vehicles (e.g. annual average daily traffic) using the road	• Horizontal and vertical alignment • Pavement condition • Number and width of lanes • Separation between opposing traffic streams • Median or centre line barriers • Overtaking opportunities • Speed limit and operating speed • Volume of heavy vehicles • Potential for wrong way movements
Intersection	Total volume of vehicles (e.g. annual average daily traffic) using the road	• Intersection type – cross, T, multi-leg, grade separated etc. • Intersection control – signalised, roundabout, STOP or GIVE WAY • Intersection features – dedicated turns lanes, channelization, movement bans etc. • Number of conflict points and complexity • Minor road volumes and movements • Volume of heavy vehicles • Right turn volumes

Other	Total volume of vehicles (e.g. annual average daily traffic) using the road	• Varies according to the crash type being considered
Pedestrian	Number of pedestrians	• Controlled or uncontrolled crossings • Crossing type (signalised, zebra, wombat, grade separated etc.) • Pedestrian characteristics (young, elderly, mobility impaired, intoxicated etc.) • Presence of a refuge or median • Volume of traffic • Speed of traffic • Crossing distance and number of lanes • Separation from vehicular traffic, including heavy vehicles
Cyclist	Number of cyclists	• Cyclist characteristics (age, commuting, recreational, training etc.) • Presence and type cycling infrastructure (separated paths, on-road bicycle lanes, wide kerbside lanes, bike boxes, controlled crossings, refuges etc.) • Volume of motorised traffic • Separation from motorised traffic, including heavy vehicles • Speed limit and operational speed of traffic
Motorcyclist	Number of motorcyclists – assume 1% of annual average daily traffic if specific data not available	• Horizontal and vertical alignment • Pavement condition • Number and width of lanes • Speed limit and operating speed • Number and type of roadside hazards • Volume of other vehicles • • Sight line restrictions • • Right turn control at intersections

Additional Resources

1) Austroads, AP-R509-16 *Safe System Assessment Framework* (2016)

PDF - https://austroads.com.au/publications/road-safety/ap-r509-16

2) VicRoads, *Safe System Assessment Guidelines V1.1* (2019)

PDF - https://www.vicroads.vic.gov.au/-/media/files/documents/business-and-industry/safe-system-engineering/safe-system-assessment-guidelines-v11-april-2019.ashx

3) VicRoads, *Rapid Safe System Assessment Report Template*

DOTX - https://www.vicroads.vic.gov.au/-/media/files/documents/business-and-industry/safe-system-engineering/rapid-safe-system-assessment-report-template.ashx

4) VicRoads, *Full Safe System Assessment Report Template*

DOTX - https://www.vicroads.vic.gov.au/-/media/files/documents/business-and-industry/safe-system-engineering/full-safe-system-assessment-report-template.ashx

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