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AN INDEPENDENT EVALUATION OF PROPOSED INITIATIVES FOR THE TASMANIAN ROAD SAFETY ACTION PLAN 2010-2013

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An Independent Evaluation of Proposed Initiatives for the Tasmanian Road Safety Action Plan 2010-2013

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Abstract:

The Department of Infrastructure, Energy and Resources (DIER), Tasmania is currently at the stage of developing the second phase of an Action Plan to accompany the Tasmanian Road Strategy 2007-2016. The aim of the report is to provide evidenced-based recommendations with regard to the packages of measures that will lead to significant reductions in serious casualty numbers in Tasmania over the life of the next plan. A selected number of potential road safety initiatives guided by four key strategic directions (including safer travel speeds, best practice infrastructure, improved safety of young drivers, enhanced vehicle safety) and a section on complementary initiatives were provided to MUARC. They were assessed based on set criteria: measure specific impact, overall impact on trauma levels, longer-term enabler, likely benefit-to-cost ratio and resource requirement, to yield a ranking of low, medium or high priority. The initiatives that were ranked as high priority were then explored in greater depth, with modelling being applied where possible. The modelling outcomes of selected high priority initiatives showed that the estimated cumulative serious casualty savings were highest for reduction in speed limits. This was then followed by mid/side barriers, the Graduated Licensing Scheme and lastly, shoulder sealing. The implications of the results are discussed in the context of the four key strategic directions, as well as the complementary initiatives. In conclusion, the study brought to the fore a number of key measures that, if incorporated into the next road safety action plan, have the potential to significantly reduce the number of serious casualties occurring on Tasmania's roads over the life of the current strategy and beyond. Their incorporation in the next plan will help bring Tasmania appreciably closer to the long-term vision of creating a truly Safe System.

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Preface

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Contributorship Statement

The research team would like to acknowledge the valuable contribution made by Professor Peter Vulcan.

Ethics Statement

Ethics approval was not required for this project.

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EXECUTIVE SUMMARY

INTRODUCTION

The Department of Infrastructure, Energy and Resources (DIER), Tasmania is currently at the stage of developing the second phase of an Action Plan to accompany the Tasmanian Road Strategy 2007-2016. As part of the development, an assessment of various road safety initiatives will be evaluated and ranked to identify initiatives with the highest potential to reduce the number of serious casualties on Tasmanian roads. Where possible, the highest ranking initiatives will be quantified using a well-established modelling technique. At the conclusion of the project, a comprehensive report detailing evidence-based recommendations with regard to the packages of measures that will lead to significant reductions in serious casualty numbers in Tasmania over the life of the next action plan, will be produced.

METHOD

The study method comprised two main components, which included a workshop to assess priority measures and, where appropriate, application of a model to predict likely trauma savings for selected, high priority measures.

Workshop component

A selected number of potential road safety initiatives were provided to MUARC by DIER for assessment. Criteria used to evaluate each initiative included:

- Measure-specific impact
- Overall impact on trauma levels
- Longer-term enabler
- Likely benefit-to cost
- Resource requirement

A half-day workshop was conducted with road safety experts from MUARC and representatives from DIER. Each initiative was assessed based on the considerations discussed above and ranked on a scale of low, medium to high in terms of *implementation priority*. High-ranking initiatives derived from this process became the subject of further consideration and, where appropriate, their likely impacts quantified.

Modelling component

The fundamental principles of the METS (Macro Estimates for Target Setting) model was used to generate estimates on the number of serious casualties that could be saved in Tasmania for a selected subset of high impact road safety initiatives. As applied to the project, the model estimates the cumulative saving in serious casualties (deaths and serious injuries) over two time spans – the three-year duration of the next action plan and also over the remaining time span of the current strategy (to the end of 2016) for each of the high priority measures where its safety impact is measurable.

RESULTS

Workshop outcomes

The half-day workshop provided a means for experts to evaluate the list of proposed initiatives for the Tasmanian Road Safety Action Plan 2010-2013. Each initiative was ranked based on a priority level and the highest ranking initiatives were reported in the main results section. Below is a list of all the high priority initiatives, categorised by its strategic direction (note: * denotes the initiative was further modelled in the next section).

Safer travel speeds:

- Lower urban limit for vulnerable road user areas
- Lower existing 60 km/h to 50 km/h (mainly arterial roads)*
- Reduced rural default speed limit*
- Point to point – Final investigation; Point to point – Implementation

Best practice infrastructure:

- Flexible safety barriers – median/mid barrier*
- Flexible safety barriers – side*
- Shoulder sealing*

Improved safety of young drivers:

- Investigate ways to encourage young drivers to drive safer vehicles
- Investigate: night/curfews/passenger restrictions; increase mandatory 120 hours supervised driving/raise licensing age; mobile phone ban; vehicle power to weight limit for young drivers*

Enhanced vehicle safety:

- Review and implement mandatory safety standards for government vehicles

Complementary initiatives:

- Implement alcohol interlocks (for recidivist and high level offenders); Followed by preliminary evaluation of alcohol interlocks
- Research inattention, including mobile phone use and attitudes; Investigation of in-vehicle distraction (focusing on a better understanding of the topic)
- Intelligent speed assistance
- Enhanced collection of traffic data
- Capacity building and shifting thinking of professionals

The workshop outcomes identify that “macro” measures that are likely to have the greatest impact in the short to medium term in reducing death and serious injury on Tasmanian roads, are most strongly represented within the “Safe Speed” and “Safe Roads and Roadsides” pillars of the Safe System but by not means exclusively so.

Modelling outcomes

The modelling outcomes for the estimated cumulative serious casualty savings for the selected high-priority initiatives across the second Action Plan (2011-2013) and the remaining strategy life respectively, include:

- Mid/side barriers: an estimated cumulative serious casualty saving of 6 (2011-2013) and 35 (2011-2016)
- Shoulder sealing: an estimated cumulative serious casualty saving of 1 (2011-2013) and 6 (2011-2016)

- Speed limits (100 km/h reduced to 90 km/h): an estimated cumulative serious casualty saving of 53 (2011-2013) and 117 (2011-2016)

- Speed limits (60km/h reduced to 50km/h): an estimated cumulative serious casualty saving of 27 (2011-2013) and 59 (2011-2016)

- Graduated Licensing Scheme (GLS): an estimated cumulative serious casualty saving of 4 (2011-2013) and 15 (2011-2016)

It is important to note that the estimated savings do not represent the total safety gains from the initiatives modelled. Their impact on trauma levels extends well beyond the life of the current strategy.

DISCUSSION

Road and roadside infrastructure

The installation of flexible barrier systems, as either a median or roadside-treatment, has been shown to reduce serious head-on and run-off-road crashes by a very substantial 80-90%. The modelling outcomes showed that an approximate investment per annum of $6M in present value terms over the remaining six years of the strategy produced a 5% road toll reduction each year upon completion of the works. Modelling completed identified that barrier treatment programs are cost-beneficial, comply with Safe System thinking and target the frequently occurring and typically most severe crash types.

Speed management

Small changes in speed give rise to very significant changes in severe trauma. The modelling completed focused on speed zones where the majority of severe crashes occur (100 km/h and 60 km/h zones). Assuming that speed limit reductions are introduced at the commencement of the next Action Plan (100km/h reduced to 90km/h and 60km/h reduced to 50km/h), outcomes of the modelling indicated that speed reductions for 100km/h zones produced approximately double the cumulative serious casualty savings (53 during the second Action Plan and 117 throughout the remaining strategy life) compared to speed reductions for 60km/h zones (27 during the second Action Plan and 59 throughout the remaining strategy life). As a whole, this initiative demonstrated the greatest cumulative serious casualty savings in contrast to the other modelled initiatives. Furthermore, from a road safety perspective, speed reductions via effective mechanisms such as reduced speed limits are very attractive options as they are Safe System compliant in that they recognise the vulnerability of the human in a crash, are highly cost-beneficial and very inexpensive compared with infrastructure measures of comparable effect.

Enhanced vehicle safety

There is no doubt that safety outcomes will significantly improve by accelerating the rate at which newer, safer cars enter the vehicle fleet and replace their older, less safe counterparts. The relatively slow rate of turnover of the Australian fleet, however, means that the gains in safety outcomes at the “macro” level are incremental and will make no significant impact on trauma trends over the life of the next Action Plan. The longer-term prognosis however provides support for action in this area. Recommendations have been made to consider reviewing and mandating appropriate safety standards for government fleets as part of the next Action Plan (which will serve several objectives outlined in more detail in the report) and investigating various technologies fitted into vehicles that can further promote safer outcomes, such as the Intelligent Speed Assist (ISA).

Improved safety of young drivers

Graduated Licensing Schemes (GLS) have been introduced in a large number of jurisdictions worldwide and evaluations have shown their ability to improve the safety of young drivers. Although the modelling outcomes presented demonstrate a comparatively low estimated cumulative serious casualty savings, projections beyond the life of the strategy are positive. As increasing numbers of beginning drivers pass through the scheme, so its influence on safety outcomes will grow. It is recommended that Tasmania conduct an assessment of successful schemes and their key

features with a view to introducing such a scheme during the life of the current strategy. This strategy should involve educating and promoting among young people and their parents, the importance of accessing the safest vehicles that are affordable or available. The Used Car Safety Ratings produced by MUARC provide a basis by which a subset of safe and affordable cars can be drawn and promoted among key target markets.

Complementary initiatives

A series of important complementary initiatives were identified during the workshop including alcohol interlock systems and the need to build on present understanding regarding driver distraction upon safety outcomes. It is also recognised that there will be a need to identify and measure on a periodic basis, each strategy, in its ability to achieve its overall aim. It is also important to note that policy plays a vital role in developing and implementing initiatives, and therefore, there is a need to develop a program to help policy and decision makers to understand the Safe System vision and, so ensure a better alignment between Safe System principles and real-world practice.

CONCLUSION

The current study has brought to the fore a number of key measures that, if incorporated into the next road safety action plan, have the potential to reduce significantly the number of serious casualties occurring on Tasmania's roads over the life of the current strategy and well beyond. It was identified that strategies that target road and roadside infrastructure (including installation of flexible barrier systems, shoulder sealing with edge-lining and tactile centre-line treatments), speed management, enhanced vehicle safety, improved safety of younger drivers (through GLS), as well as a range of various complementary initiatives (including alcohol interlocks, distraction and bringing about a Safe Systems philosophy towards policy making) are all essential components to be considered for the development of Tasmania's next road safety action plan. The incorporation of these strategies in the next plan will help bring Tasmania appreciably closer to the longer-term vision of creating a truly Safe System.

1. INTRODUCTION

1.1 BACKGROUND

The Department of Infrastructure, Energy and Resources (DIER), Tasmania is currently at the stage of developing the second phase of an Action Plan to accompany the Tasmanian Road Strategy 2007-2016. The development requires an assessment of various road safety initiatives (previously identified in the first Action Plan, 2007-2010), evaluated against the road safety problem areas within Tasmania. The assessment will involve an evaluation of previously identified initiatives that will be ranked according to their potential to reduce the number of serious casualties on Tasmanian roads.

According to DIER's specifications, the second Action Plan (2010-2013) will be guided by four key strategic directions but may also include additional initiatives. The strategic directions will include:

- Safer travel speeds
- Best practice infrastructure
- Improved safety of young drivers
- Enhanced vehicle safety

The list of initiatives supplied by DIER, some of which may be quantifiable directly in terms of reduced serious casualties on Tasmanian roads, will be discussed and ranked. Initiatives which may not have a direct influence on reducing the number of serious casualties, but which may either increase road-user awareness or support the implementation of the strategy, will also be ranked accordingly. Other initiatives seen as beneficial to implement in Tasmania, but not included in the initial list of road safety strategies will be proposed, discussed and also evaluated. A number of selected initiatives that are considered to be highly likely to reduce serious trauma will be quantified using a well-established modelling technique.

In conclusion, the most suitable combination of road safety initiatives with the greatest potential to reduce serious casualties on Tasmanian roads will be presented and ranked, particularly with regard to current or possible future budgets.

1.2 AIMS AND OBJECTIVES

The aim of the report is to provide evidence-based recommendations with regard to the packages of measures that will lead to significant reductions in serious casualty numbers in Tasmania over the life of the next action plan.

In order to achieve this aim, the following objectives need to be met:

- the range of potential measures to be included or considered for the next action plan to be prioritised in terms of their likely impact in the short and longer term, resources required including costs to be estimated and barriers to their introduction addressed
- where the priority is high and the likely safety impact significant, modelling to be applied to allow likely projections in savings of deaths and serious injury numbers to be estimated
- where the priority is high but the safety impacts are likely to be indirect and accrue in the longer term, the value of these initiatives (or enablers) to be made explicit to assist in assessing their candidacy for inclusion in the next action plan.

This report seeks to address the over-riding aim and achieve each of the three linked objectives.

2.0 METHOD

The study method comprised two main components, which included a workshop to assess priority measures and, where appropriate, application of a model to predict likely trauma savings for selected, high priority measures. Each of these components will now be described.

2.1 WORKSHOP TO REVIEW POTENTIAL INITIATIVES

A selected number of potential road safety initiatives were provided to MUARC by the Department of Infrastructure, Energy and Resources (DIER), which were guided by four key strategic directions. There was also a fifth category that included any additional initiatives not already covered. Hence, the initiatives were categorised into five areas:

- Safer travel speeds
- Best practice infrastructure
- Improved safety of young drivers
- Enhanced vehicle safety
- Complementary initiatives

The first stage of the project entailed reviewing the potential initiatives and determining a ranking for each, according to its potential to reduce the number of serious casualties on Tasmanian roads. As a means of assigning priorities, each initiative was assessed according to a number of set criteria. These criteria comprised:

- Measure-specific impact: The percent reduction in death and serious injury that the measure will bring about within the specific crash sub-group that the measure targets. *An impact of 20% or greater is considered significant.*

- Overall impact on trauma levels: The reduction in death and serious injury that the measure brings about as a percent of the total number of deaths and serious injuries that occur within Tasmania. *An impact of 5% or greater on overall road trauma levels is considered very significant.*

- Longer-term enabler: A measure that need not have any impact directly on road trauma levels but will help facilitate over the longer term the introduction of new measures that can bring about substantial change in safety levels.

- Likely benefit-to-cost: A professional opinion with regard to the ratio that is calculated by the likely social benefit (in dollar terms) of the safety measure being divided by the cost of the measure. Both costs in the quotient are usually expressed in Net Present Value terms. *Benefit-to-cost ratios of three or greater are deemed to be highly positive.*

- Resource requirement: A measure of supply, support or aid necessary to implement and maintain the initiative. *Initiatives that cost well in excess of $1 million in resources are large; costs below that approximate threshold are deemed to be moderate.*

A half-day workshop was conducted to assess the potential effectiveness of each initiative in reducing serious casualties in Tasmania. Road safety experts and representatives from DIER attended the workshop to help provide further information and clarification about the list of possible initiatives. Each initiative was assessed based on the considerations discussed above and ranked on a scale of low, medium to high in terms of implementation priority. Importantly, the workshop representatives further considered each of the high-ranking initiatives in terms of the context in which those measures could reasonably be introduced.

High-ranking initiatives derived from this process became the subject of further consideration and, where appropriate, their likely impacts quantified.

2.2 MODELLING

The METS (Macro Estimates for Target Setting) model was developed originally in 2006 with Vicroads funding and has been since updated and improved for application to the development of long-term road safety strategies in Western Australia (2007), Australia's next National Road Safety Strategy (2009) and the Northern Territory (2010). The model methodology has been peer-reviewed (Corben et al, 2010).

The purpose of this exercise was to use the fundamental principles of the METS model to generate estimates of the numbers of serious casualties (the sum of fatalities and serious injuries) that could be saved in Tasmania for a selected subset of high impact road safety initiatives. This process formed part of a more comprehensive prioritisation process undertaken by MUARC as part of the planning for the implementation of the second Action Plan (2010-2013) of the current Tasmanian Road Safety Strategy, 2007-2016.

As applied in this project, the model estimates the cumulative saving in serious casualties (deaths and serious injuries) over two time spans - the three year duration of the next action plan and also, over the remaining time span of the current strategy (to end 2016) for each of the high priority measures where its safety impact is measurable.

3.0 RESULTS

3.1 WORKSHOP OUTCOMES

The half-day workshop provided a means for experts to evaluate the list of proposed initiatives for the Tasmanian Road Safety Action Plan 2010-2013 and produce a table summarising a completed assessment of each initiative's implementation priority (refer to Appendix A). Table 1 summarises the details only for those initiatives that were ranked "high" priority for implementation as an outcome of the workshop.

Table 1 High-ranking initiatives determined in the workshop

Strategic Direction	Initiative	Measure-specific impact	Overall impact on trauma levels	Longer-term enabler	Likely benefit-to-cost	Resource requirements	Additional Comments/Notes
Safer travel speeds	Lower urban limit for vulnerable road user areas	Moderate	Low-Moderate	Moderate	High	Modest	Selective introduction at high risk locations
	Lower existing 60km/h to 50km/h (mainly arterial roads)	High	High	N/A	High	Moderate	Significant driver of trauma reduction across most road user groups. Achieves synergies with non-safety goals (smooth traffic flow, reduced toxic emissions, urban noise levels and overall health related aspects such as stress and obesity)
	Reduced rural default speed limit	High	High	N/A	High	Low-Moderate	Once off costs for public education, etc. Potentially targeting ~50% of serious casualties.
	Point to point – Final investigation Point to point - Implement	N/A	N/A	High	N/A	N/A	Point-to point trial currently being scoped, with longer-term implementation anticipated.
Best practice infrastructure	Flexible safety barriers – median/mid barrier	High	Moderate-High	N/A	Moderate	Moderate	Should include investigation of 2+1 treatments or other cross-section types. Proportion of head-on crashes is high (~20%) compared with the rest of Australia
	Flexible safety barriers	High	Moderate-High	N/A	Moderate	Moderate	Proportion of run-off-road serious casualties is high

Strategic Direction	Initiative	Measure-specific impact	Overall impact on trauma levels	Longer-term enabler	Likely benefit-to-cost	Resource requirements	Additional Comments/Notes
	- side						(~45%)
	Shoulder Sealing	Low-Moderate (~25% S.C. reduction)	Low-Moderate	Moderate (Preparatory step for flexible barrier implementation	Moderate-High (If gravel shoulders already present)	Moderate (depending upon extent of treatment)	Not regarded as Safe System, but potentially valuable for lower volume roads
Improved safety of young drivers	Investigate ways to encourage young drivers to drive safer vehicles	Moderate-High	Low-Moderate	Moderate	High	Low	DIER to liaise with VicRoads
	Investigate: Night/curfews/ passenger restrictions Increase mandatory 120 hours supervised driving/raise licensing age Mobile phone ban Vehicle power to weight limit for young drivers	N/A	N/A	High	N/A	Low	DIER to liaise with Antonietta Cavallo (VicRoads) DIER to review current GLS and develop updated package based on best evidence
Enhanced vehicle safety	Review and implement Mandatory Safety Standards for Government Vehicles	Moderate	Moderate	Moderate-High	Moderate-High	Moderate	This is a key method for driving a safer vehicle fleet, particularly via private buyer 2nd hand
Complementary Initiatives	Implement alcohol interlocks (Note: for recidivist and high level offenders) Followed by preliminary evaluation of alcohol interlocks	Moderate-High	Low	Low-Moderate	Low-Moderate	Low-Moderate	Important to target both recidivist and high-level offenders Check effectiveness study

Strategic Direction	Initiative	Measure-specific impact	Overall impact on trauma levels	Longer-term enabler	Likely benefit-to-cost	Resource requirements	Additional Comments/Notes
	Research inattention, including mobile phone use and attitudes Investigation of in-vehicle distraction (Note: focussing on a better understanding of the topic)	N/A	N/A	N/A	N/A	N/A	Monitor and evaluate MUARC research Potentially more valuable to focus on improved compliance, particularly for young drivers
	Intelligent speed assistance	Moderate	Moderate	Moderate-High	Moderate-High	Moderate-High	For broad-based installation Prior step is to establish a valid, accurate and updatable map
	Enhanced collection of traffic data	N/A	N/A	High	N/A	N/A	Measure of speed profiles – important safety performance indicator and valuable tool for measuring impact of speed and other measures
	Capacity building and accelerate take up on Safe System thinking by professionals	Low-Moderate	Low	N/A	Moderate	Low	A priority is to help build "Safe system" thinking into professionals' approach to standard setting, design, implementation

* Note: The highlighted initiatives were the high priority initiatives selected to be modelled.
* Note: N/A refers to Not Applicable.

The workshop proved to be highly productive in identifying the "macro" measures that are likely to have the greatest impact in the short to medium term in reducing death and serious injury on Tasmanian roads. Their representation is strongest within the "Safe Speed" and "Safe Roads and Roadsides" pillars of the Safe System but by no means exclusively so. Importantly, a series of measures were also identified that, in their own right, would have little impact on road trauma in the short term, yet would grow in safety influence over time or would help facilitate in the longer term new initiatives that can be directly influential in reducing serious trauma.

The next section describes the application of the model to the identified high-priority measures.

3.2 MODELLING

3.2.1 Key Assumptions

General

The model requires serious casualty numbers (the sum of fatalities and serious injuries) for a baseline period in order to build estimates of serious casualty savings into the future. The reference period chosen for Tasmania was 2007-2009, during which an average yearly total of 50 fatalities and 298 serious injuries were recorded, leading to the baseline of 348 serious casualties that was used.

Predictions were made on the basis of investment over the three-year period of the second Action Plan and, in the case of infrastructure spending, continued investment at the same level to the end of the strategy in 2016. Estimated benefits in serious casualty savings, therefore, have been provided for the three-year period of the second Action Plan as well as for the remaining life of the strategy, given the cumulative effect of many high-impact initiatives.

Safe Roads & Roadsides – mid/side barrier program

Run-off-road crashes constitute around 45% of serious casualties in Tasmania and head-on crashes a further 19%. The potential benefits of a systematic installation program of mid- and side barriers were modelled.

Based on data provided by DIER for these two crash types for the period 2005-2009 inclusive, the road lengths with the highest concentrations of serious casualties per kilometre were examined and the following chosen for treatment over the remaining six years of the strategy:

Head-on crashes: Eleven non-contiguous road lengths totalling 70 km, with a total of 7.2 serious casualties per year along the entire road length.

Run-off-road crashes: Eighteen non-contiguous road lengths totalling 115 km, with an average of 12.6 serious casualties per year along the entire road length.

Based on a cost of $120 per metre of flexible barrier run, the progressive installation over six years of a single mid-barrier for head-on crashes and two runs of side barrier for run-off-road crashes was modelled. No consideration was given for additional investment required per length for any associated road-works necessary to allow these installations. It was assumed that flexible barrier would yield an 85% reduction in serious casualties of the targeted type, but the undoubted effect on run-off-road crashes of mid-barrier was neglected to yield a more conservative estimate of benefits.

The program of works described corresponds to a total investment per annum of $6M ($1.4M in centre barriers and $4.6M in side barriers) based on Net Present Value terms and does not take into account maintenance costs linked to the installation of flexible barrier systems. The timeframe for implementation is over the remaining six years of the current strategy.

Also briefly considered are the implementation of “shoulder sealing plus delineation” and “tactile centre-line” treatments and the serious casualty rates at which break-even occurs when comparing program costs with savings, typically over a 15-year and five-year treatment life respectively.

Safe Speeds – speed limits

Speed zones signed at 60 km/h account for 15% of Tasmanian serious casualties, so speed reductions resulting from all 60 km/h speed limits being changed to 50 km/h at the commencement of the new Action Plan were modelled using Nilsson’s relationships, on the basis of an assumed reduction in mean speed from 40 km/h to 37 km/h. A change in the rural default from 100 km/h to 90 km/h would address an estimated 40% of serious casualties and was modelled as a mean speed reduction of 95 km/h to 90 km/h. These estimated reductions in average travel speeds for differing speed zone settings are based on the work of Elvik and Vaa (2004).

Safe Road Use

A Graduated Licensing Scheme (GLS) was modelled based on projections made by VicRoads for Victoria. An effectiveness of 8% was applied to the 19% of younger driver-involved serious casualties. Key components of the Victorian GLS include 120 hours of supervised practice as a Learner, a four-year probationary period, and passenger and hand-held mobile phone restrictions in year one. A zero blood alcohol law applies across all four years of the probationary period. Benefits were phased in on the basis of program introduction to new drivers in 2011.

3.2.2 Modelling outcomes

The modelling outcomes for the estimated cumulative serious casualty savings for the selected high-priority initiatives are summarised and illustrated in Table 2, Figure 1 and Figure 2, respectively.

Table 2 The estimated cumulative serious casualty savings for the selected initiatives identified for the Second Action Plan (2011-2013) and the remaining strategy life (2011-2016)

Initiative	Estimated cumulative serious casualty savings
Second Action Plan (2011-2013)	
Mid/side barriers	6
Shoulder sealing	2
Tactile centreline	3
Speed limits (100km/h reduced to 90 km/h)	53
Speed limits (60km/h reduced to 50km/h)	27
Graduated Licensing Scheme (GLS)	4
Remaining strategy life (2011-2016)	
Mid/side barriers	35
Shoulder sealing	8
Tactile centreline	12
Speed limits (100km/h reduced to 90 km/h)	117
Speed limits (60km/h reduced to 50km/h)	59
Graduated Licensing Scheme (GLS)	15

It is important to note that the estimated savings in the above table do not represent the total safety gains from the initiatives modelled. Their impact on trauma levels extends well beyond the life of the current strategy.

The results of the modelling, presented pictorially in Figures 1 and 2, point to the significant roles that infrastructure investment and speed reductions especially can play in reducing the number of serious casualties. The results also highlight the way in which the trauma savings increase significantly over the remaining six years of the strategy.

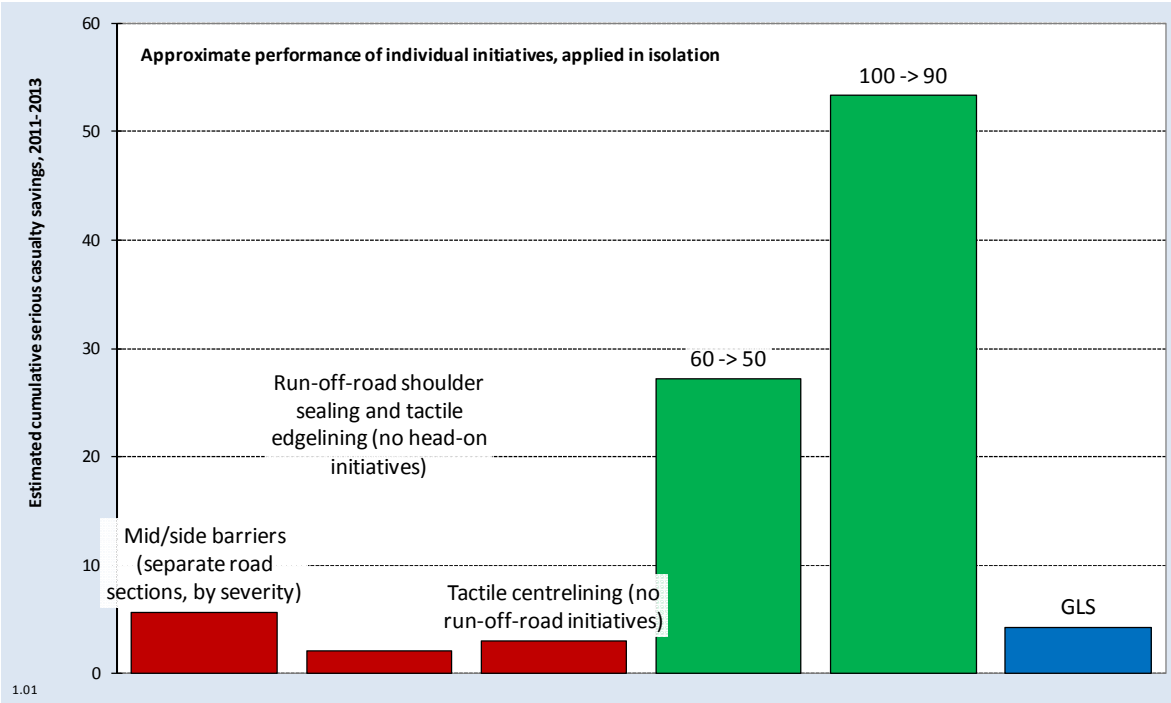

Figure 1 Performance of individual initiatives, applied in isolation for 2011-2013

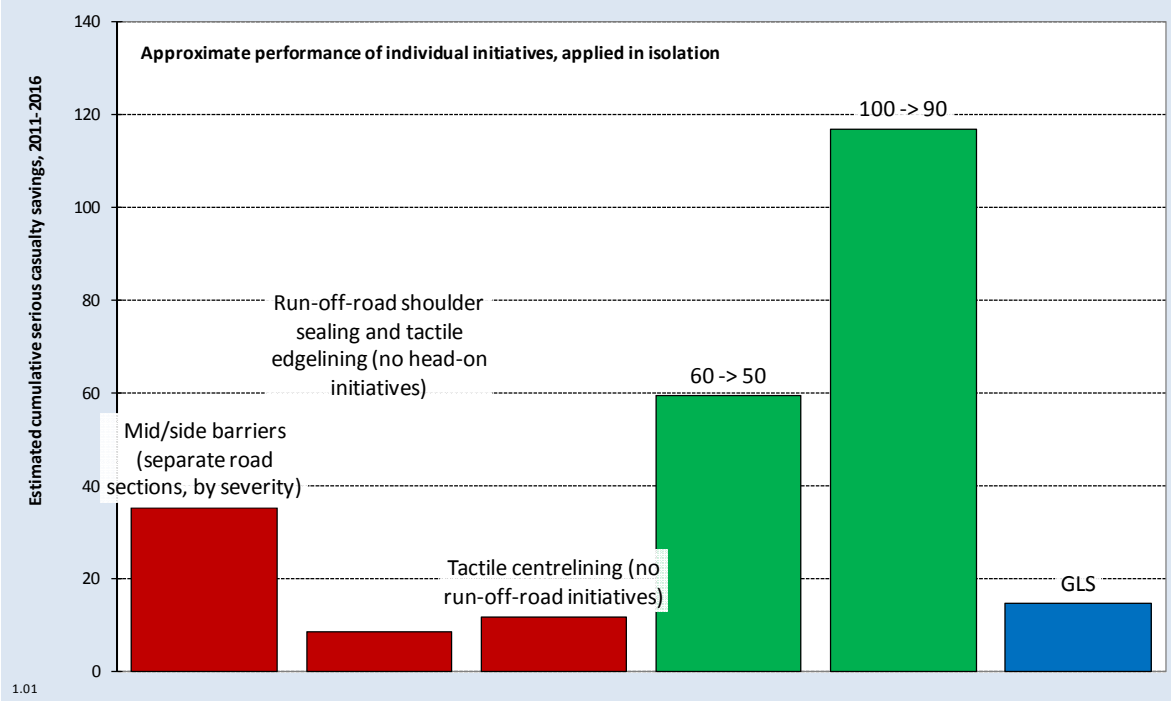

Figure 2 Performance of individual initiatives, applied in isolation for 2011-2016

Past applications of the METS modelling have calculated a number of measures of worth of investment. One of the primary measures applied is an estimate of the average cost per initiative to save one serious casualty. This measure is favoured in that it is regarded as more compatible with Safe System thinking than conventional economic evaluation measures. It has typically been applied as part of strategy formulation with, as its window, a full ten to twelve years of cumulative savings being estimated. However, with the current focus on a three to six year timeframe, it is considered more practical to utilise benefit-to-cost ratios to help inform investment allocation among competing options.

A discussion follows of the implications of the above results for investing cost-effectively across the range of potential interventions in developing and delivering Tasmania's next road safety Action Plan. Consideration is also given to further options that provide impetus to the Strategy in the medium to longer term.

4.0 DISCUSSION

The conduct of the workshop together with the application of a customised model to gauge the safety impact of a number of important safety initiatives serve to provide strong evidence-based guidance in the development of a second Action Plan to reduce significantly the levels of serious trauma on Tasmania's roads over the life of the current strategy and beyond. In particular, the modelling has pointed to the highly influential role that strategic investments in road and roadside infrastructure can deliver together with broad-based reductions in speed limits on the open road and in built-up areas. Each of these measures will be considered in turn, as will the other cornerstones that make up the Safe System.

4.1 ROAD AND ROADSIDE INFRASTRUCTURE

The installation of flexible barrier systems, as either a median or roadside treatment, has been shown to reduce serious head-on and run-off-road crashes by a very substantial 85%. These crash types make up a large proportion of serious casualties and are typically very severe, with young drivers especially over-represented. The barrier treatment options modelled have focused on those sections of the declared road network with the highest crash concentrations per kilometre. The program of works described represents an approximate investment per annum of $6M in present value terms over the remaining six years of the strategy. It is important to note that the safety impact of these treatments extends well beyond the life of the current strategy with an approximate 5% road toll reduction each year upon completion of the works (based on current trauma levels).

But what would be the safety outcome if the barrier investment per annum was doubled for each of the six years? Based on the crash information provided by DIER, it is unlikely that the overall safety impact will also double. This is because the next selection of road links for treatment is likely to have slightly lower serious casualty rates per kilometre of road. This need not mean, however, that it is not worthwhile increasing investments in barrier treatments, as the measure may well still be highly cost beneficial.

In fact, benefit-to-cost estimates (BCRs) for each of the modelled programs of work show favourable outcomes. In the case of mid-barrier treatments tackling head-on crashes, an estimated BCR of 6.3 is realised for an investment of $8.4M in net present value terms. The results of the model are presented for the case where $1.4M is expended per annum over six years. The savings can be brought forward, however, if the investments are doubled and are made over the three years of the next Action Plan ($2.8M per annum over three years).

Similarly, the program of works costing $27.6M targeting run-off-road crashes gives rise to an estimated BCR of 3.4. The serious casualty savings from this program modelled in the previous section assume investments of $4.6m per annum over six years. But once again, the investments could be brought forward to realise the savings at the end of the next three-year Action Plan through an expenditure profile of $9.2m per annum. It should be noted that the above estimates are based on a treatment life of 15 years, the costs of flexible barrier per metre provided represent the total installation costs, an 85% reduction in the target crashes and no account taken of maintenance costs over the life of the treatments.

To summarise, barrier treatment programs are cost-beneficial, comply with Safe System thinking and target the frequently occurring and typically most severe crash types. A potential total investment of $36M has been considered in this study with likely savings estimated based on equal investments over the remaining six years of the strategy. These trauma savings could be brought forward if investment in these two programs is "front loaded" (for example, $12M per annum for each of three years).

Two further road and roadside treatments have been considered that can help reduce the incidence of run-off-road crashes and head-on crashes – " shoulder sealing with edge-lining" and "tactile centre-line" treatments respectively. The former is a costly form of treatment (averaged at $406,000 per km) and, with an assumed 35% effectiveness in reducing run-off-road crashes, will only prove cost-beneficial if it targets road stretches with especially high rates of serious casualties per km per annum (a break-even serious casualty rate of 0.134 was estimated assuming a 15-year treatment life). Accordingly, the widespread implementation of shoulder sealing is not

recommended, although targeting of especially problematic road stretches where barrier treatments are impractical with shoulder sealing may be a viable strategy.

Tactile centre-line treatments, however, do have considerable potential for application to selected road segments, by virtue of their relatively inexpensive cost per kilometre ($5,000) and an assumed potential to reduce head-on crashes by 15%. While they are not a countermeasure that complies with Safe System thinking, they can prove highly cost beneficial for broad-based implementation in instances where barrier treatments are either impractical or not cost-beneficial but where head-on crashes in aggregate are at least moderate in number. Assuming a five-year treatment life, an indicative break-even serious casualty rate from head-on crashes for application of centre-line tactile treatments is 0.012 serious casualties per km per annum - a rate that is exceeded for the bulk of the State Road Network of Tasmania.

Tactically, it is recommended that those sections of the road network be first earmarked where, subject to funding, combinations of centre-barrier and side-barrier can be cost-beneficially applied either within the coming Action Plan or at least within the life of the current strategy. Those remaining sections of the State Road Network with the highest serious casualty rates per km per annum arising from head-on crashes then become the prime candidates for highly cost-beneficial application of tactile centre-line treatments. Generally, roads such as the Midland and Bass highways may well prove to be valuable routes to target in view of their high exposure to the run-off-road and head-on crash problems.

4.2 SPEED MANAGEMENT

With reference to speed management, the relationship between speed and trauma outcomes has been well established (see, for example, a recently updated review by Elvik 2009). Small changes in speed give rise to very significant changes in severe trauma. The broad-based options modelled in this project have focused on those speed zones where the majority of severe crashes occur – 100 km/h and 60 km/h zones. The reduction in average speeds assumed, 5 km/h in 100 km/h zones and 3 km/h in 60 km/h zones are typically those reported in the literature examining the impact of reduced speed limits on speeding behaviour (see Elvik & Vaa, 2004).

Reference to Table 2 in Section 3.2.2 shows that cumulative serious casualty savings are greatest overall for speed limit reductions with the impact in 100 km/h zones approximately double that in 60 km/h zones. These estimates, however, assume that speed limit reductions are introduced at the commencement of the next Action Plan and that the average speed limit reductions achieved are as assumed, based on the available literature. From a road safety perspective, speed reductions via effective mechanisms such as reduced speed limits are very attractive for the following reasons – they are Safe System compliant as they recognise the vulnerability of the human in a crash, they are highly cost-beneficial, and relatively inexpensive compared with infrastructure measures. The introduction of speed limit reductions will be more successful if the community understands the rationale for these reductions and, at least to a degree, accepts the changes as delivering a very significant benefit to the community. Tasmania's pilot program in Kingborough is an excellent example of a measure designed to demonstrate the value of speed limit reductions and to build community support for these measures.

Strategically, the Action Plan provides a platform to foreshadow the introduction of broad-based reductions in speed limits by articulating the societal benefits that will flow and the public education program that will precede it. Professional judgement locally will assess the most appropriate timing for these important measures. Ideally, the introduction of speed limit reduction measures will take place as part of the next Action Plan.

With a view to building speed compliance with the current and any future revisions to the speed zoning regime, it is recommended that an investigation and trial of point-to-point speed camera operations be conducted to assess its value in terms of process and outcome. The principle of measuring average speed over a defined distance rather than the spot speed at a point location is attractive for the following reasons - the speeds measured are more likely to be those resulting from deliberate choice rather than inadvertent behaviour and, as a result, this approach to enforcement is more likely to be accepted by the community on the grounds of fairness. Moreover, an enforcement method that deters persistent speeding behaviour is a very positive step in terms of improving safety.

4.3 ENHANCED VEHICLE SAFETY

There is no doubt that safety outcomes will significantly improve by accelerating the rate at which newer, safer cars enter the vehicle fleet and replace their older, less safe counterparts. Studies by Newstead, Watson and Cameron (2009) show that the safest cars are some 3.9 times safer than the oldest, least safe cars in the Australian fleet. The star rating provided by a series of crash tests performed on the most popular new vehicles within the Australian New Car Assessment Program (ANCAP) provides evidence-based guidance to assist consumers to purchase safer cars.

The relatively slow rate of turnover of the Australian fleet, however, means that the gains in safety outcomes at the "macro" level are incremental and will make no significant impact on trauma trends over the life of the next Action Plan. This is no reason for inaction, however, as the longer-term prognosis is very favourable if the fleet is renewed with cars that can both assist drivers better to avoid a crash or, in the event of a crash, provide a high level of protection both to the vehicle occupants and to other parties involved in the crash. A car that is purchased now without a high standard of built-in safety is an "opportunity lost", as it will be on the road potentially for the next twenty years.

Accordingly, consideration should be given to reviewing and mandating appropriate safety standards for government fleets as part of the next Action Plan. Government leadership will serve a number of key objectives – it will provide a greater level of protection to government employees in the "workplace" of the car under the Occupational, Health and Safety umbrella; it will allow early community access to safe, second-hand cars as the fleet turns over every two to three years and finally, it provides a model for private companies to follow suit and adopt similar fleet leasing or purchasing policies. Development of a model fleet purchase policy that can be promoted for adoption within the commercial sector is recommended.

In terms of effective after-market technologies fitted to vehicles that can further promote safer outcomes, Intelligent Speed Assist (ISA) is a prime example. DIER recognises the potential of this technology and currently has representation on the Australasian Intelligent Speed Assist Initiative – a coalition of jurisdictional representatives with either a stake-hold or interest in progressing the assessment and introduction of ISA. The technology itself deploys GPS tracking to locate a vehicle on the road network by referencing an electronic map with speed limits held on-board the vehicle. If the travel speed of the vehicle exceeds the speed limit then guidance can be provided to the driver to slow down. In some variants of the technology, the vehicle is not permitted to exceed the speed limit. Assessments of the safety impact of this technology have been very favourable (see, for example, Regan et al, 2006; Carsten & Tate, 2001). A first priority in the successful deployment of ISA systems, however, is to have access to an accurate and updateable electronic map of the road network complete with speed limits. Accordingly, the development of such a map would be an important first step and a most worthwhile inclusion for action within Tasmania's new Action Plan.

4.4 IMPROVED SAFETY OF YOUNG DRIVERS

Graduated Licensing Schemes (GLS) have been introduced in a large number of jurisdictions world-wide. A number of schemes have been evaluated and shown to improve the safety of young drivers (see, for example, Senserrick & Whelan, 2003) Their aim is to structure the exposure of novice drivers to increasingly demanding situations as they accumulate experience and as they acquire higher-order skills such as hazard perception and workload management. The scheme introduced in Victoria includes a 120 hours of supervised practice as a Learner, passenger and mobile phone restrictions for year one of licensure and a zero blood alcohol restriction across all four years of an extended probationary period. The estimated impact of the Victorian scheme upon young driver serious casualty numbers has formed the basis for the current modelling exercise.

The savings estimated in Table 2 of the report based on the modelling exercise are comparatively low over the remaining six years of the current road safety strategy. Projections beyond the life of the strategy are positive, nevertheless. As increasing numbers of beginning drivers pass through the scheme, so its influence on safety outcomes will grow. It is recommended, therefore, that Tasmania conduct an assessment of successful schemes and their key features with a view to introducing such a scheme during the life of the current strategy.

Section 4.3 pointed to the potential of safer vehicles to reduce serious road trauma levels. When it comes to young drivers, this potential is greatly magnified. Whelan, Scully and Newstead (2009) estimated that, if young crash-involved drivers had been driving the safest vehicle available of the

same year of manufacture as their crash vehicle, then serious casualty risk would have been reduced by 60%. This result highlights the need to promote among young people and their parents the importance of accessing the safest vehicles that are affordable or available. The Used Car Safety Ratings produced by MUARC (Newstead et al., 2009; Whelan et al., 2009) that assess the real-world crash performance of used cars provides a base list from which a subset of safe and affordable cars can drawn and promoted among key target markets.

4.5 COMPLEMENTARY INITIATIVES

There are a number of important complementary initiatives that were identified during the workshop, each of which is a worthy inclusion within Tasmania's next Action Plan. Each will be considered briefly in turn.

The alcohol interlock is an important technology that can help break the nexus between driving and alcohol. These devices are commercially available and studies show they are effective in reducing the level of drink-driving (see, for example Wills, Lybrand & Bellamy, 2004) while fitted to the vehicle. They are being increasingly deployed in Victoria as a condition for the re-licensing of drivers convicted of drink-driving and an assessment of their potential to be deployed in Tasmania should form part of the next Action Plan.

While technology such as interlocks can make a very positive contribution to safety, technology introduced for recreational or functional purposes such as mobile phones or navigational aids has the potential to adversely affect safety. Against this background, it is appropriate that DIER keeps abreast of the program of research currently being conducted by MUARC on this topic area for Victorian clients. The outcomes of this research can help inform Tasmania's approach to minimising the impact of distraction, within or external to the cabin, upon safety outcomes.

In working towards developing a Safe System, it is contended that the initiatives described above can all play a part. Important, though, will be the need to identify and measure on a periodic basis the success of the strategy in achieving its overall aim as well as its progress within each of the key fields of endeavour, be they road user behaviours such as alcohol or drugs, Safe System compliance of the road network or the speeding behaviour of drivers. Accordingly, a suite of measures (such as periodic speed profiles at select sites) needs to be identified and actioned to assist in the timely and targeted measurement of performance and progress.

Finally, the successful implementation of the long-term strategy requires that those setting policy and those developing and implementing initiatives bring a Safe System philosophy to their work. Successfully achieving this outcome is by no means a simple task, but it is a very worthwhile task. Accordingly, there is a need to develop a program to help shift the thinking of policy and decision makers to align more closely with a Safe System perspective. The implications of this perspective upon design, standards and practice need to be explored within this program.

5.0 CONCLUSION

This study has set out to explore, through workshop participation and impact modelling, key measures to be potentially included in Tasmania's next road safety action plan. Measures deemed "high priority" with a direct safety impact having been assessed, as have measures with longer-term safety potential in their own right or that play a facilitative role for new and effective countermeasures to be introduced at a later date.

Chief among the measures recommended for introduction are barrier treatments to reduce substantially the incidence of two of Tasmania's major crash types; run-off-road crashes and head-on crashes, as well as speed limit reductions on 100 km/h and 60 km/h roads. The former requires significant funding, while the latter relies to some degree upon community acceptance. Both of these measures are Safe System compliant, cost-beneficial and will be key drivers in reducing road trauma at a macro level. Moreover, their impact on safety outcomes extends well beyond the life of the current strategy.

As a complementary treatment targeting the safety of roads, tactile centre-lines can prove a highly cost-beneficial measure. They are well suited to broad-based application in instances where barrier treatments are either impractical or not cost-beneficial but where head-on crashes in aggregate are at least moderate in number. Shoulder sealing treatments, however, in light of their high installation costs, are best reserved for instances where barrier installation is impractical but run-off-road crashes are relatively frequent. Shoulder sealing installation as part of a general road upgrade and improvement program, though, will further the cause of both safety and mobility.

While speed management and safety improvements to the road and roadsides address two key pillars within the Safe System vision, it is critical that the remaining pillars of the system are progressed in parallel. Accordingly, it is recommended that the safety standards for government vehicle fleets be reviewed and upgraded and that a model vehicle purchase/lease policy be developed and promoted for adoption among commercial fleets.

The fourth pillar of the Safe System is road user behaviour. The workshop review of "high priority" countermeasures resulted in recommendations to tackle two of the key problem behaviours – young driver safety and drink-driving.

As in many other jurisdictions, young drivers remain over-involved in severe road crashes. Two measures recommended for introduction into Tasmania to help address this issue are a Graduated Licensing Scheme (subsequent to a review of effective options) and programs to encourage access by young people to the safest cars that are either affordable or available. In order to address drink-driving, the role of technology in the form of alcohol ignition interlocks deployed as a condition of re-licensing for the drink-drive offender was viewed as an important measure for assessment and introduction.

Finally, the need to instil the Safe System philosophy into the thinking of transport decision and policy makers as well as road safety professionals was judged to be of high priority with implications for how policy, standards and practice evolve to provide a safe traffic network for the community to access.

The current study has brought to the fore a number of key measures that, if incorporated into the next road safety action plan, have the potential to reduce significantly the number of serious casualties occurring on Tasmania's roads over the life of the current strategy and well beyond. Their incorporation in the next plan will help bring Tasmania appreciably closer to the long-term vision of creating a truly Safe System.

6.0 REFERENCES

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APPENDIX A: WORKSHOP OUTCOMES

Package	Initiatives	Measure-Specific Impact	Overall Impact on Trauma Levels	Longer-term Enabler – Likely Influence	Likely Benefit-to-Cost	Resource Requirement	Comment	Implementation Priority
Safe Speeds	Lower urban limit for vulnerable road user areas	Moderate	Low-Moderate	Moderate	High	Modest	Selective introduction at high risk locations	High
Safe Speeds	Continue safer speeds demonstrations	N/A	N/A	Moderate-High	N/A	Low	Will help to enable following initiatives	High (until following two achieved)
Safe Speeds	Lower existing 60-50km/h (mainly arterial roads)	High	High (to be modelled)	N/A	High	Moderate	Significant driver of trauma reduction across most road user groups. Achieves synergies with non-safety goals (smooth traffic flow, reduced toxic emissions, urban noise levels and overall health related aspects such as stress and obesity)	High
Safe Speeds	Reduced rural default speed limit	High (see also work of Max Cameron)	High (to be modelled)	N/A	High	Low-Moderate	Once-off costs for public education, etc. Potentially targeting ~50% of S.C.s	High
Safe Speeds	Point to point – finalise investigation Point to point – implement	Moderate-High	Moderate	High	Moderate	High	Point-to-point trial currently being scoped, with longer-term implementation anticipated	High
Safe Speeds	Educate community about impact of speeding Preliminary evaluation effect of reduced rural speed	Low	Low	Moderate	Low-Moderate	Low	Linked to introduction of reduced default rural speed limit	Moderate-High
Safe Speeds	Investigate usefulness of fixed speed cameras	N/A	N/A	Low	N/A	Low	Need to evaluate in the context of a relatively sparse crash distribution	Moderate

Package	Initiatives	Measure-Specific Impact	Overall Impact on Trauma Levels	Longer-term Enabler – Likely Influence	Likely Benefit-to-Cost	Resource Requirement	Comment	Implementation Priority
Safe Speeds	Investigate recidivist speeder issues	N/A	N/A	Low-Moderate	N/A	Moderate (for an investigation)	Proposed area of exploratory research	Low
Safe Speeds	Electronic school speed signs	Low-Moderate	Low	Moderate	Low-Moderate	Moderate	Committed – in progress	Moderate
Best Practice Infrastructure	Flexible safety barriers – median/mid barrier	High	Moderate-High	N/A	Moderate	Moderate	Should include investigation of 2+1 treatments or other cross-section types. Proportion of head-on crashes is High (~20%) cf. rest of Aust.	High
Best Practice Infrastructure	Flexible safety barriers – side	High	Moderate-High	N/A	Moderate	Moderate	Proportion of run-off-road S.C.s is High (~45%)	High
Best Practice Infrastructure	Shoulder sealing Tactile line marking Enhanced delineation	Low-Moderate (~25% S.C. reduction) Low	Low-Moderate? (Model if possible)	Moderate (preparatory step for flexible barrier implementation)	Moderate-High (if gravel shoulders already present)	Moderate (depending upon extent of treatment)	Not regarded as safe system, but potentially valuable for lower volume roads	Moderate-High (depending upon routes selected for implementation)
Best Practice Infrastructure	Intersection design/roundabouts reducing speed leading to intersection	High	Moderate? (to be modelled)	N/A	Moderate	Moderate-High	Relatively low proportion of intersections S.C.s cf. Aust. Consider low-cost roundabouts in local streets	Moderate (due to size of existing problem)
Best Practice Infrastructure	Case study of design work Preliminary design work[1]	N/A	N/A	Moderate-High	N/A	N/A	Used for demonstration purposes to encourage more comprehensive use of further safe system treatments	High
Best Practice Infrastructure	Demonstrate safe system transformation of routes	High	Low	Moderate	Low-Moderate	Moderate	Strategically important for raising general road design standards	Moderate

Package	Initiatives	Measure-Specific Impact	Overall Impact on Trauma Levels	Longer-term Enabler – Likely Influence	Likely Benefit-to-Cost	Resource Requirement	Comment	Implementation Priority
Best Practice Infrastructure	Road safety audits against safe systems principles Promote safe system approach for future road design	N/A	N/A	Moderate-High	N/A	Low	Strategically important for raising general road design standards	Moderate
Best Practice Infrastructure	Community education on the benefits of dividing roads and median barriers[2]	N/A	N/A	Moderate	N/A	Moderate	Should be targeted at raising community acceptance of SS principles	Moderate
Best Practice Infrastructure	Funding for local government – traffic studies on road safety hotspots	Moderate	Low	Low	Moderate	Modest	Need to select consultants carefully	Moderate
Best Practice Infrastructure	Red light cameras or red light and speed cameras	Moderate-High	Low	N/A	Moderate	Moderate-High	Need to review current state of knowledge to better justify program Preference for combination red light/speed cameras Moderate	Moderate
Best Practice Infrastructure	Motorcycle safety measures – infrastructure	Moderate	Low	N/A	Moderate-High (perhaps better if integrated with other investment)	Moderate-High	Most effective in conjunction with general SS treatments that also benefit m/cs	Moderate
Best Practice Infrastructure	Continue $ for $ shared urban spaces[3] Traffic calming pedestrians, cycling measures $ for $ for cycling safety	Moderate	Low	Moderate	Moderate	Low-Moderate	Potential influence on local councils regarding shared space concepts	Low-Moderate
Best Practice Infrastructure	Demonstration site-underground power	N/A	N/A	Low-Moderate	Low	Moderate-High		Low-Moderate

Package	Initiatives	Measure-Specific Impact	Overall Impact on Trauma Levels	Longer-term Enabler – Likely Influence	Likely Benefit-to-Cost	Resource Requirement	Comment	Implementation Priority
Best Practice Infrastructure	Review and rationalisation of existing roadside signage	Low	Low	Low	Low	Low	Should be incorporated with road maintenance	Low
Best Practice Infrastructure	Colour coded line marking for speed zones Guide post speed limit reminder signs	Low	Low	Low	Low	Moderate	Little knowledge of effectiveness of either measure (e.g. conspicuity in poor lighting conditions, colour blindness, etc.) Maintenance issues with colour-coded paint ISA would be an alternative method of addressing issue	Low
Improved Safety of Young Drivers	(Investigate ways to) Encourage young drivers to drive safer vehicles	Moderate-High	Low-Moderate	Moderate	High	Low	DIER to liaise with Vicroads	High
Improved Safety of Young Drivers	Investigate: Night curfews/passenger restrictions Increase mandatory 120 hours supervised driving/raise licensing age Mobile phone ban Vehicle power to weight limit for young drivers	N/A	N/A	High	N/A	Low	DIER to talk to Antonietta Cavallo (Vicroads) DIER to review current GLS and develop updated package based on best evidence	High
Improved Safety of Young Drivers	Road risk reduction in schools[4]	Low	Low	Low-Moderate	Moderate	Low-Moderate	Need integrated approach from early childhood to support this initiative	Low-Moderate

Package	Initiatives	Measure-Specific Impact	Overall Impact on Trauma Levels	Longer-term Enabler – Likely Influence	Likely Benefit-to-Cost	Resource Requirement	Comment	Implementation Priority
Improved Safety of Young Drivers	Learner driver mentor program funding Continue participation/observation keys2drive and VIC P-plate trial[5]	Low	Low	N/A	N/A	N/A	May assist to retain younger drivers in the licensing system	Low
Improved Safety of Young Drivers	Investigate improving supervisor driver standard/professional trainers	Low	Low	Low	N/A	Low	No reliable evidence of effectiveness	Low
Improved Safety of Young Drivers	Linking pre-driver attitude and behaviour to privilege to obtain license[6]	Low	Low	Low	Low	Moderate	Lack of evidence to support	Low
Improved Safety of Young Drivers	Educating young drivers about unlicensed driving	Low	Low	Low	Very Low	Moderate	Strong political support for this initiative	Low
Improved Safety of Young Drivers	Preliminary evaluation of novice reforms	N/A	N/A	N/A	N/A	N/A	Too early to review (perhaps Year 3)	N/A
Enhanced Vehicle Safety	(Review and implement) Mandatory safety standards for government vehicles	Moderate	Moderate	Moderate-High	Moderate-High	Moderate	This is a key method for driving a safer vehicle fleet, particularly via private buyer 2nd hand	High
Enhanced Vehicle Safety	Promote advanced safety features for cars/motorcycles	Low-Moderate	Low-Moderate	Moderate	High	Low-Moderate	Select appropriate crash avoidance and crashworthiness features for maximum benefit	Moderate-High
Enhanced Vehicle Safety	Investigate incentives – fleet owners and operators to purchase vehicles with better crash ratings and safety technology	Moderate	Moderate	Moderate-High	Moderate-High	Moderate	Possible incentives could include Workcover premiums, compulsory 3rd party insurance, etc.	Moderate

Package	Initiatives	Measure-Specific Impact	Overall Impact on Trauma Levels	Longer-term Enabler – Likely Influence	Likely Benefit-to-Cost	Resource Requirement	Comment	Implementation Priority
Enhanced Vehicle Safety	ANCAP	Low-Moderate	Moderate	Moderate	Moderate-High	Low	Existing commitment Support for used car safety ratings also would be highly desirable	Moderate
Enhanced Vehicle Safety	Investigate ways to decrease age of the vehicle fleet	N/A	N/A	Low-Moderate	Low-Moderate	Low	Probably not justifiable on safety alone, but need to build in environmental and other consequences	Moderate
Enhanced Vehicle Safety	Research/Investigate issue of vehicle safety checks pre-sale[7] Educate public – roadworthiness and relation to safety	Low	Low	Low	Low	Moderate	Lack of evidence to support connection between roadworthiness and safety	Low
Complementary Initiatives	Implement alcohol interlocks (followed by preliminary evaluation of alcohol interlocks)	Moderate-High	Low	Low-Moderate	Low-Moderate	Low-Moderate	Important to target both recidivist and high-level offenders Check effectiveness study	High
Complementary Initiatives	Research inattention including mobile phone use and attitudes Investigation of in-vehicle distraction[9]	N/A	N/A	N/A	N/A	N/A	Monitor and evaluation MUARC research Potentially more valuable to focus on improved compliance, particularly for young drivers	High (as a monitoring action)
Complementary Initiatives	Intelligent speed assistance[10]	Moderate	Moderate	Moderate-High	Moderate-High	Moderate-High	For broad-based installation Prior step is to establish a valid, accurate and updatable map	High

Package	Initiatives	Measure-Specific Impact	Overall Impact on Trauma Levels	Longer-term Enabler – Likely Influence	Likely Benefit-to-Cost	Resource Requirement	Comment	Implementation Priority
Complementary Initiatives	Enhanced collection of traffic data[11]	N/A	N/A	High	N/A	Moderate	Measures of speed profiles – important safety performance indicator and valuable tool for measuring impact of speed and other measures	High
Complementary Initiatives	Capacity building and accelerated take up of Safe System thinking by professionals[12]	N/A	N/A	High	N/A	Moderate	A priority is to help build "safe system" thinking into professionals' approach to standard setting, design, implementations	High
Complementary Initiatives	Motorcycle identification[13]	Low-Moderate	Low	N/A	Moderate	Low	Action builds the equity and legitimacy of the enforcement system by removing ability to bypass	Moderate-High
Complementary Initiatives	Engage with and continue to improve cross government approaches to drink-drive and alcohol abuse	N/A	N/A	Low-Moderate	N/A	Low-Moderate	Drink-driving (and drink-walking) can be addressed through broader alcohol usage reduction campaigns	Moderate-High
Complementary Initiatives	(Investigate and implement) lower BAC limit from 0.05 to 0.02 or 0.00	Moderate	Low-Moderate	Moderate	Moderate-High	Low	Careful consideration will need to be given to the choice of 0.02 or zero when implemented Need to check evidence	Moderate-High
Complementary Initiatives	Behavioural research – with RSTF[14]	N/A	N/A	Moderate	N/A	Moderate	RSTF can be a valuable partner in a number of investigations flagged – for example, review of sanctions and investigating value of 0.02 BAC limit	Moderate-High

Package	Initiatives	Measure-Specific Impact	Overall Impact on Trauma Levels	Longer-term Enabler – Likely Influence	Likely Benefit-to-Cost	Resource Requirement	Comment	Implementation Priority
Complementary Initiatives	Enforcement – fund and evaluation effectiveness – change in enforcement practices[15]	N/A	N/A	Moderate-High	N/A	Low	Evaluation of stepped up enforcement practices provides justification for further investments	Moderate-High
Complementary Initiatives	ANPR[16]	Moderate	Low	N/A	Moderate-High	Low-Moderate	An expanded system, if effectively promoted, can help deter level of unlicensed/unregistered driving	Moderate-High (evaluation of deployment worthwhile)
Complementary Initiatives	Evaluation of vehicle sanctions legislation[17]	N/A	N/A	Low	N/A	Low		Moderate
Complementary Initiatives	Review penalties/sanctions for road offences (and action as appropriate) • Rewards and incentives[18] • Link fines with income • Double demerit points – enforcement option[19]	Low-Moderate	Low	N/A	Moderate	Low	Comprehensive review is recommended, taking into account 'certainty', 'severity', and 'swiftness'	Moderate
Complementary Initiatives	Community road safety partnership program[20]	N/A	N/A	Low-Moderate	N/A	Low-Moderate	Community action that produces results needs strong support and 'best practice' guides – monitor current developments in Victoria	Moderate
Complementary Initiatives	Role of medical practitioners in licence retention and use of prescription drugs[21]	Low	Low	N/A	Low-Moderate	Low	MDs have an important advisory role to play as do pharmacists when dispensing drugs Educational role	Moderate

Package	Initiatives	Measure-Specific Impact	Overall Impact on Trauma Levels	Longer-term Enabler – Likely Influence	Likely Benefit-to-Cost	Resource Requirement	Comment	Implementation Priority
Complementary Initiatives	Evaluate new national road safety strategy for TAS initiatives	N/A	N/A	Moderate	N/A	Low	National strategy still under development with aspects no doubt of value in guiding action plan development	Moderate Subject to strategy's timely availability
Complementary Initiatives	Motorcycle good gear guide	Low	Low	Low	Moderate	Low	Success depends on availability, pricing and styling of appropriate gear. Also need a minimum standard	Low-Moderate
Complementary Initiatives	Motorcycle public education campaigns	Low	Low	N/A	Low-Moderate	Low	Campaigns should be very precisely targeted at high-impact initiatives, e.g. motorcycle ABS, safe clothing	Low-Moderate (if targeted as per comment)
Complementary Initiatives	Greater police involvement with motorcyclists	Low	Low	Low	Low	Low-Moderate	Need to consider opportunity cost to police	Low
Complementary Initiatives	Raise awareness: motorcycle refresher training/returning rider issue[22]	N/A	N/A	Low	N/A	Low-Moderate	Monitor developments in other states (Victoria) Potentially linked to the next initiative	Low
Complementary Initiatives	Review motorcycle rider training and licensing	N/A	N/A	N/A	N/A	Low-Moderate	Monitor developments in other states (Victoria)	Low
Complementary Initiatives	Continue use of VSL and weather/time based signs Electronic message signs	Moderate	Low	Low	Moderate	Moderate		Low
Complementary Initiatives	Road kill education[23]	Low	Low	N/A	Low	Low - signage	Very low likely impact on safety	Low

Package	Initiatives	Measure-Specific Impact	Overall Impact on Trauma Levels	Longer-term Enabler – Likely Influence	Likely Benefit-to-Cost	Resource Requirement	Comment	Implementation Priority
Complementary Initiatives	Stopping traffic around school buses	Low-Moderate	Low	N/A	Moderate	Costs need to be established first	First, there is a need to establish the benefits and likely costs of this measure elsewhere before advocating one way or the other	Priority subject to assessment
Complementary Initiatives	Fund further high visibility police car purchase	Moderate	Low	N/A	Moderate	Low-Moderate	Safety impact relates to the degree to which targeted but unpredictable enforcement is significantly increased via these purchases	Variable (subject to provisos stated)

Additional notes:

1 For DIER internal use – not to be ranked

2 Aimed at motorcyclist issues and trade-off between access and safety in rural areas

3 Traffic calming in High pedestrian activity areas

4 Existing resource – counts towards TCE. Currently taken up by ~60% of schools

5 Already in progress. Not to be evaluated.

6 Liberal Party policy. Based on practices in Alabama implying a relationship between school attendance/behaviour and driving suitability

7 Upon transfer of ownership (similar to Vic. System)

8 For recidivist and High-level offenders.

9 Focusing on a better understanding of this topic

10 Conduct an ISA trial. Has been put on hold due to funding limitations

11 Better collection of speed data. For funding of DIER to conduct.

12 Within procurement and program management in particular

13 Front number plates, eg.

14 RSTF = Road Safety Task Force. Could be used as a vehicle for the conduct of behavioural research in conjunction with DIER

15 Effect of changing enforcement practices.

16 Expand existing program

17 Wheel clamps, etc.

18 Seeking opportunities for rewards to complement penalty regimes

19 Not currently implemented

20 Translation of state-based initiatives to local level. Enabling initiative

21 Investigate.

22 Assume *public* awareness.

23 Look out for animals.