



Road Safety Audit Report



Location: **1-27 Princes Highway, Dandenong South**

Project: **Access Arrangements**

Audit Stage: **Functional Stage**

Client: **Impact**

Report Issue Date: 30 April 2024

RSA Reference: 15795



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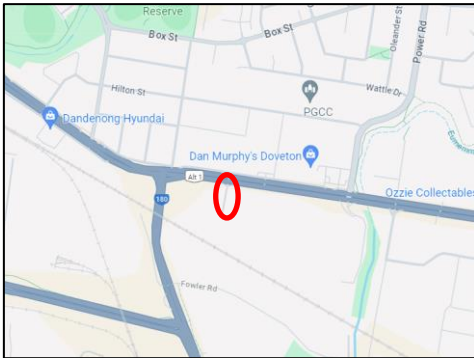
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Road Safety Audit Report

1-27 Princes Highway, Dandenong South Impact

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Google Maps

Document Record

Revision	Delivered	Road Safety Auditors	Contact
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PROJECT BACKGROUND

INTRODUCTION

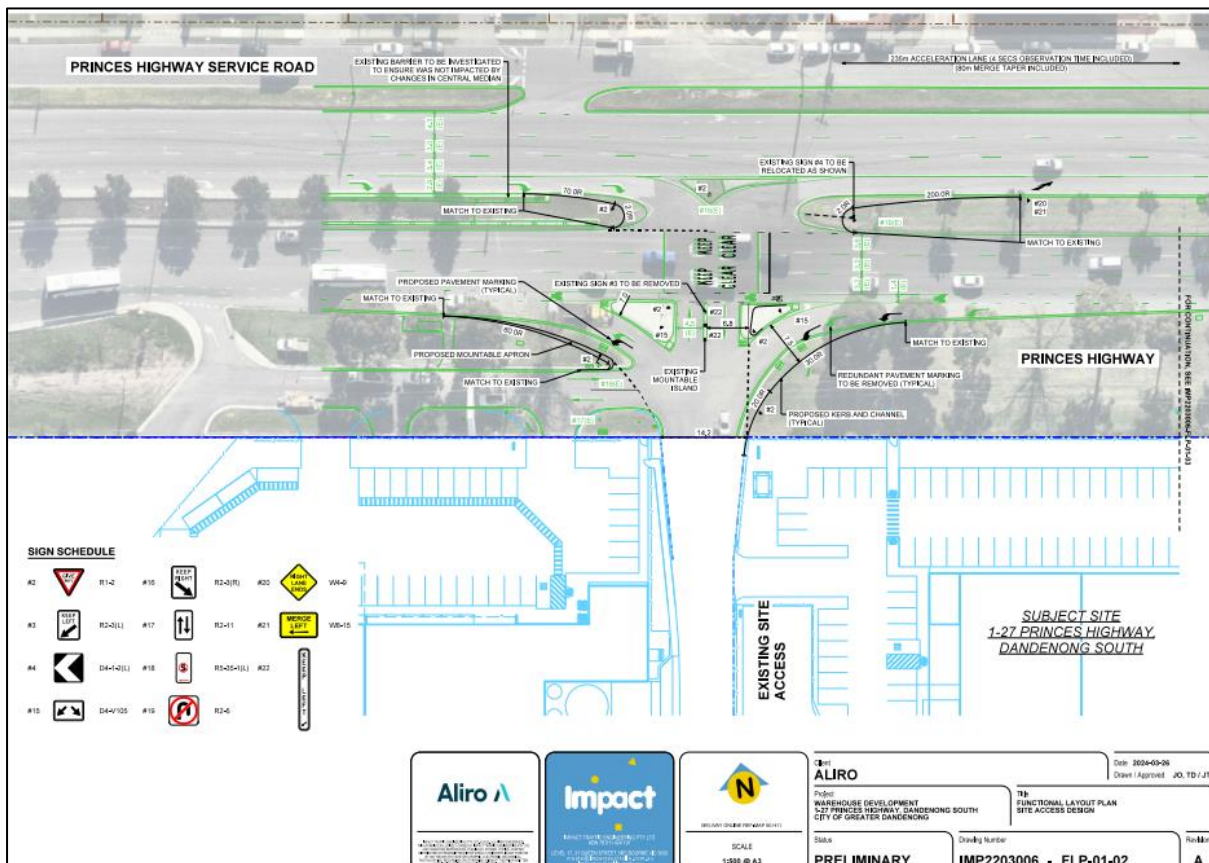
This is a functional design stage road safety audit of access arrangements at 1-27 Princes Highway, Dandenong South.

The audit has been undertaken by Road Safety Audits, commissioned by Impact.

It has been carried out in accordance with "Austrroads Guide to Road Safety, Part 6 Road Safety Audit 2022" guidelines.

PROJECT

The property at 1-27 Princes Highway will be undergoing redevelopments. As part of this, the existing access/egress lanes are modified to accommodate heavy vehicle movements(B - doubles). The project also involves signage and line marking upgrades.



Site layout plan

LOCATION AND ROAD CONDITIONS

Princes Highway along the subject site is a median divided multi lane road in th east -west direction. The existing access caters for ingress and egress traffic movements in both directions through giveway priority control. There is a cycle lane along westbound Princess Highway at the subject site and also a bus stop ~35m west of the site access. The speed limit along this section is 80km/h.



Westbound along Princes Highway (Arrow indicates subject site access)



Eastbound along Princes Highway at the subject site access



Looking northeast at the site access



Looking north at the site access



Looking northwest at access



Looking northwest towards the service road

PROJECT-SPECIFIC AUDIT FOCUS

The audit has contemplated issues associated with the project, including but not limited to the following:

- Increase in site traffic

As per client correspondence negligible increase in site traffic post development is expected.

- Site access / intersection readability

No issues identified.

- Auxiliary turn lanes

The auxiliary turn lane dimensions are consistent with Austroads Guide to Road Design (AGRD)4A. The eastbound Princes Highway acceleration lane length is 235m. AGRD 4A recommends 320m for truck acceleration lane at 60km/h merge speed (20km/h speed reduction on the through traffic speed is accepted for trucks). However, the design meets the recommended length for cars to accelerate to the 80km/h posted speed limit as per AGRD 4A extended design domain - Appendix 10 and is a significant improvement on the existing condition.

- Turn controls and potential conflict points

The existing site ingress and egress vehicle movements remain unchanged.

- Sight distance

No issues identified.

- Intersection lighting

See audit points section for further discussion.

- Horizontal and vertical alignment factors

The alignment is generally straight with a flat terrain. No issues identified.

- Roadside hazards

The offset to the tree on the eastside of the site access is reduced ~1m due to the left slip lane widening. However, the increase in risk is minimal given the low turning speed.

- Signs and line marking

See audit points section for further discussion.

COMMENCEMENT MEETING

Email correspondence between RSA and the client.

CONSTRAINTS AND EXCLUSIONS

- This audit may cover lighting issues, but is not a formal lighting assessment to AS1158.

CONDUCT OF THE SITE INSPECTION

A site visit was carried out day and night on 22/04/24 by drive throughs and on foot. The weather was fine at the time.

DOCUMENTATION PROVIDED FOR THE AUDIT

The following documents were provided by the client to facilitate the audit:

- Functional layout plan No.: IMP 2203006 – FLP 01 to 05 Rev A
- Document no: IMP 2203006 LET01F01

AUDIT FINDINGS AND RECOMMENDATIONS

1. Give – way control

The existing left turn site egress towards westbound Princes Highway has no 'give-way' control and gives the impression of a *free left* with minor pavement widening to accelerate and merge. Egressing vehicles (especially heavy vehicles) may find it difficult to merge safely in this high-speed environment, increasing the risk of various traffic conflicts.



Westbound left egress lane

Risk Rating (Austroads GRS6)

Risk Rating: Unlikely (3-7Y) + Minor = Low

Recommendation

Provide 'give-way' line marking and signage.

2. Trees

The site ingress left slip lane along westbound Princes Highway is widened on the southside (red line) to accommodate heavy vehicle movements. The low hanging branches on the left side tree may create nuisance impact issues with the turning vehicles.



Princes Highway ingress left slip lane

Risk Rating (Austroads GRS6)

Risk Rating: Unlikely (3-7Y) + Minor = Low

Recommendation

Review. Trim low branches as needed.

3. Lighting

There are no street lights in the immediate vicinity of the subject site. The area was poorly illuminated at night. Vehicles ingressing/egressing from the site may not be conspicuous at night, increasing the risk of various conflicts.



Princes Highway westbound

Risk Rating (Austroads GRS6)

Risk Rating = Unlikely (3-7Y) + Moderate = Medium

Recommendation

Consider intersection lighting if project is increasing heavy vehicle movements outside day light hours.

FINALISATION

CONCLUDING STATEMENT

- The audit has attempted to balance the safety needs of all road users within the site/design constraints. As per Austroads guidelines, the recommendations provided have attempted to be realistic, feasible, and commensurate with the risk posed.
- The audit attempts to raise all potential safety risks, however at times this is not possible due to a limited knowledge of the site and the design.
- Agreement to the issues and/or suggestions does not necessarily eliminate risk.
- The project team should incorporate audit findings into the broader design process and ask the audit team further questions where necessary.

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RESPONDING TO THE ROAD SAFETY AUDIT

The audit findings should be carefully considered in combination with the knowledge and insight from the responding entity (client) and other stakeholders. The responding entity does not have to agree to the audit findings; however, a written response should be made to the audit findings raised. When responding to the audit, the responding entity is encouraged to focus on the 'audit finding', not the 'recommendations'. This is due to various options usually being available and Road Safety Audits having limited knowledge of the project background and constraints.

Road Safety Audits does not change the substance of the audit findings, or sign off on the responses from the responding entity. However, the client is encouraged to provide the responses to RSA to check that each audit point has been fully understood.

ROAD SAFETY AUDIT BACKGROUND

ROAD SAFETY AUDIT: OVERVIEW

A road safety audit is an independent examination of a design or condition to evaluate potential safety issues for all road user types. It is carried out by a team of suitably qualified people, typically comprising at least one engineer, and can provide recommendations for consideration by the client. It combines the experience of the individual team members with contemporary evidence-based knowledge on road crash types and countermeasures. It uses the principles of Austroads Guide to Road Safety Part 6: Road Safety Audit 2022 and DOT (VicRoads) / Austroads guidelines and standards as references where relevant. A road safety audit is not a checklist or a check of compliance to standards.

ROAD SAFETY AUDIT TEAM AND QUALITY ASSURANCE

The road safety audit was carried out by Robin Mathew and Peter Harris. Robin Mathew and Peter Harris both carry out road safety audits full-time in various states of Australia and have extensive experience in all stages of road safety audits, leading or participating in several hundred audits and risk assessments every year.

Road Safety Audits is accredited for the conduct of road safety audits under VicRoads' professional services register. Peter Harris is an accredited Senior Road Safety Auditor under VicRoads pre-qualified senior road safety audit scheme. Robin Mathew is an accredited Road Safety Auditor under VicRoads pre-qualified road safety audit scheme.

Road Safety Audits' quality assurance process encompasses three key areas:

- Staff: Utilising highly experienced road safety practitioners
- Staff: Customising the audit team for the project to inject the necessary skill-set.
- Processes: Utilise customised checklists designed for niche areas in traffic engineering and road design such as safety barriers, public transport hubs, CBD / inner-urban, and cyclists.
- Training: Regular in-house and external training.
- Review: Up to four-layer review: 1. On-site auditor evaluation; 2. Media and data review; 3. Specialist auditor input; and 4. Blinded reviews.

AUDIT TYPE

A functional design stage road safety audit tends to examine the broad design for more fundamental issues that can't be changed later by minor signs or linemarking changes. This includes intersection layouts and types, horizontal and vertical alignments, access points, and all road user groups.

SCOPE: GENERAL

Road Safety Audits utilises a high experience base and focus on high-level fundamental safety issues affecting road safety, based on likely road user behaviour and expectations.

Checking compliance to road design guidelines is incorporated within the audit but forms a secondary consideration. "A Road Safety Audit is not a check of compliance to standards. Rather than checking for compliance, a road safety audit is checking fitness for purpose: will the road or treatment work safely for its expected road users?" (AGRS RSA 2022).

The scope is generally limited to the *safety* effects of the proposed changes, and does not look beyond the limits of works to try to improve substandard conditions outside of the general scope of the works.

Where suggestions are provided, they are made from a safety perspective only, and are made in the absence of full project knowledge and design constraints. Road Safety Audits can provide a detailed risk assessment / issue evaluation report upon request.

Generally, a road safety audit only raises *issues* and does not discuss design elements if they are *not* safety issues. i.e. if a topic (such as 'drainage') is not mentioned, then it means that there are no issues of concern on that topic.

SCOPE: SAFE SYSTEM

Austrroads guidelines encourage practitioners to adopt safe system principles within design and within road safety audits. Safe system (roads) calls for a design to not allow serious injury and fatalities to occur for the expected road users and the typical crash types expected for that design type. This design-objective is considered within this road safety audit and is detailed in the Risk Ratings section. However, a road safety audit by definition is not a 'Safe System Assessment'.

REFERENCES

Relevant guidelines, standards, codes, road rules, and policy documents, including:

- Austrroads Guide to Road Safety Part 6 – Road Safety Audit – 2022
- State-specific road safety audit guides where applicable (e.g. NSW *Guidelines for Road Safety Audit Practices*)
- Austrroads Guide to Road Design Series (AGRD)
- Austrroads Guide to Traffic Management Series (AGTM)
- Austrroads Guide to Road Safety Series (AGRS)
- Miscellaneous Austrroads Publications relating to road trauma, crash causality and statistics, traffic engineering treatments and Safe System
- AS 1742 Manual of Uniform Traffic Control Devices
- State road authority supplements to above documents
- State road authority technical publications including standard drawings, road design notes and other publications
- Other industry knowledge as disseminated through industry conferences, seminars, workshops via organisations including Austrroads, ITE, ACRS, AITPM, TMAA and IRF

RISK RATINGS

Austrroads Road Safety Audit Part 6 suggests that the organisation responding to the audit uses the following risk assessment method as a tool to give an indication of risk. Road Safety Audits will typically offer its own evaluation of risk for the responder to use as a guide.

Figure 10.2: Austrroads RSA risk matrix

		Severity*					
		Insignificant	Minor	Moderate	Serious	Fatal	
		Property damage	Minor first aid	Major first aid and/or presents to hospital (not admitted)	Admitted to hospital	Death within 30 days of the crash	
Likelihood (includes exposure)	Almost Certain	One per quarter	Medium	High	High	Extreme (FSI)	Extreme (FSI)
	Likely	Quarter to 1-year	Medium	Medium	High	Extreme (FSI)	Extreme (FSI)
	Possible	1 to 3 Years	Low	Medium	High	High (FSI)	Extreme (FSI)
	Unlikely	3 to 7 Years	Negligible	Low	Medium	High (FSI)	Extreme (FSI)
	Rare	7 years+	Negligible	Negligible	Low	Medium (FSI)	High (FSI)

*see Severity Guidance Sheet

Safe System crash outcome threshold

Figure 10.3: The severity guidance sheet – to be used with the risk matrix (Figure 10.2)

		Crash Speed (km/h)									
		< 10	10	20	30	40	50	60	70	80	90
Crash Type	Pedestrian (vs HV)	Fatal Serious Injury Moderate Injury Minor Injury									
	Cyclist (vs HV)										
	Motorcyclists (vs HV)										
	Pedestrian (vs car)										
	Cyclist (vs car)										
	Pole/Tree Impact (car)										
	Motorcyclists (vs car)										
	Side Impact (HV vs car)										
	Side Impact (car vs car)										
	Head On (HV vs car)										
	Head On (car vs car)										

"The corresponding priorities for mitigation are categorised as:

- Negligible – no action required
- Low – should be corrected or the risk reduced if the treatment cost is low
- Medium – should be corrected or the risk significantly reduced, if the treatment cost is moderate, but not high
- High – should be corrected or the risk significantly reduced, even if the treatment cost is high
- Extreme – must be corrected regardless of cost.

No definitive guidance can be given as to the respective monetary values of the terms 'low', 'moderate' or 'high' regarding treatment costs, but it is expected that consideration against the total project cost would be an important factor when categorising mitigation of each risk." (AGRS-RSA2022)

Furthermore, suggested recommendations are given a safe system treatment ranking as follows:

Primary Treatment	<ul style="list-style-type: none"> • Road planning, design and management considerations that practically eliminate the potential of fatal and serious injuries occurring in association with the foreseeable crash types
Supporting (step towards)	<ul style="list-style-type: none"> • Road planning, design and management considerations that improve the overall level of safety associated with foreseeable crash types, but not expected to virtually eliminate the potential of fatal and serious injuries occurring • Improves the ability for a Primary Treatment to be implemented in the future
Supporting Treatment	<ul style="list-style-type: none"> • Road planning, design and management considerations that improve the overall level of safety associated with foreseeable crash types, but not expected to virtually eliminate the potential of fatal and serious injuries occurring • Does not change the ability for a Primary Treatment to be implemented in the future
Non-Safe System Treatment	<ul style="list-style-type: none"> • Road planning, design and management considerations that are not expected to achieve an overall improvement in the level of safety associated with foreseeable crash types occurring • Reduces the ability for a primary treatment to be implemented in the future

A risk cannot always be assigned to an issue when there is a highly indirect relationship between the issue 'leading to a crash'. However, the issue may still be *important* for the design, the project, general safety and amenity. Other common language used and its meaning are as follows:

- '**Urgent**': Needs immediate attention / changes as per RSA suggestion or similar.
- '**Recommend**' / '**Serious**' / '**Important**': Must be robustly reviewed. Most likely requires a change to avoid a high-risk road environment for one or more user groups.
- '**Should**' / '**Suggest**' / '**Significant**': Based on the view of the RSA team the suggestion should be done, but it concedes that there could be reasons why inaction or alternative action is equally correct. Must be robustly reviewed by contractor and where relevant key traffic engineering project stakeholders.
- '**Review**' / '**Consider**': RSA is raising an observation but has no *strong* opinion on need for changes due to limitations in knowledge on the site / design / constraints.
- '**Minor**': Typically, a low road-safety consequence / compliance issues (to guidelines or plans) / administrative controls. Unlikely to increase risk of crash.
- '**Note**': Little or no road safety significance. Typically added to give a complete picture of the design, site, context, analysis, auditors understanding.



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