ST MARYS FREIGHT HUB

FORRESTER ROAD: ACCESS DRIVEWAY TO GLOSSOP STREET
ROAD SAFETY AUDIT

FOR

PACIFIC NATIONAL

Gold Coast
Suite 26, 58 Riverwalk Avenue
Robina QLD 4226
P: (07) 5562 5377
W: www.bitziosconsulting.com.au

Brisbane
Level 2, 428 Upper Edward Street
Spring Hill QLD 4000
P: (07) 3831 4442
E: admin@bitziosconsulting.com.au

Sydney
Studio 203, 3 Gladstone Street
Newtown NSW 2042
P: (02) 9557 6202

Project No: P3796 Version No: 001 Issue date: 9 December 2019

DOCUMENT CONTROL SHEET

Issue History

Report File Name	Prepared by	Reviewed by	Issued by	Date	Issued to
P3796.001R St Marys Freight Hub RSA.docx	A. Ahmed	A. Finlay	A. Finlay	6/12/2019	Ben Keith Ben.keith@bgeeng.com.au
P3796.002R St Marys Freight Hub RSA	A Ahmed	A Finlay	A Finlay	9/12/2019	Ben Keith Ben.keith@bgeeng.com.au

CONTENTS

1. INTRODUCTION

1.1 BACKGROUND

Bitzios Consulting has been commissioned by Pacific National to undertake a Road Safety Audit (RSA) of the proposed heavy vehicle driveway access for the St Marys Freight Hub in Forrester Road, St Marys. The audit also covers the proposed route for B-double vehicles along Forrester Road from the driveway to the Glossop Street intersection, St Marys.

The audit is limited to key roads, and pedestrian and cycle routes, around St Marys Train Station including Forrester Road, its intersection with Harris Street, the proposed driveway location for the Freight Hub and the roundabout immediately adjacent to the train station.

The heavy vehicle access to the site has assumed the following:

- a two-way driveway on the western side of Forrester Road immediately south of the Harris Street intersection;
- provision for simultaneous arrival and departure of 26m long B-Double trucks (right turn into and left turn out of, the driveway);
- the movement of B-Doubles along Forrester Road between the proposed driveway and the Forrester Road/Glossop Street intersection; and
- a maximum of 15 B-double movements per hour into the driveway, and 15 B-double movements per hour out of the driveway.

The Road Safety Audit (RSA) was requested to determine any road safety issues along the study section. This report summarises the findings of the road safety audit.

1.2 SCOPE OF THE AUDIT

The road safety audit was undertaken in accordance with the procedure set out in the Austroads Guide to Road Safety Audit Part 6: Road Safety Audit (2009). The audit involved undertaking a *Concept Design Road Safety Audit* for the areas shown in Figure 1.1.

The following items were reviewed from an operational road safety perspective:

- sight distances and grades;
- signs and pavement markings;
- roadside objects and hazards; and
- drivers' sight distance to pedestrians and cyclists.

The scope of road safety audit included reviewing the B-Double access swept path drawing (see Appendix A).

This road safety audit details a list of safety issues identified during the site visit that present a road safety risk.

Source: Google Maps

Figure 1.1: Site Access and Audit Section

2. ROAD SAFETY AUDIT PROCESS

2.1 DEFINITIONS

The Austroads Guide to Road Safety Audit Part 6: Road Safety Audit (2009) defines a road safety audit as:

"a formal examination of a future road or traffic project or an existing road, in which an independent, qualified team reports on the project's crash potential and safety performance"

The essential elements of this definition are:

- a formal process and not an informal check;
- an independent process;
- carried out by someone with appropriate experience and training; and
- restricted to road safety issues.

The objectives of a road safety audit are:

- to identify potential safety problems for road users and others affected by a road project; and
- to ensure that measures to eliminate or reduce the problems are considered fully.

The benefits of a road safety audit are:

- the likelihood of accidents on the road network can be reduced; and
- the severity of accidents can be reduced.

The aim of a road safety audit is:

"to identify any existing deficiencies of design, layout and road furniture which are not consistent with the road's function and use. There should be a consistency of standards such that the road users' perception of local conditions assists safety behaviour."

2.2 METHODOLOGY

The road safety audit was carried out as per the procedures set out in the Austroads Guide to Road Safety Audit Part 6: Road Safety Audit (2009). Items audited as part of this road safety audit included (but was not limited to) the following:

- sight distances and grades;
- drivers sight distances to pedestrian and cyclists;
- signs and pavement markings; and
- roadside objects and hazards.

2.3 AUDIT TEAM

The road safety audit was carried out by an audit team comprising:

- Alan Finlay – NSW Level 3 Lead Road Safety Auditor;
- Arif Ahmed - Level 2 Road Safety Auditor (team member).

Both auditors are completely independent from the study team which prepared the *St Marys Freight Hub Traffic and Transport Assessment Report*.

2.4 INFORMATION SOURCES

Information sources for the road safety audit included:

- Swept path diagram referred to with this RSA, as attached in Appendix A;
- Australian Standards publications;
- Austroads Guide to Road Design publications; and
- Austroads Guide to Road Safety publications.

2.5 SITE INSPECTIONS

2.5.1 Site Visits

Day time (1600 to 1800) and night time (1945 to 2030) site inspections were carried out as part of the RSA. Both inspections were carried out on 2 December 2019, and covered the afternoon commuter peak period and early evening period. The weather on the day was fine and visibility was good.

The purpose of the site inspections was to determine the existing geometry, gradients, illumination and sight lines potential safety issues and their impact on the proposed amendments to the road geometry.

Prior to the site inspections, a desktop review was undertaken of the B-Double swept path diagram for access to/from the site.

2.6 AUDIT HISTORY

The audit team is unaware of any previous audits undertaken for this project.

2.7 RISK ASSESSMENT

The issues identified have been prioritised based on Austroads' standards risk assessment. The risk level is based on a combination of the frequency that a crash type will happen by the severity of the resulting crash. Table 2.1 below is from the Austroads Guide to Road Safety, Part 6.

Table 2.1: Risk Matrix

Severity	Frequent	Probable	Occasional	Improbable
Catastrophic	Intolerable	Intolerable	Intolerable	High
Serious	Intolerable	Intolerable	High	Medium
Minor	Intolerable	High	Medium	Low
Limited	High	Medium	Low	Low

Source: Austroads Guide to Road Safety Part 6 Road Safety Audits

3. CONCEPT DESIGN ROAD SAFETY AUDIT

This section summarises the safety issues identified during the audit. The audit findings are presented in Table 3.1 below.

3.1 AUDIT FINDINGS

The entire section of Forrester Road south of Glossop Street was audited.

Issues identified during the audit are documented in Table 3.1. The 'Response' column has been completed by Pacific National. Key findings from the audit are itemised as follows

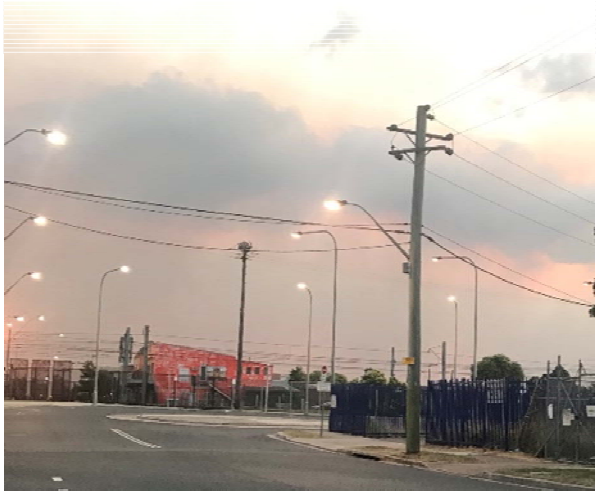
- In general, pedestrian and cyclist volumes were very low, especially on the western footpath of Forrester Road. There is no natural pedestrian desire line from the western side of the roundabout at the southern end of Forrester Road, so most pedestrians use the eastern footpath. In this location, there would be no conflict between pedestrian and the proposed B-double vehicles.
- Forrester Road is lightly trafficked and is suitable for B-double operation, including the proposed turning movements at the intersection of Glossop Street.
- Most alighting train passengers proceeded to the large commuter car park, and do not use the Forrester Road footpaths.
- The bus stop at the station was not observed to be used by buses in the afternoon or evening when the site visits were undertaken. According to bus timetables, the stop is only used occasionally in the early morning (services at 0620, 0650, 0720 and 0802) and for train replacement buses. This is a very small volume of buses an d the probability of a bus turning movement at the roundabout occurring at the same time as a B-Double entry or exit would be extremely small. Cars were observed to park briefly in both the bus stop and the taxi zone while dropping off or picking up train passengers but this did not create any conflicts with buses or taxis.
- There was low to medium Kiss and Ride activity at the roundabout. B-Doubles either entering or exiting the site would be required to yield to the small volume of circulating cars if they were present in the same location at the same time, which would have a low probability of occurring. These would all be very low speed movements given the geometry of the area.
- There were very few cyclists, and most of these were observed to ride along the eastern footpath. Very few, if any, cyclists would be expected to depart the station via Forrester Road around the roundabout and past the proposed access location.

Table 3.1: Road Safety Audit Findings

Item	Issue	Risk	Site Illustration	Response on behalf of Pacific National
1	There are two speed limit signs within 12 metres of each other. One is 'End School Zone – 50'; facing north immediately north of Harris Street. The other is a 10km/h speed limit sign (without any supplementary plate) facing north at the entry to the roundabout, as shown in the photo with red circles. Two speed limit signs are within close proximity of each other and would confuse drivers. In the event drivers miss, or ignore the 10km/h sign, they would continue to travel at 50km/h. The higher speed may pose potential safety risks with the road users near the station access.	L	 	Penrith City Council remove the 10 kph sign on the understanding that it is non statutory in NSW as a stand alone sign.

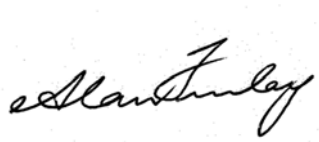
Item	Issue	Risk	Site Illustration	Response on behalf of Pacific National
2	There is a potential sight distance issue for exiting heavy vehicles viewing traffic circulating on the roundabout. Some fencing may require removal or replacement with a more suitable type. The red lines in the second image show the sections of fence that would require modification or removal to meet sight line requirements.	M	 	As part of detailed design development considerations fencing will be removed and/ or replaced with a more suitable type and style to preserve sight line integrity.

Item	Issue	Risk	Site Illustration	Response on behalf of Pacific National
3	There could be potential confusion over an incoming heavy vehicle's right turn indicator. It might be interpreted by nearby road users as intention to circulate around the roundabout. The likelihood of this risk is low due to low traffic volumes and the consequences are also low due to the slow speed environment and the slow speed of B-Doubles making this turn.	L	(Not applicable)	Noted that this is considered very low risk due to low speed environment and low traffic volumes.
4	As shown in the swept path diagram, the driveway would need to be very wide if an incoming and outgoing B-double were to operate simultaneously. The power pole immediately north of the driveway would require relocation in order to allow the driveway to be widened. This pole carries High Voltage cables.	Note		Refer to "Heavy Vehicle and Transport Analysis Summary Report" at which a concpet design is provided in reposne to this concern.

Item	Issue	Risk	Site Illustration	Response on behalf of Pacific National
5	There is a very high standard of street lighting in the vicinity of the station and the roundabout. One of these streetlights would be eliminated if the High Voltage power pole (see 4. above) were removed, but that would still leave eight lights remaining, which would be sufficient.	Note		Noted

4. CONCLUDING STATEMENT

We have examined the sites and the plans provided. The audit has been carried out to identify any features of the project which could be altered or removed to improve safety. Recommendations have not been suggested and the design team should provide suggested responses in the table above to reduce the possibility of crashes.

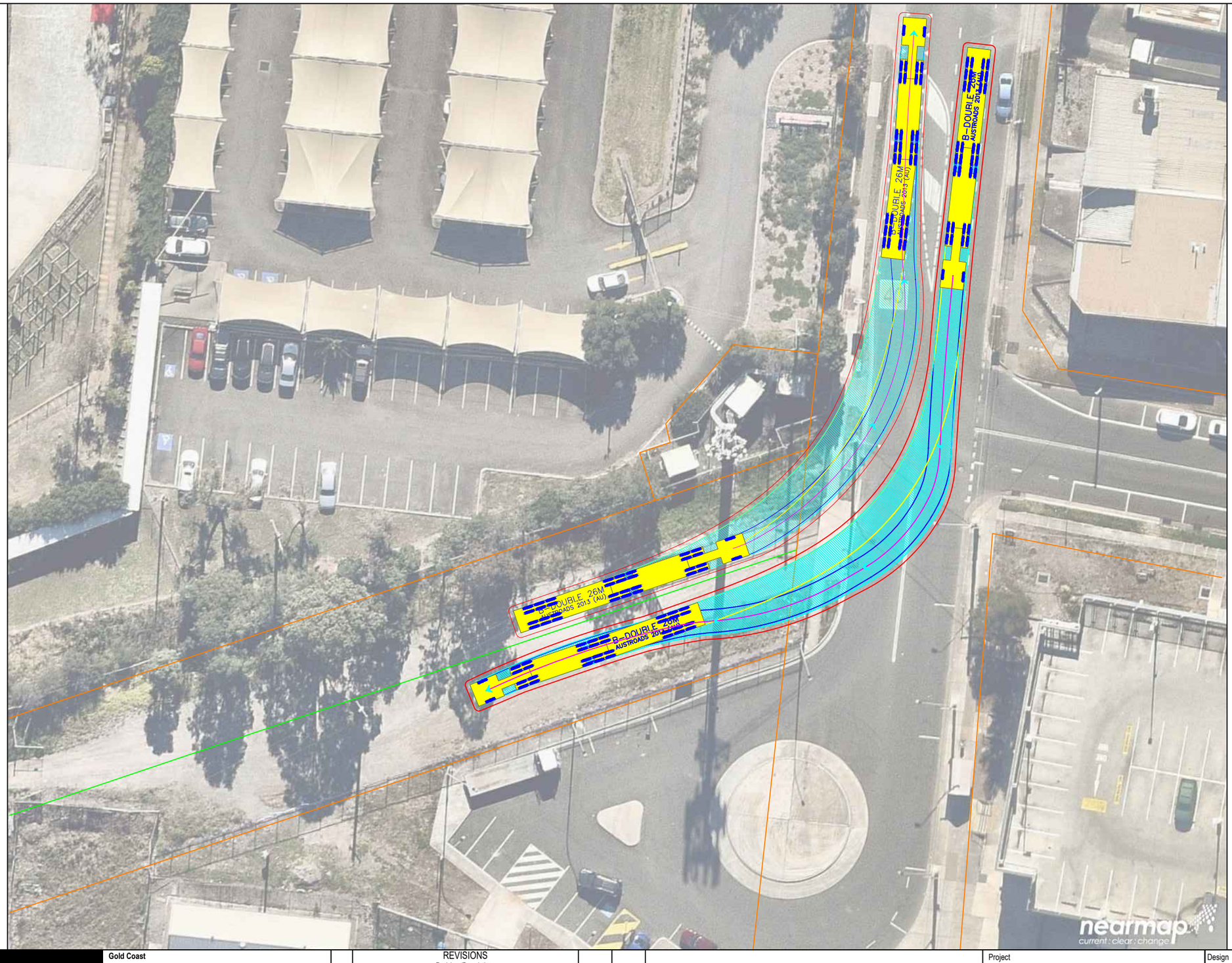


Alan Finlay - Level 3 Road Safety Auditor (Lead Auditor)

Arif Ahmed – Level 2 Road Safety Auditor (Team Member)

APPENDIX A

FORRESTER ROAD ACCESS B-DOUBLE SWEPT PATHS



BITZIOS consulting
traffic engineering ■ transport planning

Gold Coast
Suite 26, 58 Riverwalk Avenue, Robina QLD 4226.
P: (07) 5562-5377
W: www.bitziosconsulting.com.au
Brisbane
Level 2, 428 Upper Edward Street, Spring Hill 4000.
P: (07) 3831-4442
E: admin@bitziosconsulting.com.au
Sydney
Studio 203, 3 Gladstone Street, Newtown NSW 2042.
P: (02) 9557 6202

REVISIONS

Issue	Revisions/Descriptions	Drawn	Date
001	SWEPT PATH 1	S.D	02.12.2019

Project	ST MARYS INLAND CONTAINER TERMINAL EIS
Title	PROPOSED FORRESTER ROAD ACCESS B-DOUBLE SWEPT PATHS

Design	Drawn	Checked
S.D	S.D	A.G
CONCEPT ONLY		Date 02.12.2019
Project Number P3796	Sheet Number 1	Issue 001

APPENDIX B

ROAD SAFETY AUDIT CHECKLIST

P3796 St Marys Freight Hub RSA

Checklist 2: Preliminary design stage audit			
Issue	Yes	No	Comment
2.1 General topics 1 Changes since previous audit Do the conditions for which the scheme was originally designed still apply? (eg. no changes to the surrounding network, area activities or traffic mix)			N.A.
Has the general form of the project design remained unchanged since previous audit (if any)?			N.A.
2 Drainage Will the scheme drain adequately?			N.A.
Has the possibility of surface flooding been adequately addressed, including overflow from surrounding or intersecting drains and water courses?			N.A.
3 Climatic conditions Has consideration been given to weather records or local experience which may indicate a particular problem? (eg. snow, ice, wind, fog).			N.A.
4 Landscaping If any landscaping proposals are available, are they compatible with safety requirements (eg. sight lines and hazards in clear zones)?			N.A.
5 Services Does the design adequately deal with buried and overhead services (especially in regard to overhead clearances, etc)?		X	one H.V. pole to be removed
Has the location of fixed objects or furniture associated with services been checked, including the position of poles?	X		
6 Access to property and developments Can all accesses be used safely? (entry and exit/merging).		X	see Item 2
Is the design free of any downstream or upstream effects from accesses, particularly near intersections?		X	see Item 2
Have rest areas and truck parking accesses been checked for adequate sight distance, etc.?			N.A.
7 Adjacent developments Does the design handle accesses to major adjacent generators of traffic and developments safely?	X		

Alan Finlay 9/12/19

Checklist 2: Preliminary design stage audit continued …			
Issue	Yes	No	Comment
Is the drivers' perception of the road ahead free of misleading effects of any lighting or traffic signals on an adjacent road?	X		
8 Emergency vehicles and access Has provision been made for safe access and movements by emergency vehicles?	X		
Does the design and positioning of medians and vehicle barriers allow emergency vehicles to stop & turn without unnecessarily disrupting traffic?	X		
9 Future widening and/or realignments If the scheme is only a stage towards a wider or dual carriageway is the design adequate to impart this message to drivers? (Is the reliance on signs minimal/appropriate, rather than excessive?)			N.A.
Is the transition between single and dual carriageway (either way) handled safely?			N.A.
10 Staging of the scheme If the scheme is to be staged or constructed at different times: • Are the construction plans and program arranged to ensure maximum safety? • Do the construction plans and program include specific safety measures, signing; adequate transitional geometry; etc. for any temporary arrangements?			N.A.
11 Staging of the works If the construction is to be split into several contracts, are they arranged safely?			N.A.
12 Maintenance Can maintenance vehicles be safely located?			N.A.
2.2 <u>Design issues (general)</u> **1 Design standards** Is the design speed and speed limit appropriate (eg. consider the terrain; function of the road)?	X		
Has the appropriate design vehicle and check vehicle been used?	X		
2 Typical cross sections Are lane widths, shoulders, medians and other cross section features adequate for the function of the road?	X		

Checklist 2: Preliminary design stage audit continued ...			
Issue	Yes	No	Comment
Is the width of traffic lanes and carriageway suitable in relation to: • Alignment? • Traffic volume? • Vehicle dimensions? • The speed environment? • Combinations of speed and traffic volume?	X		
Are overtaking/climbing lanes provided if needed?			N.A.
Have adequate clear zones been achieved?	X		
3 The effect of cross sectional variation Is the design free of undesirable variations in cross section design?	X		
Are crossfalls safe? (particularly where sections of existing highway have been utilised or there have been compromises to accommodate accesses, etc.)	X		
Does the cross section avoid unsafe compromises such as narrowings at bridge approaches or past physical features?	X		
4 Roadway layout Are all traffic management features designed so as to avoid creating unsafe conditions?	X		
Is the layout of road markings and reflective materials able to deal satisfactorily with changes in alignment? (particularly where the alignment may be substandard.)	X		
5 Shoulders and edge treatment Are the following safety aspects of shoulder provision satisfactory: • Provision of sealed or unsealed shoulders? • Width and treatment on embankments? • Cross fall of shoulders?			N.A.
Are the shoulders likely to be safe if used by slow moving vehicles or cyclists?			N.A.
Are any rest areas and truck parking areas safely designed?			N.A.
6 Effect of departures from standards or guidelines Any approved departures from standards or guidelines: is safety maintained?			N.A.
Any hitherto undetected departures from standards: is safety maintained?			N.A.

Checklist 2: Preliminary design stage audit continued …			
Issue	Yes	No	Comment
2.3 Alignment details 1 Geometry of horizontal and vertical alignment Does the horizontal and vertical design fit together correctly?	X		
Is the design free of visual cues that would cause a driver to misread the road characteristics (eg. visual illusions, subliminal delineation such as lines of trees, poles, etc.)?	X		
Does the alignment provide for speed consistency?	X		
2 Visibility; sight distance Are horizontal and vertical alignments consistent with the visibility requirements?			
Will the design be free of sight line obstructions due to: • Safety fences or barriers? • Boundary fences? • Street furniture? • Parking facilities? • Signs? • Landscaping? • Bridge abutments? • Parked vehicles in laybys or at the kerb? • Queued traffic?		X	see Item 2
Are railway crossings, bridges and other hazards all conspicuous?			N.A.
Is the design free of any other local features which may affect visibility?	X		
3 New/existing road interface Does the interface occur well away from any hazard? (eg. a crest, a bend, a roadside hazard or where poor visibility/distractions may occur.)			N.A.
If carriageway standards differ, is the change effected safely?			N.A.
Is the transition where the road environment changes (eg. urban to rural; restricted to unrestricted; lit to unlit) is it done safely?			N.A.
Has the need for advance warning been considered?			N.A.
4 'Readability' of the alignment by drivers Will the general layout, function and broad features be recognised by drivers in sufficient time?	X		
Will approach speeds be suitable and can drivers correctly track through the scheme?	X		

Checklist 2: Preliminary design stage audit continued ...			
Issue	Yes	No	Comment
2.4 Intersections 1 **Visibility to and visibility at intersections** Are horizontal and vertical alignments at the intersection or on the approaches to the intersection consistent with the visibility requirements?	X		
Will drivers be aware of the presence of the intersection (especially on the minor road approach)?			N.A.
Will the design be free of sight line obstructions due to: • Safety fences or barriers? • Boundary fences? • Street furniture? • Parking facilities? • Signs? • Landscaping? • Bridge abutments?		X	See Item 2
Are railway crossings, bridges and other hazards near intersections conspicuous?			N.A.
Will the design be free of any local features which adversely affect visibility?			N.A.
Will intersection sight lines be obstructed by permanent or temporary features such as parked vehicles in laybys, or by parked or queued traffic generally?		X	
2 **Layout, including the appropriateness of type** Is the type of intersection selected (cross roads, T, roundabout, signalised, etc.) appropriate for the function of the two roads?	X		
Are the proposed controls (Give Way, Stop, Signals, etc.) appropriate for the particular intersection?	X		
Are junction sizes appropriate for all vehicle movements?		X	see Item 4
Are the intersections free of any unusual features which could affect road safety?	X		
Are the lane widths and swept paths adequate for all vehicles?		X	see Item 4
Is the design free of any upstream or downstream geometric features which could affect safety? (eg. merging of lanes.)	X		
Are the approach speeds consistent with the intersection design?	X		

Checklist 2: Preliminary design stage audit continued …			
Issue	Yes	No	Comment
Where a roundabout is proposed: • Have pedal cycle movements been considered? • Have pedestrian movements been considered? • Are details regarding the circulating carriageway sufficient?			N.A.
3 **Readability by drivers** Will the general type, function and broad features be perceived correctly by drivers?	X		
Are the approach speeds and likely positions of vehicles as they track through the scheme safe?		X	See Item 3
Is the design free of sunrise or sunset problems which may create a hazard for motorists?	X		
2.5 <u>Special road users</u> 1 **Adjacent land** Will the scheme be free of adverse effects from adjacent activity and intensity of land use? (If not, what special measures are needed?)	X		
2 **Pedestrians** Have pedestrian needs been satisfactorily considered?	X		
If footpaths are not specifically provided, is the road layout safe for use by pedestrians (particularly at blind corners or on bridges)?			N.A.
Are pedestrian subways or footbridges sited to provide maximum use? (i.e. Is the possibility of pedestrians crossing at grade in their vicinity minimised?)			N.A.
Has specific provision been made for pedestrian crossings, school crossings or pedestrian signals?			N.A.
Where present, are these facilities sited to provide maximum use with safety?			N.A.
Are pedestrian refuges/kerb extensions provided where needed?	X		
Has specific consideration been given to provision required for special groups (eg. young, elderly, disabled, deaf or blind)?	X		
3 **Cyclists** Have the needs of cyclists been satisfactorily considered, especially at intersections?	X		
Have cycle lanes been considered?			N.A.
Are all cycleways of standard or adequate design?			N.A.

Checklist 2: Preliminary design stage audit continued …			
Issue	Yes	No	Comment
Where a need for shared pedestrian/cycle facilities exists, have they been safely treated?			N.A.
Where cycleways terminate at intersections or adjacent to the carriageway, has the transition treatment been handled safely?			N.A.
Have any needs for special cycle facilities been satisfactorily considered? (eg, cycle signals)			N.A.
4 Motorcyclists Has the location of devices or objects which might destabilise a motorcycle been avoided on the road surface?	X		
Will warning or delineation be adequate for motorcyclists?	X		
Has barrier kerb been avoided in high speed areas?			N.A.
In areas more likely to have motorcycles run off the road is the roadside forgiving or safely shielded?			N.A.
5 Equestrians and stock Have the needs of equestrians been considered, including the use of verges or shoulders and rules regarding the use of the carriageway?			N.A.
Can underpass facilities be used by equestrians/stock?			N.A.
6 Freight Have the needs of truck drivers been considered, including turning radii and lane widths?	X		
7 Public transport Has public transport been catered for?	X		
Have the needs of public transport users been considered?	X		
Have the manoeuvring needs of public transport vehicles been considered?	X		
Are bus stops well positioned for safety?	X		
8 Road maintenance vehicles Has provision been made for road maintenance vehicles to be used safely at the site?	X		

Checklist 2: Preliminary design stage audit continued …			
Issue	Yes	No	Comment
2.6 Signs and lighting 1 Lighting Is this project to be lit? Will safety be maintained if the project is not lit?	X		
Is the design free of features which make illuminating sections of the road difficult (eg. Shadow from trees or overbridges)?	X		
Has the question of siting of lighting poles been considered as part of the general concept of the scheme?	X		
Are frangible or slip-base poles to be provided?		X	
Are any special needs created by ambient lighting? Will safety be maintained if special treatments are not provided?			N.A.
Have the safety consequences of vehicles striking lighting poles (of any type) been considered?	X		
2 Signs Are signs appropriate for their location?		X	see Item 1 re 10 km/h sign
Are signs located where they can be seen and read in adequate time?		X	〃
Will signs be readily understood?		X	〃
Are signs located so that visibility to and from accesses and intersecting roads is maintained?	X		
Are signs appropriate to the driver's needs (eg. destination signs, advisory speed signs, etc.)?			N.A.
Have the safety consequences of vehicles striking sign posts been considered?	X		
Are signs located so that drivers' sight distance is maintained?	X		
Any signs to be located in the clear zone: are they frangible or adequately shielded by a crash barrier?			N.A.
3 Marking and delineation Has the appropriate standard of delineation and marking been adopted?	X		
Are the proposed markings consistent with the works in the adjoining section of the route?	X		
Are the previous/adjacent markings to be upgraded? If not, will safety be maintained?	X		N.A.

Checklist 2: Preliminary design stage audit continued ...			
Issue	Yes	No	Comment
2.7 Traffic management 1 Traffic flow and access restrictions Can traffic volumes from the proposed scheme be safely accommodated on existing sections of road?	X		
Has parking provision and parking control been adequately considered?	X		
Can any turn bans be implemented without causing problems at adjacent intersections?			N.A.
Has the effect of access to future developments been considered?	X		
Any traffic diverting to other roads (eg. to avoid a traffic control device): is safety maintained?			N.A.
2 Overtaking and merges Is overtaking sight distance and stopping distance adequate?	X		~~N.A.~~
Have suitable shoulder widths been provided at lane drop merges?			N.A.
Have standard signs and markings been provided for any lane drop?			N.A.
Has adequate sight distance been provided to any lane drop?			N.A.
Are shoulders wide enough opposite access points and intersections?			N.A.
3 Rest areas and stopping zones Are there sufficient roadside stopping areas, rest areas and truck parking areas?			N.A.
Are any entries and exits to rest areas or truck parking areas safe?			N.A.
4 Construction and operation If the scheme is to be constructed "under traffic", can this be done so safely?	X		
Can the scheme be safely constructed?	X		
Have the maintenance requirements been adequately considered?	X		
Is safe access to and from the works available?	X		

Checklist 2: Preliminary design stage audit continued …			
Issue	Yes	No	Comment
2.8 Additional questions to be considered for development proposals 1 Horizontal alignment Is visibility adequate for drivers and for pedestrians at proposed accesses?		X	See Item 2
Is adequate turning space provided for the volume and speed of traffic?	X		
Are curve radii and forward visibility satisfactory?	X		
Are sight and stopping distances adequate?	X		
2 Vertical alignment Are gradients satisfactory?	X		
Are sight and stopping distances adequate?	X		
3 Parking provision Is on-site parking adequate to avoid on-street parking and associated risks?	X		
Are parking areas conveniently located?	X		
Is adequate space provided in parking areas for circulation and intersection sight distance?	X		
4 Servicing facilities Are off street loading/unloading areas adequate?	X		
Are turning facilities for large vehicles provided in safe locations?	X		
Is emergency vehicle access adequate?	X		
5 Signs and markings Have necessary traffic signs and road markings been provided as part of a development?			N.A.
Is priority clearly defined at all the intersection points within the car park and access routes?			N.A.
Will the signs and markings be clear in all conditions, including day/night, rain, fog, etc.?			N.A.
6 Landscaping Does landscaping maintain visibility at intersections, bends, accesses and pedestrian locations?			N.A.
Has tree planting been avoided where vehicles are likely to run off the road?			N.A.

Checklist 2: Preliminary design stage audit continued ...			
Issue	Yes	No	Comment
7 Traffic management Have any adverse area-wide effects been addressed?	X		
Will the design keep travel speeds at the safe level?	X		
Are the number and location of accesses appropriate?	X		
Are the facilities for public transport services safely located?	X		
Are any bicycle facilities safely located in respect to vehicular movements?			N.A.
Are pedestrian facilities adequate and safely located?	X		
8 Other Has appropriate street lighting been provided?	X		
Are any roadside hazards appropriately dealt with?	X		
Has safe pedestrian access to the development been provided?	X		
2.9 Any other matter 1 Safety aspects not already covered Will there be special events? Have any consequent unusual or hazardous conditions been considered?			N.A.
Is the road able to safely handle oversize vehicles, or large vehicles like trucks, buses, emergency vehicles, road maintenance vehicles?	X		
If required, can the road be closed for special events in a safe manner?			N.A.
If applicable, are special requirements of scenic or tourist routes satisfied?			N.A.