Auckland Transport

Central Bus Tracking Project Site 1: Carlton Street

Detailed Design Safety Audit

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Detailed Design Safety Audit

Prepared By

Samitha Jayamaha
Traffic Engineer

Reviewed By

Karthi Govindasamy
Principal Traffic Engineer

Approved for Release By

Chris Freke
Manager Auckland South

WSP Opus
Auckland South Office
15 Putney Way, Manukau, Auckland
Po Box 76-725, Manukau 2241
New Zealand

Telephone: +64 9 263 2500
Facsimile: +64 9 263 2501

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1 Background

1.1 The Safety Audit Procedure

A road safety audit is a term used internationally to describe an independent review of a future road project to identify any safety concerns that may affect the safety performance. The audit team considers the safety of all road users and qualitatively reports on road safety issues or opportunities for safety improvement.

A road safety audit is therefore a formal examination of a road project, or any type of project which affects road users (including cyclists, pedestrians, mobility impaired etc.), carried out by an independent competent team who identify and document road safety concerns.

A road safety audit is intended to help deliver a safe road system and is not a review of compliance with standards.

The primary objective of a road safety audit is to deliver a project that achieves an outcome consistent with Safer Journeys and the Safe System approach, that is, minimisation of death and serious injury. The road safety audit is a safety review used to identify all areas of a project that are inconsistent with a safe system and bring those concerns to the attention of the client in order that the client can make a value judgement as to appropriate action(s) based on the risk guidance provided by the safety audit team.

The key objective of a road safety audit is summarised as:

> *To deliver completed projects that contribute towards a safe road system that is increasingly free of death and serious injury by identifying and ranking potential safety concerns for all road users and others affected by a road project.*

A road safety audit should desirably be undertaken at project milestones such as:

- Concept Stage (part of Business Case);
- Scheme or Preliminary Design Stage (part of Pre-Implementation);
- Detailed Design Stage (Pre-implementation/Implementation); and
- Pre-Opening/Post-Construction Stage (Implementation/Post-Implementation).

A road safety audit is not intended as a technical or financial audit and does not substitute for a design check on standards or guidelines. Any recommended treatment of an identified safety concern is intended to be indicative only, and to focus the designer on the type of improvements that might be appropriate. It is not intended to be prescriptive and other ways of improving the road safety or operational problems identified should also be considered.

In accordance with the procedures set down in the "NZTA Road Safety Audit Procedures for Projects Guideline", (Interim Release May 2013)", the audit report should be submitted to the client who will instruct the designer to respond. The designer should consider the report and comment to the client on each of any concerns identified, including their cost implications where appropriate, and make a recommendation to either accept or reject the audit report recommendation.

For each audit team recommendation that is accepted, the client shall make the final decision and brief the designer to make the necessary changes and/or additions. As a result of this instruction the designer shall action the approved amendments. The client may involve a safety engineer to provide commentary to aid with the decision.

Decision tracking is an important part of the road safety audit process. A decision tracking table is embedded into the report format at the end of each set of recommendations to be completed by the designer, safety engineer and client for each issue documenting the designer's response, client's decision (and asset manager's comments in the case where the client and asset manager are not one and the same) and action taken.

A copy of the report, including the designer's response to the client, and the client's decision on each recommendation, will be given to the road safety audit team leader as part of the important feedback loop. The road safety audit team leader will disseminate this to team members.

1.2 The Safety Audit Team

The road safety audit was carried out in accordance with the "NZTA Road Safety Audit Procedure for Projects Guideline", (Interim Release May 2013), by:

- Karthi Govindasamy, Principal Traffic Engineer, WSP Opus, Auckland South; and
- Samitha Jayamaha, Traffic Engineer, WSP Opus, Auckland South.

The Safety Audit Team (SAT) met at the WSP Opus Manukau office to review the drawings on 30 May 2018. Auckland Transport's representative briefed the SAT members prior to this date via emails. A site inspection was undertaken on 30 May 2018. If required, an exit meeting will be held following the receipt of this report.

1.3 Report Format

The potential road safety problems identified have been ranked as described in the following pages.

The expected crash frequency is qualitatively assessed on the basis of expected exposure (how many road users will be exposed to a safety issue) and the likelihood of a crash resulting from the presence of the issue. The severity of a crash outcome is qualitatively assessed on the basis of factors such as expected speeds, type of collision, and type of vehicle involved.

Reference to historic crash rates or other research for similar elements of projects, or projects as a whole, have been drawn on where appropriate, to assist in understanding the likely crash types, frequency and likely severity that may result from a particular concern.

The frequency and severity ratings are used together to develop a combined qualitative ranking for each safety issue using the Concern Assessment Rating Matrix in Table 1. The qualitative assessment requires professional judgement and a wide range of experience in projects of varying scope and locations.

Severity (Likelihood of Death or Serious Injury Consequence)	Frequency (Probability of a Crash)			
	Frequent	Common	Occasional	Infrequent
Very Likely	Serious	Serious	Significant	Moderate
Likely	Serious	Significant	Moderate	Moderate
Unlikely	Significant	Moderate	Minor	Minor
Very Unlikely	Moderate	Minor	Minor	Minor

Table 1: Concern Assessment Rating Matrix

While all safety concerns should be considered for action, the client or nominated project manager, will make the decision as to what course of action will be adopted based on the guidance given in this ranking process with consideration to factors other than safety alone. As a guide, a suggested action for each concern category is given in Table 2.

Concern	Suggested Action
Serious	A major safety concern that must be addressed and requires changes to avoid serious safety consequences.
Significant	Significant concern that should be addressed and requires changes to avoid serious safety consequences.
Moderate	Moderate concern that should be addressed to improve safety.
Minor	Minor concern that should be addressed where practical to improve safety.

Table 2: Risk Categories

In addition to the ranked safety issues, it is appropriate for the Safety Audit Team (SAT) to provide additional comments with respect to items that may have a safety implication but lie outside the scope of the safety audit. A comment may include items where the safety implications are not yet clear due to insufficient detail for the stage of project, items outside the scope of the audit such as existing issues not impacted by the project, or an opportunity for improved safety which is not necessarily linked to the project itself. While typically comments do not require a specific recommendation, in some instances suggestions may be given by the auditors.

1.4 Scope of Audit

The audit is a Detailed Design Safety Audit for the proposed alterations to the speed tables on Carlton Road, situated in Hillsborough.

1.5 Documents Provided

The SAT has been provided with the following drawings of the proposed works:

Drawing Number	Description	Rev.
C001	Location and General Notes	A
C002	Base Plans	A
C003	Base Plans	A
C004	Base Plans	A
C005	Layout Plan with Critical Dimensions	A
C006	Layout Plan with Critical Dimensions	A
C007	Layout Plan with Critical Dimensions	A
C008	Roadmarking and Signage Plans	A
C009	Roadmarking and Signage Plans	A
C010	Roadmarking and Signage Plans	A
C011	Setout Plans	A
C012	Setout Plans	A
C013	Setout Plans	A
C014	Setout Plans	A
C015	Roadmarking Setout Plans	A
C016	Roadmarking Setout Plans	A
C017	Roadmarking Setout Plans	A
C030	Standard Engineering Details	A
C031	Standard Engineering Details	A

1.6 Disclaimer

The findings and recommendations in this report are based on an examination of available relevant plans, the specified road and its environs, and the opinions of the SAT. However, it must be recognised that eliminating safety concerns cannot be guaranteed since no road can be regarded as absolutely safe and no warranty is implied that all safety issues have been identified in this report. Safety audits do not constitute a design review nor an assessment of standards with respect to engineering or planning documents.

Readers are urged to seek specific technical advice on matters raised and not rely solely on the report.

While every effort has been made to ensure the accuracy of the report, it is made available on the basis that anyone relying on it does so at their own risk without any liability to the SAT or their organisations.

1.7 Project Description

WSP Opus Auckland South was commissioned by Auckland Transport to carry out a Detailed Design Safety Audit of the proposed alterations to the speed tables on Carlton Road, situated in Hillsborough. The proposed works include removal of existing speed tables along the route, installation of bus friendly speed cushions, new bus stops, new traffic islands, new signs and alterations to existing pavement markings.

2 Safety Audit Findings

2.1 Minor Concern – Visibility of Edgeline on Approach to Traffic Island

The SAT is concerned with the delineation of the entry taper on the westbound approach to the proposed side island. Visibility of the tapered white edgeline on the approach to the side island may decrease during wet or dark conditions. Poor visibility of the tapered edgeline may direct motorists towards the side island during wet or dark conditions. The delineation of the entry taper could be improved by installing mono-directional red Reflective Raised Pavement Markers (RRPMs) on the edgeline.

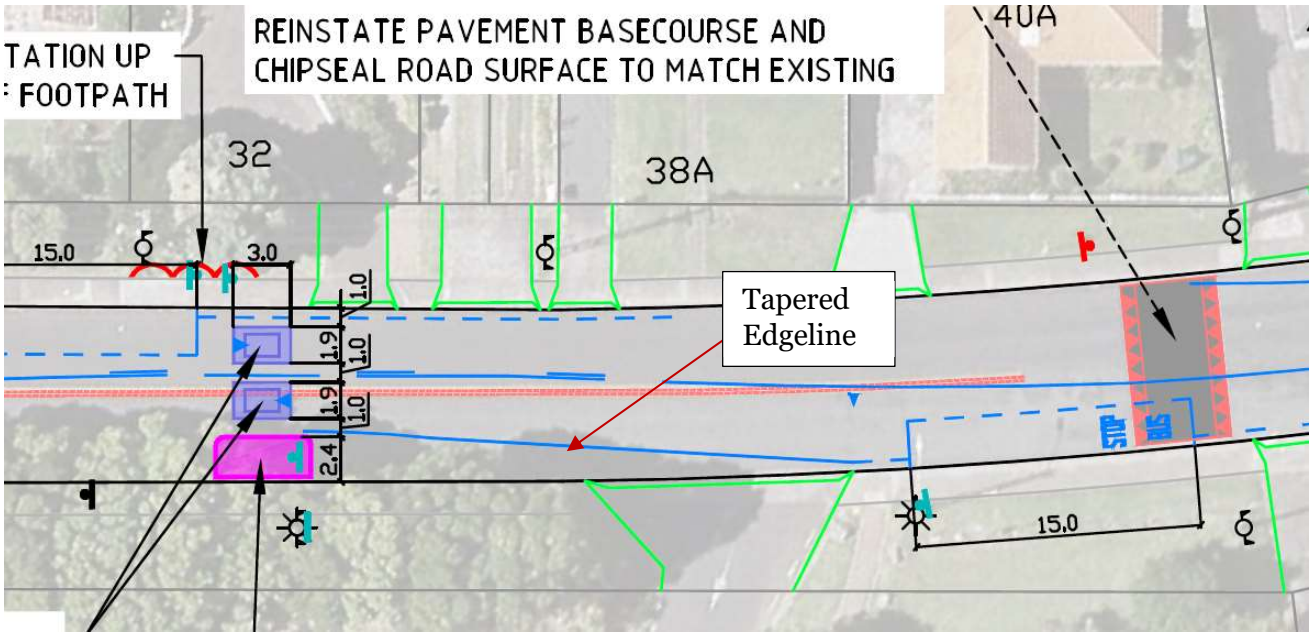

Figure 1 : Tapered Edgeline on Approach to Side Island

Recommendation:

Consider installing mono directional red RRPMs along the tapered edgeline.

Frequency Rating	**Occasional**	*Severity Rating*	**Unlikely**

Designer Response	
Safety Engineer	
Client Decision	
Action Taken	

2.2 Minor Concern – Location of Bus Stop

The SAT is concerned with the proposed location of the bus stop adjacent to 30 Carlton Street. The bus stop creates a narrow lane width for eastbound motorists. This is exacerbated by the close proximity of the side island to the bus stop which creates a pinch point for motorists. The bus stop should be relocated further to the west of the side island to avoid the formation of a possible pinch point for motorists.

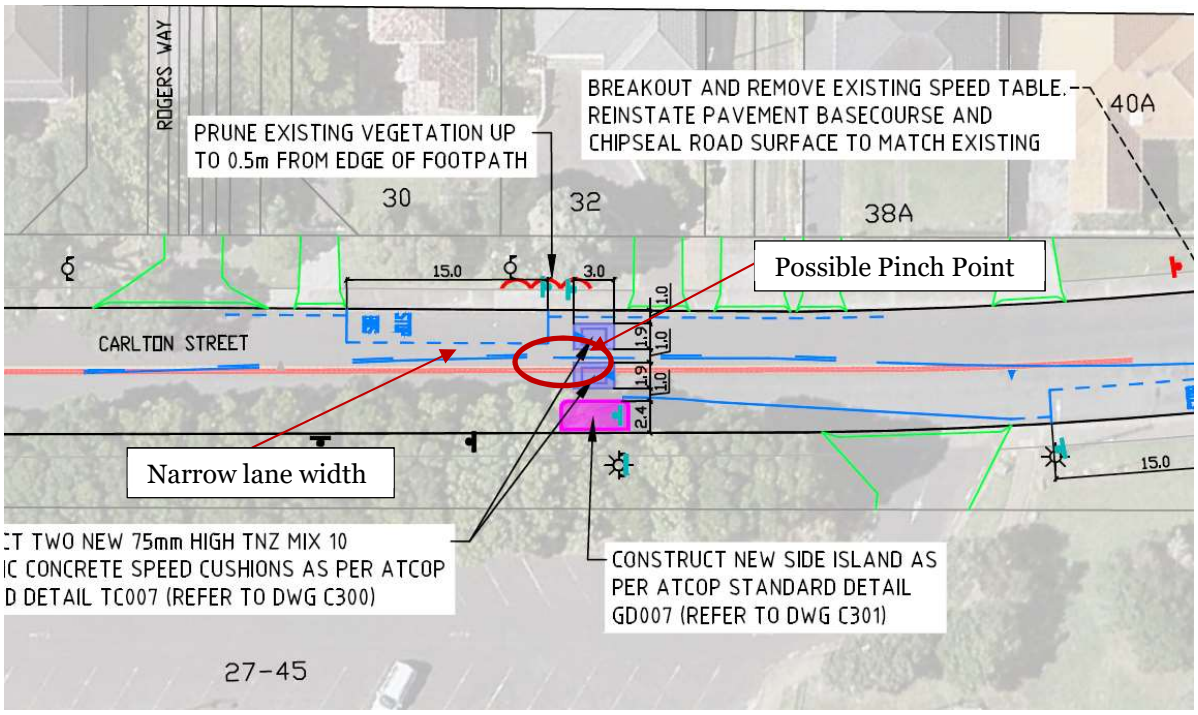

Figure 2 : Pinch Point Adjacent to Bus Stop

Recommendation:

Consider relocating the bus stop away from the side island to avoid the formation of a possible pinch point for motorists.

Frequency Rating	**Occasional**	*Severity Rating*	**Unlikely**

Designer Response	
Safety Engineer	
Client Decision	
Action Taken	

2.3 Moderate Concern – Existing No Overtaking Lines

The drawings provided to the SAT state that a new centreline will be provided along the route, however the drawings to do not specify what the control of the proposed centreline will be. The existing centreline markings contain 'No Overtaking' markings along certain sections of the route, as shown in Figure 3. The new centreline markings should match the existing centreline marking controls along the route.

Figure 3 : Existing No Overtaking Lines

Recommendation:

Ensure that the proposed centreline markings match the existing centreline controls along the route.

Frequency Rating	**Infrequent**	*Severity Rating*	**Likely**

Designer Response	
Safety Engineer	
Client Decision	
Action Taken	

2.4 Comment – Speed Cushions

The existing speed tables force all vehicles to reduce speed at these locations. Replacing the tables with cushions may not have the same reduction in speed. This could result in complaints from residents regarding an increase in speed.

3 Audit Statement

We certify that we have used the available plans, and have examined the specified roads and their environment, to identify features of the project we have been asked to look at that could be changed, removed or modified in order to improve safety. The problems identified have been noted in this report.

Signed Date 05 June 2018

Karthi Govindasamy, BTech
Principal Traffic Engineer
WSP Opus

Signed Date 05 June 2018

Samitha Jayamaha, BE (Hons), GIPENZ
Traffic Engineer
Opus International Consultants Limited

Designer	*Name*	.....	*Position*	.....
	Signature	.....	*Date*	.....
Safety Engineer	*Name*	.....	*Position*	.....
	Signature	.....	*Date*	.....
Project Manager	*Name*	.....	*Position*	.....
	Signature	.....	*Date*	.....
Action Completed	*Name*	.....	*Position*	.....
	Signature	.....	*Date*	.....

Project manager to distribute audit report incorporating decision to Designer, Safety Audit Team Leader, Safety Engineer and project file.

Date:.....

WSP Opus
15 Putney Way, Manukau, Auckland
Po Box 76-725, Manukau 2241
New Zealand

t: +64 9 263 2500
f: +64 9 263 2501
w: www.wsp-opus.co.nz