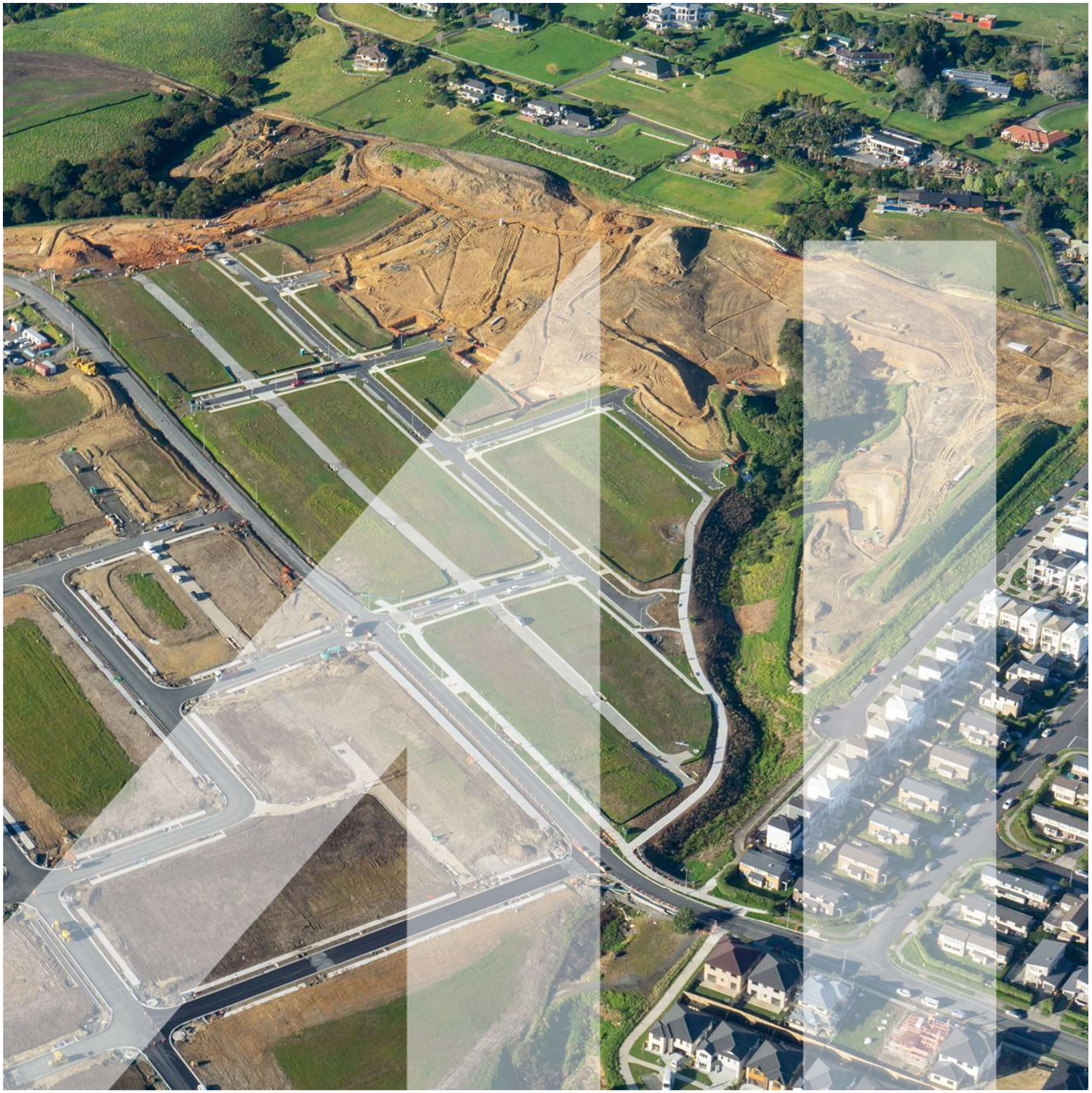
Safe System Audit - Proposed Subdivision at Arawa Road Pongakawa



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Quality Assurance Information

Prepared for	Momentum Planning and Design
Job Number	MPDL-J001
Prepared by	Clare Cassidy
Reviewed by	Sue Philbin

Date issued	Status	Approved by
18 July 2023	For designer response	Shane Turner

1. Safe System Audits for Transport Projects

1.1 Safe System Audits

The primary objective of a Safe System audit is to deliver a project that achieves an outcome consistent with the Safe System approach, that is, minimisation of death and serious injury. The Safe System 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 Safe System audit is summarised as:

> *To deliver completed projects that contribute towards a Safe System by identifying and ranking potential safety concerns for all road users and others affected by a transport project.*

A Safe System audit should 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 Safe System audit is not intended as a technical or financial audit and does not substitute for a design check on standards or guidelines.

1.2 Safe Systems Approach

The national road safety strategy, Road to Zero (2021 to 2030), is focused on preventing fatal and serious injury crashes to all road users. Under this approach less attention is placed on more minor crashes, which are considered inevitable, due to driver error, under the safe system approach.

Road to Zero is New Zealand's road safety strategy to achieve Vision Zero, where no one is killed or seriously injured on our roads. The Safe system approach considers human factors in the road system and considers:

- how roads can be made more forgiving of human error
- how vehicles can contribute to saving lives and reducing harm
- ensure travel speeds are appropriate for the roads and for all who use them.

It is not only about reducing the likelihood of crashes but also it is about reducing their severity when they do occur. The key aim of a safe system is to reduce the potential for fatalities and serious injuries. A key element in safe road design and the overarching principles of a safe system requires the provision of safe speeds.

1.3 Safe System Audit Procedure

A Safe System audit is an independent review of a future transport project to identify any safety concerns that may affect the safety performance and alignment to a Safe System. A Safe System audit is therefore a formal examination of a transport project, or any type of project which affects road users (including cyclists, pedestrians, mobility impaired etc), carried out by an independent competent team. This is a two-stage process where:

- The Safe System alignment of the project option(s) is assessed and compared to the existing situation.

- The audit team considers the safety of all road users and qualitatively reports on road safety issues or opportunities for safety improvement.

Safe System Alignment

The Safe System assessment evaluates a project's alignment with Safe System principles and identifies ways to improve the alignment with a focus on minimising fatal and serious injuries. It investigates the inherent risk of the infrastructure and includes consideration of road user exposure.

This is achieved through a scoring system which considers seven crash types and the exposure, likelihood and severity associated with each crash type. Each combination is assigned a score out of four. The exposure, likelihood and severity scores for each crash type are multiplied to give a product out of 64. These are then added to determine the total safe system assessment score, with a maximum of 448. A score of zero or close to zero indicates a high level of alignment with the Safe System.

For some project types, such as infrastructure for new developments, the safe system score will be worse for the project option than for the existing situation because the number of road users will increase (increasing the exposure score) and new potential crash types may be assessed (for example, dure to the introduction of an intersection or driveways). It is important to note that in these cases, the worse score does not necessarily mean that the project option has poor safe system alignment. Similarly, if a project option improves safe system alignment, this does not mean that identified road safety issues do not need to be addressed.

Road Safety Issues

Any recommended treatment of an identified safety concern is intended to be indicative only, and to focus the design team 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.

The potential road safety problems identified have been ranked as follows:

- 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 risk ranking for each safety issue using the Safety concern risk rating matrix below. The qualitative assessment requires professional judgement and a wide range of experience in projects of all sizes and locations.

The potential road safety problems identified have been ranked as follows:

		Severity outcome			
		Non-injury	Minor	Serious	Fatal
		Property damage only (PDO)	Injury which is not 'serious' but requires first aid, or which causes discomfort or pain to the person injured.	Injury (fracture, concussion, severe cuts or other injury) requiring medical treatment or removal to and retention in hospital.	A death occurring as the result of injuries sustained in a road crash within 30 days of the crash.
Probability of a crash	Very likely	Minor	Moderate	Serious	Serious
	Likely	Minor	Moderate	Serious	Serious
	Unlikely	Minor	Minor	Significant	Serious
	Very unlikely	Minor	Minor	Significant	Significant

Safe System injury threshold

Figure 1.1 Concern Assessment Rating Matrix

In addition to the ranked safety issues, it is appropriate for the safety audit team to provide additional comments with respect to items that may have a safety implication but lie outside the scope of the 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 but not necessarily linked to the project itself. While typically comments do not require a specific recommendation, in some instance's suggestions may be given by the auditors.

Decision making and recording

In accordance with the procedures set down in the "Waka Kotahi NZ Transport Agency Safe System Audit Guidelines" the audit report should be submitted to the client who will instruct the design team to respond. The design team 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 design team to make the necessary changes and/or additions. As a result of this instruction the design team 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 Safe System 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 design team, safety engineer and client for each issue documenting the design team's response, client decision and action taken.

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

1.4 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 does not guarantee a completely safe road, since no road can be regarded as absolutely safe and no warranty is implied that all safety issues have been identified in this report. Road 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 safety audit team or their organisations.

2. Safe System Audit Details

2.1 Type of Audit

This audit is a concept stage safe system audit of the transport design associated with a possible new subdivision at Arawa Road in Pongakawa.

2.2 Audit Team

The safe system audit team was agreed with Momentum Planning and Design and were:

Audit Team Leader: Clare Cassidy, Principal Transport Engineer, Abley

Audit Team Member: Sue Philbin, Associate Transport Planner, Abley

2.3 Safety Project Team

The safety issues raised in this audit will require responses from the designer and the project safety engineer. The client decision and Action Completed against the safety issues will also be recorded. The following organisations are identified for these roles:

Designer response:	Momentum Planning and Design
Safety Engineer:	Western Bay of Plenty District Council and Waka Kotahi NZ Transport Agency.
Clients Response:	Momentum Planning and Design (on behalf of the developer)
Action Completed:	Momentum Planning and Design

2.1 Meetings and Site Inspections

The audit team visited the site on Monday 26th June at 11:30am. The weather conditions were fine and dry, and the road surface was dry.

2.2 Documents Provided

The SAT has been provided with the following documents for this audit by Momentum Planning and Design:

- Transportation Assessment, dated December 2022
- Emailed comments from Waka Kotahi Planner Ashleigh Peti dated 8th March 2023
- Emailed feedback from Waka Kotahi Safety Engineer dated 19th May 2023
- Drawing 496-01 - Intersection reconfiguration – Option 1 full left turn deceleration lane
- Drawing 496-02 - Intersection reconfiguration – Option 2 short left turn deceleration lane
- Pongakawa Plan Change Structure Plan, December 2022
- Stratum concept site plan

3. Project Description

3.1 Project Background and Objective

A private plan change is proposed to re-zone land on the north-western side of Arawa Road, Pongakawa, from Rural to Residential. This will allow the subdivision of the land to provide up to approximately 120 residential lots. The site location is shown in Figure 3.1.

As part of the plan change, upgrades to Arawa Road, a channelised left-turn treatment from SH2 into Arawa Road with associated improvements and an internal transportation network are proposed.

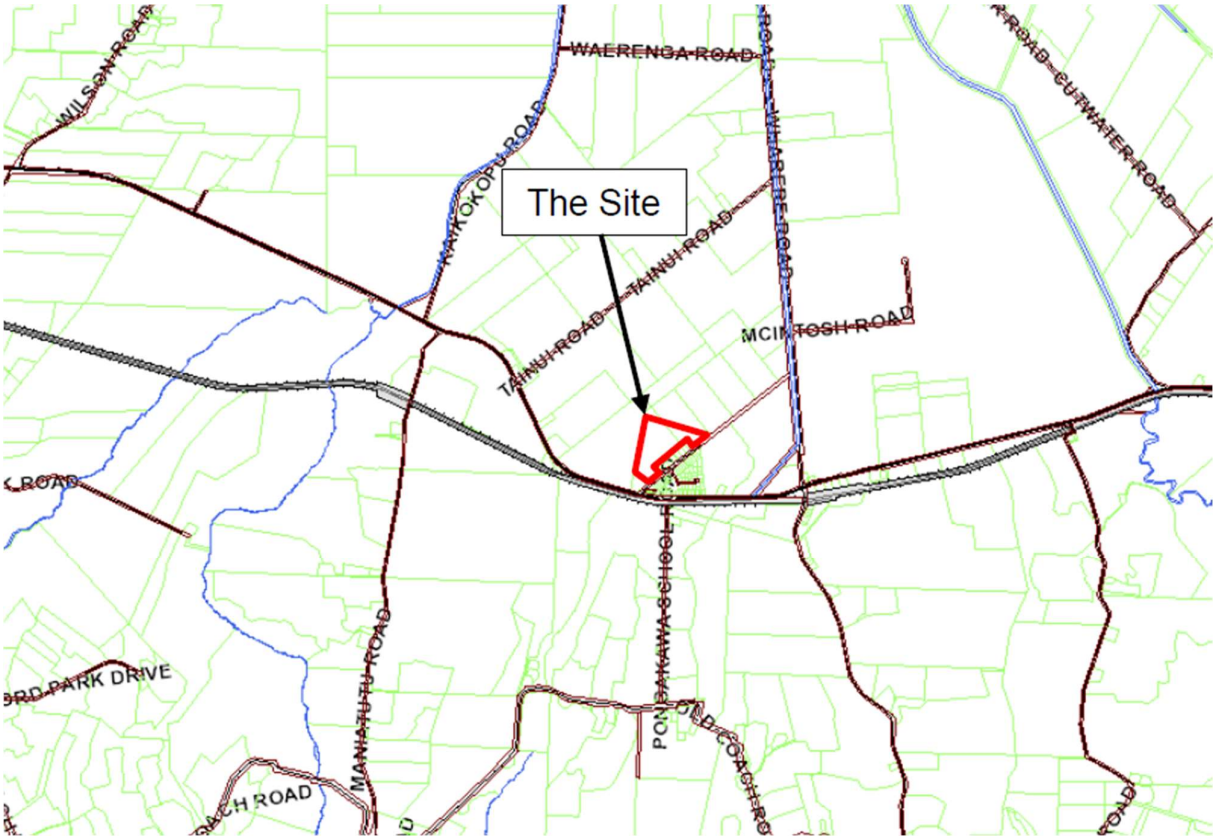

Figure 3.1 Site location

3.2 Existing Conditions and Context

Road function

Arawa Road is classified as a local Road in the Western Bay of Plenty District Plan. It provides access to 59 residential properties in an otherwise rural area and carries around 330 vehicles per day.

SH2 is classified as an Arterial route in the One Network Road Classification and carries just under 7,000 vehicles per day.

Speed environment

State highway 2 is subject to a 100km/h speed limit in this section. There are no intersection speed zones in the area and observations on site are that operating speeds appear to be high. The safe and appropriate speed for this section of SH2 is 80km/h. However, this section of State highway 2 was not

included in the interim Bay of Plenty Speed management Plan. Arawa Road is subject to a 40km/h speed limit.

Road users

State Highway 2 in the vicinity of the site is a rural state highway. There are no facilities for pedestrians and cyclists and whilst there are public bus services operating in the area, the nearest stops are in Matata and Paengaroa. State Highway 2 is a key freight route between the Eastern Bay of Plenty and Port of Tauranga and carries approximately 13% heavy vehicles.

Arawa Road is located in the rural zone but serves primarily residential dwellings and some small-scale farming activity. A footpath is located on the east side of the road, and there is a bus shelter close to the SH2 intersection which is assumed to be used for school buses. Vehicle use is predominantly light vehicles.

Crash history

There have been no reported crashes on Arawa Road in the 5-year period 2018-2022 or in 2023 so far. There have been three reported crashes on State highway 2 within 100m of the Arawa Road intersection in the same time period. Two non-injury crashes occurred to the west of the intersection involving drivers losing control on the straight and leaving the road to the right. One minor injury crash occurred at the intersection and involved a head-on impact on the State Highway. All of the crashes reported speed as a factor.

3.3 Proposed Works

The proposed private plan change would re-zone land on the western side of Arawa Road from Rural to residential, allowing for the subdivision of one site to provide for around 120 residential lots.

Internal roads are proposed within the site with one proposed intersection onto Arawa Road and no direct access to SH2. The predominant movements at the SH2 and Arawa Road intersection are anticipated to be a left turn into Arawa Road, and the right-turn out.

In order to accommodate the additional development and associated traffic is proposed that:

- Arawa Road is widened to 8.5m between SH2 and the intersection providing access to the development
- A left-turn deceleration lane be provided at the intersection of SH2 and Arawa Road (options have been developed for a 100km/h speed limit and a 70km/h limit.
- Development details such as on-site parking, internal road and intersection design and the intersection with Arawa Road be considered as part of the subdivision stage (acknowledging that minimum separation distances will be achieved for the new intersection on Arawa Road).

This audit focuses on the proposed arrangements for the intersection of Arawa Road and SH2. Options have been developed for a short deceleration lane (appropriate for an 70km/h speed limit) and a longer deceleration lane for a 100km/h speed limit. The scheme plan for the longer deceleration lane is shown in Figure 3.2.

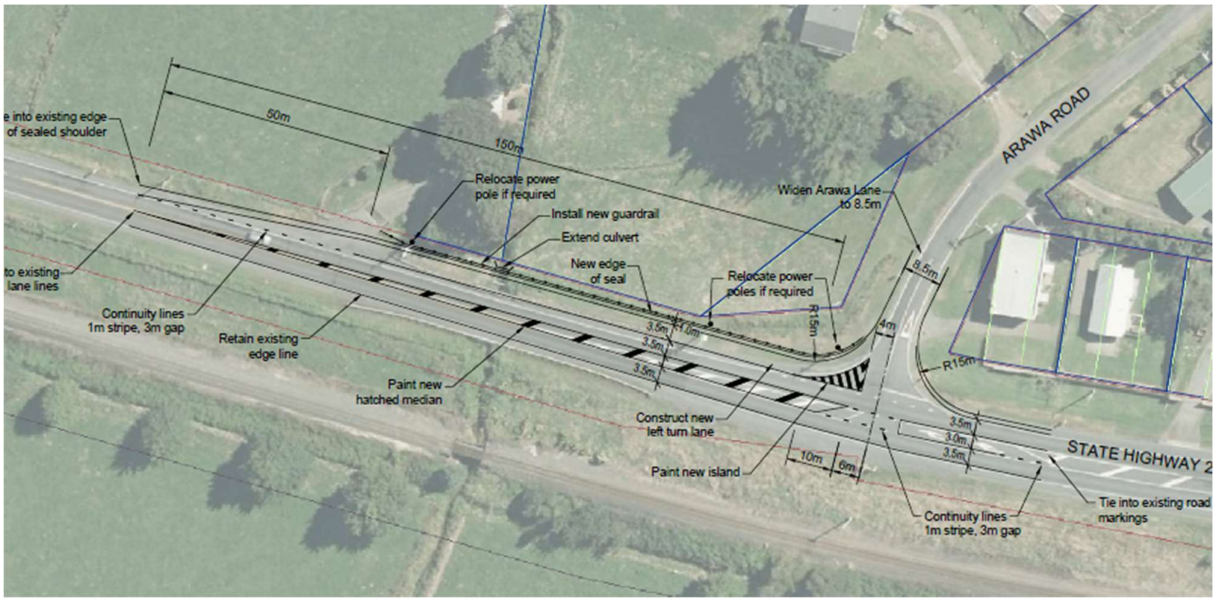

Figure 3.2 Scheme layout (longer deceleration lane)

4. Assessment of Safe System Alignment

4.1 Project Design Safe System Assessment Summary

A Safe System Assessment has been carried out for SH2 in the vicinity of Arawa Road for the existing conditions and for the proposed conditions with additional traffic and the proposed intersection improvements. The scores for each crash type are shown in Table 4.1. The detailed assessments are presented in Section 4.2.

Table 4.1 Safe System assessment score summary table

Option	Score
Existing conditions	156 / 448
Proposed conditions	156 / 448

The SSA scores for each crash type are the same for both the existing situation and for the proposed development and associated improvements.

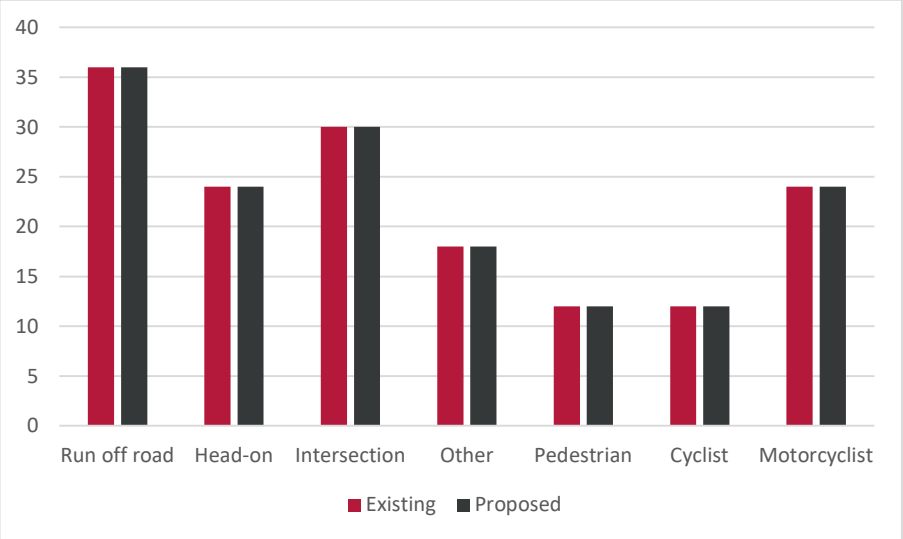

Figure 4.1 Safe system assessment scores

Although the increased volume of expected traffic increases exposure, the overall level, both on SH2 and at the intersection stays within the same 5,000-10,000 vehicles per day range, so the exposure score remains the same across both assessments.

Likelihood of crashes remains the same across both situations with no real changes affecting most crash types. For intersection crashes, the likelihood of rear-end type is reduced by the proposed channelised left-turn, but this is offset by the increase in risk due to the potential dynamic visibility obstruction by vehicles in the left-turn lane for higher severity side impact crashes.

There are no proposals which affect the likely severity of crashes. Operating speeds will remain the same and there is limited additional protection from roadside hazards.

4.2 Safe System Assessment Matrix

SH2 – Existing situation

	Run-off road	Head-on	Intersection	Other	Pedestrian	Cyclist	Motorcyclists
Exposure Comments:	AADT = 7,000 Vehicle flows between 5,000 and 10,000vpd	AADT = 7,000 Vehicle flows between 5,000 and 10,000vpd	AADT = 7,000 and 300 Vehicle flows between 5,000 and 10,000vpd	AADT = 7,000 Vehicle flows between 5,000 and 10,000vpd	Pedestrian flows assumed to be <10 per day	Cyclist flows assumed to be <10 per day	Motorcycle flows assumed to be 10-50 per day
Exposure Score:	3/4	3/4	3/4	3/4	1/4	1/4	2/4
Likelihood Comments:	Factors that increase the likelihood include: • High operating speed • Unprotected severe clear zone hazards Factors that decrease the likelihood include: • Shoulders • Straight alignment • Daytime and night-time delineation	Factors that increase the likelihood include: • High operating speed • Lack of physical separation • Factors that decrease the likelihood include: • Straight alignment • Painted median at the intersection • Daytime and night-time delineation	Factors that increase the likelihood include: • High operating speed • All movements permitted • No channelised left-turn • Factors that decrease the likelihood include: • Straight alignment • Channelised right turn • Good sight distances • Daytime and night-time delineation, flag lighting	Factors that increase the likelihood include: • High operating speeds • Property accesses Factors that decrease the likelihood include: • Shoulder area and wide lanes allow passing of turning vehicles	Factors that increase the likelihood include: • No specific facilities for pedestrians • Lack of lighting beyond the intersection Factors that decrease the likelihood include: • Shoulder areas and berms • Low crossing demand • Good visibility	Factors that increase the likelihood include: • No specific facilities for cyclists • Lack of lighting beyond the intersection Factors that decrease the likelihood include: • Shoulder areas and berms • Good visibility	Factors that increase the likelihood include: • High operating speeds • Unprotected clear zone hazards Factors that decrease the likelihood include: • Straight alignment • Painted median at the intersection • Daytime and night-time delineation
Likelihood Score:	3/4	2/4	2.5/4	2/4	3/4	3/4	3/4
Severity Comments:	Factors that increase the Severity include: • High operating speeds exceed safe system threshold • Clear zone hazards Factors that decrease the severity include: • Barrier protection of some hazards	Factors that increase the likelihood include: • High operating speeds exceed safe system threshold Factors that decrease the likelihood include: • None	Factors that increase the likelihood include: • High operating speeds exceed safe system threshold • Likely side impact angles Factors that decrease the likelihood include: • None	Factors that increase the likelihood include: • High operating speeds Factors that decrease the likelihood include: • Likely rear-end impact	Factors that increase the likelihood include: • High operating speeds exceed safe system threshold Factors that decrease the likelihood include: • None	Factors that increase the likelihood include: • High operating speeds exceed safe system threshold Factors that decrease the likelihood include: • None	Factors that increase the likelihood include: • High operating speeds exceed safe system threshold Factors that decrease the likelihood include: • None
Severity Score:	4/4	4/4	4/4	3/4	4/4	4/4	4/4
Product **(multiply scores above for crash type)**	36/64	24/64	30/64	18/64	12/64	12/64	24/64
TOTAL						**156/448**	

SH2 – Proposed (with development and channelised left-turn)

	Run-off road	Head-on	Intersection	Other	Pedestrian	Cyclist	Motorcyclists
Exposure Comments:	AADT = 7,000 Vehicle flows between 5,000 and 10,000vpd	AADT = 7,000 Vehicle flows between 5,000 and 10,000vpd	AADT = 7,000 and 1,464 Vehicle flows between 5,000 and 10,000vpd	AADT = 7,000 Vehicle flows between 5,000 and 10,000vpd	Pedestrian flows assumed to be <10 per day	Cyclist flows assumed to be <10 per day	Motorcycle flows assumed to be 10-50 per day
Exposure Score:	3/4	3/4	3/4	3/4	1/4	1/4	2/4
Likelihood Comments:	Factors that increase the likelihood include: • High operating speed • Unprotected severe clear zone hazards Factors that decrease the likelihood include: • Shoulders • Straight alignment • Daytime and night-time delineation	Factors that increase the likelihood include: • High operating speed • Lack of physical separation • Factors that decrease the likelihood include: • Straight alignment • Painted median at the intersection • Daytime and night-time delineation	Factors that increase the likelihood include: • High operating speed • All movements permitted • No channelised left-turn • Potential for dynamic visibility obstruction (left-turn) Factors that decrease the likelihood include: • Straight alignment • Channelised right and left-turns • Good sight distances • Daytime and night-time delineation, flag lighting	Factors that increase the likelihood include: • High operating speeds • Property accesses Factors that decrease the likelihood include: • Shoulder area and wide lanes allow passing of turning vehicles	Factors that increase the likelihood include: • No specific facilities for pedestrians • Lack of lighting beyond the intersection Factors that decrease the likelihood include: • Shoulder areas and berms • Low crossing demand • Good visibility	Factors that increase the likelihood include: • No specific facilities for cyclists • Lack of lighting beyond the intersection Factors that decrease the likelihood include: • Shoulder areas and berms • Good visibility	Factors that increase the likelihood include: • High operating speeds • Unprotected clear zone hazards Factors that decrease the likelihood include: • Straight alignment • Painted median at the intersection • Daytime and night-time delineation
Likelihood Score:	3/4	2/4	2.5/4	2/4	3/4	3/4	3/4
Severity Comments:	Factors that increase the Severity include: • High operating speeds exceed safe system threshold • Clear zone hazards Factors that decrease the severity include: • Barrier protection of some hazards	Factors that increase the likelihood include: • High operating speeds exceed safe system threshold Factors that decrease the likelihood include: • None	Factors that increase the likelihood include: • High operating speeds exceed safe system threshold • Likely side impact angles Factors that decrease the likelihood include: • None	Factors that increase the likelihood include: • High operating speeds Factors that decrease the likelihood include: • Likely rear-end impact	Factors that increase the likelihood include: • High operating speeds exceed safe system threshold Factors that decrease the likelihood include: • None	Factors that increase the likelihood include: • High operating speeds exceed safe system threshold Factors that decrease the likelihood include: • None	Factors that increase the likelihood include: • High operating speeds exceed safe system threshold Factors that decrease the likelihood include: • None
Severity Score:	4/4	4/4	4/4	3/4	4/4	4/4	4/4
Product **(multiply scores above for crash type)**	36/64	24/64	30/64	18/64	12/64	12/64	24/64
TOTAL						**156/448**	

5. Safety Concerns

5.1 Serious Concern – Speed Limit on SH2

Severity	Frequency	Safety Rating
Serious	Likely	Serious

Description

The speed limit on this section of SH2 exceeds the Safe and Appropriate Speed (SAAS) for this section of road. Operating speeds appeared to be high on site, and speed was a factor in all of the reported crashes in this area increasing the risk and likely severity of all crash types.

There is no median separation on this section of SH2, and a number of roadside hazards that are unprotected. Intersections are standard T-intersections where side impact crashes would occur. Two run-off road and a head-on crash have occurred on this section of SH2 in the last 5 years so the probability of a crash is assessed as likely.

The safe system impact threshold is exceeded for head-on, run-off-road and side impact crashes so the potential severity is assessed as serious.

Recommendation

Work with the Road Controlling Authority to reduce the speed limit on this section of State Highway 2 to reflect the SAAS ahead of the development occurring. If a permanent speed limit cannot be considered in the appropriate timeframe, options to install an Intersection Speed Zone for Arawa Road could also be considered.

Reduced speed limits are a supporting safe system treatment.

Designer Response	
Auditor Response	
Safety Engineer	
Client Decision	
Action Taken	

5.2 Serious Concern – Proposed barrier on SH2

Severity	Frequency	Safety Rating
Serious	Likely	Serious

Description

There are several potential issues with the proposed guardrail installation that mean it may not perform as required or protect errant vehicles from the significant roadside hazards. These issues include:

- Working width – there does not appear to be adequate distance between the barrier and the hazards that it is intended to protect (culvert, deep swale and power poles)
- Test level performance – a higher containment level may be required for the culvert
- Ground conditions – the existing ground conditions, particularly with the barrier moving closer to the existing swale may not be adequate to support the guardrail and strengthening may be required
- Ground level – the existing ground level is below the level of the seal and falls away, so that the beam will need to be mounted higher to be at the right height from the pavement
- Terminal treatments – appropriate terminal treatments will be required to unsure that there are no spearing hazards for errant vehicles

Any vehicles losing control would not be adequately protected from roadside hazards if the barrier systems are not appropriately designed. Two run-off road crashes have occurred on this section of SH2 in the last 5 years, so the probability of a crash is assessed as likely. The safe system impact threshold is exceeded for run-off-road crashes into unprotected hazards, so the potential severity is assessed as serious.

Figure 5.1 Existing roadside barrier which will be relocated adjacent to the power poles and swale

Recommendation

Ensure that the proposed barrier is designed by a Waka Kotahi accredited designer in accordance with NZTA M23:2022 Specification and guidelines for road safety hardware and devices. Consideration may need to be given to relocating power poles (which is identified on the plans) and to relocating or piping the existing stormwater swale.

Safety barriers are a primary safe system treatment.

Designer Response	
Auditor Response	
Safety Engineer	
Client Decision	
Action Taken	

5.3 Significant Concern – Channelised left-turn creating dynamic visibility obstruction

Severity	Frequency	Safety Rating
Fatal	Very Unlikely	Significant

Description

There is no separation between the proposed channelised left-turn lane and the through lane on the eastbound approach to Arawa Road. Left-turning vehicles could create a dynamic visibility obstruction for drivers exiting Arawa Road. This increases the risk of side impact crashes involving vehicles emerging from Arawa Road in conflict with eastbound through traffic.

Vehicle flows into and out of Arawa Road will remain relatively low and are expected to be tidal (movement out in the morning peak and in in the evening peak), which reduces the risk that a vehicle will be turning in at the same time as another is emerging. There is unlikely to be a queue of vehicles turning left or a high number of heavy vehicles which reduces the level of sight-line obstruction. Therefore, the frequency of this type of crash is considered to be very unlikely.

The operating speeds on SH2 significantly exceed the safe system threshold for side-impact so there would be a high probability of fatal injuries for any crash occurring.

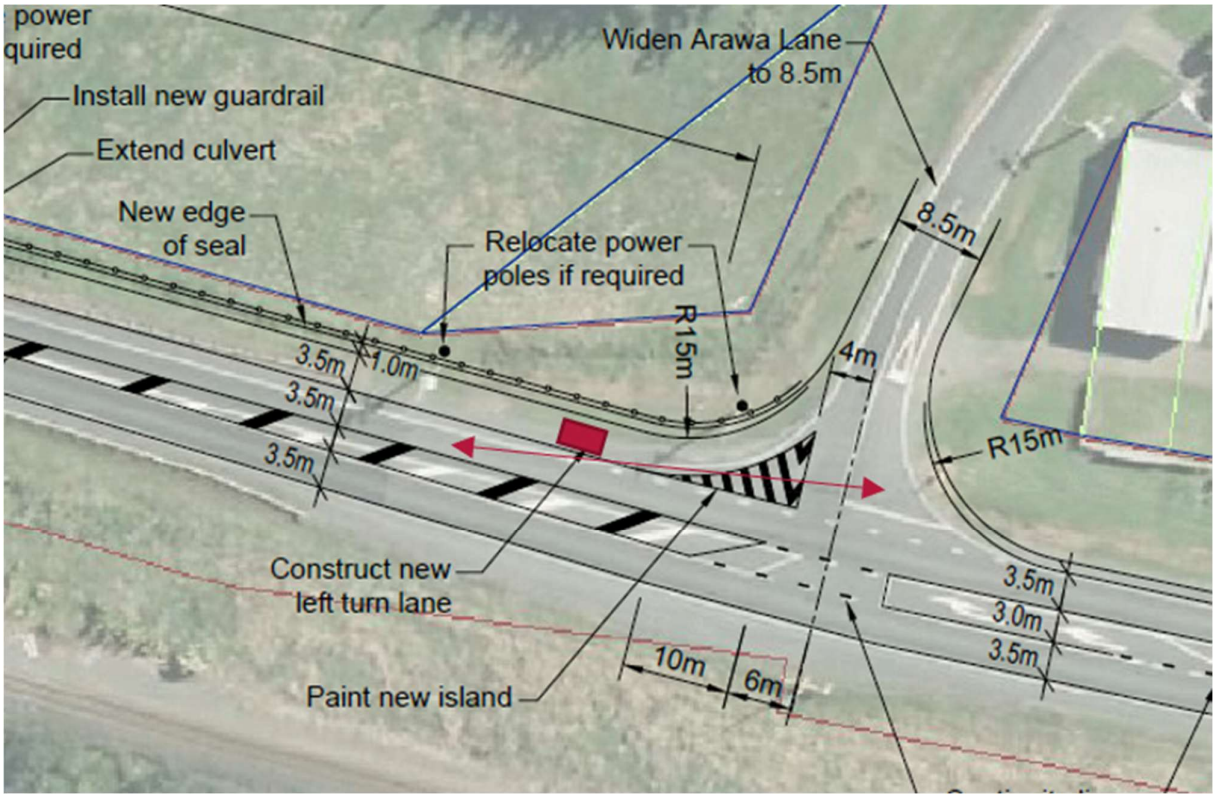

Figure 5.2 – Left turning vehicle creating obstruction to sightlines for emerging driver

Recommendation

Consider offsetting the channelised left-turn treatment so that left-turning vehicles do not obstruct visibility for drivers emerging from Arawa Road.

If the left-turn lane cannot be offset for the full length, consider:

- providing a Short Turn Lane [AUL(S)] in accordance with Austroads Guide to Road Design, Part 4A section 8.2.2 with additional offset to mitigate the visibility obstruction. Although this will increase the risk of rear-end crashes they have a lower potential severity than side impact crashes
- reducing the width of the left turn lane to 3.0m with a 1.0m shoulder to provide additional 0.5m offset between the through lane and the left-turn lane.

Whether a short or full auxiliary lane is provided, it should be designed for the existing operating speed rather than the reduced speed limit, unless a speed limit reduction is confirmed, and measures are put in place to reduce operating speeds.

Channelised turns are a safe system supporting treatment.

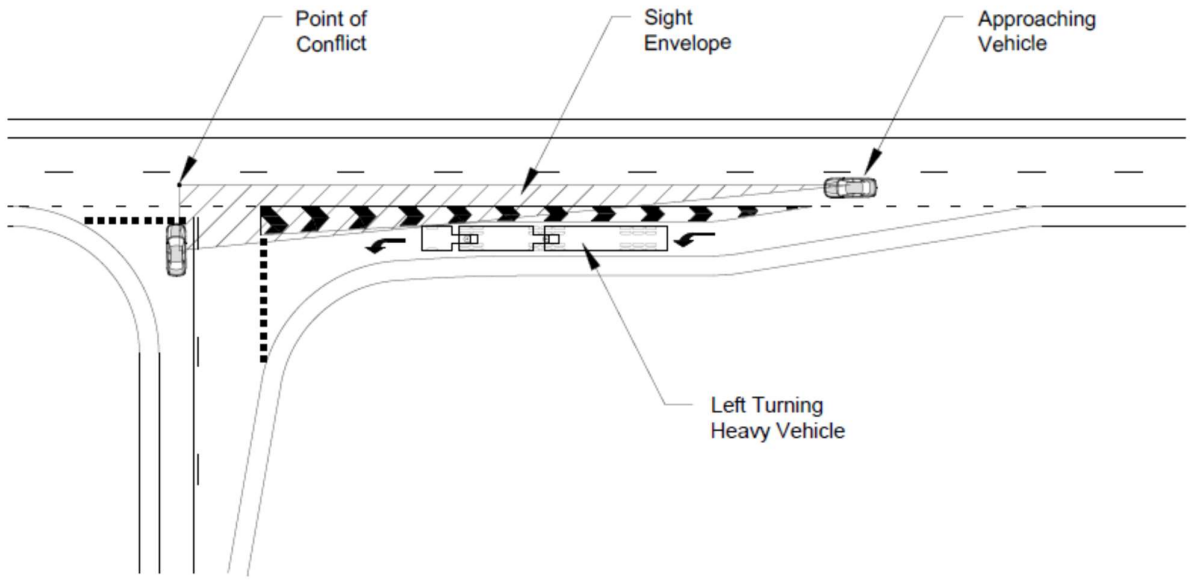

Figure 5.3 Example of offset left-turn treatment (Austroads Guide to Road Design Part 4A, Figure 8.6)

Designer Response	
Auditor Response	
Safety Engineer	
Client Decision	
Action Taken	

5.4 Minor Concern – Proposed widening of Arawa Road

Severity	Frequency	Safety Rating
Minor	Unlikely	Minor

Description

It is proposed to widen Arawa Road to from 6m to 8.5m to accommodate additional traffic resulting from the development. Existing properties on Arawa Road have good levels of off-street parking, and parking demand from the development will be accommodated through the internal roads and off-street parking provided.

Without side friction generated by off-street parking and additional turning movements, traffic speeds on Arawa Road are likely to be increased, leading to an increased likelihood of intersection / driveway crashes and crashes involving vulnerable users on the residential street.

Because of the low number of users involved and the residential nature of the street the frequency is considered unlikely and the severity of crashes is likely to be minor.

Figure 5.4 Arawa Road looking south from proposed development access

Recommendation

Consider reducing the proposed width of Arawa Road to 6.5m – 7m to reduce vehicle speeds or consider marking shoulders or a flush medina to clearly identify narrower lanes. Consider a gateway treatment to reinforce the 40km/h speed limit on Arawa Road.

Improved delineation and lower speed environments are safe system supporting treatments.

Designer Response	
Auditor Response	
Safety Engineer	
Client Decision	
Action Taken	

5.5 Comments

Pavement design for proposed widening on SH2

The widening of the existing seal on SH2 to accommodate the proposed left-turn lane will result in the seal join being within the wheel path for left-turning vehicles. In combination with the existing ground conditions close to the swale, it is possible that early failure of the pavement will occur without appropriate design and strengthening. Full pavement design should be undertaken at the detailed design stage.

Ghost markings

Consideration should be given at the detailed design stage to resealing SH2 within the area of the proposed works to avoid potential for “ghost markings” where old markings have been removed but are still visible to drivers.

School buses

The existing shelter at the SH2 end of Arawa Road may be indicative of school buses servicing Arawa Road. At the detailed design stage an appropriate footpath connection from the new subdivision to the existing footpath on the east side of Arawa Road. Consideration should also be given to whether bus turning can be accommodated within the design.

Service relocations

There are existing underground cables on SH2 which may need to be relocated to accommodate the proposed seal widening and barrier.

Figure 5.5 Marker identifying buried cables at the intersection of SH2 and Arawa Road

Access from Arawa Road into proposed development

The main accessway into the subdivision appears to be a causeway raised above the level of the adjoining ground. The design of the intersection will need to be considered at detailed design to ensure that the gradient from the subdivision is not too steep so that vehicles are not on a steep down slope at the limit lane and to ensure there is no risk of bottoming out. Kerb and channel should be provided at the intersection to prevent edge break and shoulder deterioration identified elsewhere on Arawa Road.

Figure 5.6 Gradient up from Arawa Road at development access

6. Safe System Audit Statement

We certify that we have used the available plans and have examined the specified roads and streets to assess the Safe System alignment and identified any safety concerns that could be changed, removed or modified in order to improve road safety outcomes.

Signed: …… …… Date: 18 July 2023

Clare Cassidy, Audit Team Leader

Principal Transport Engineer, Abley

Signed: …… …… Date: 18 July 2023

Sue Philbin, Audit team Member

Associate Transport Planner, Abley

The safety concerns identified have been noted in this report and are summarised in Table 6.1 below.

Table 6.1 Issue identification summary

Serious	Significant	Moderate	Minor	Comments	Total
2	1	Choose an item.	Choose an item.	5	8

Designer: Bruce Harrison. Position –

Signature: Date: Click or tap to enter a date.

Auditor Response: Clare Cassidy Position – Audit Team Leader

Signature: Date: Click or tap to enter a date.

Safety Engineer: Waka Kotahi Position – Click or tap here to enter text.

Signature: Date: Click or tap to enter a date.

Clients Response: Position – Click or tap here to enter text.

Signature: Date: Click or tap to enter a date.

Action Completed: Click or tap here to enter text. Position – Click or tap here to enter text.

Signature: Date: Click or tap to enter a date.

Project sponsor to distribute audit report incorporating decision to designer,
Safety Audit Team Leader, Safety Engineer and project file Date: Click or tap to enter a date.

Auckland
Level 1/70 Shortland Street
Auckland 1010
Aotearoa New Zealand

Wellington
Level 1/119-123 Featherston Street
Wellington 6011
Aotearoa New Zealand

Christchurch
Level 1/137 Victoria Street
PO Box 36446, Merivale
Christchurch 8146
Aotearoa New Zealand

hello@abley.com
+64 3 377 4703
abley.com