

Appendix G

Road Safety Audit

RSA report recommendations – Decision-tracking form – PMM 6.5a



NZ TRANSPORT AGENCY
WAKA KOTAHI

Project title PP20 Kapiti Coast Expressway
 Project manager Andy Quinn
 Road safety auditors Jos Vroegop, Steve Reddish, Jon England

RSA stage 2: Scheme design
 Designer Opus/URS/Holmes

Recommendation*	Report reference and severity*	Designer comments	Decision
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Cyclists using the expressway

- | | | | |
|---|----------------|--|--|
| a. <i>Prohibit the use of the expressway by cyclists through local KCDC bylaw or by designating the expressway as motorway.</i> | | a) At this present time there is no intention of designating the expressway as motorway. | |
| b. <i>Direct cyclists to use the old SH1 and new section of arterial road, plus any adjacent off-road facilities.</i> | 2.1
Serious | b) It is intended to encourage cyclists to use the local arterial corridor. The current expressway layout with its limited number of ramps will help to discourage cyclists from using the expressway. Any improved cycle facilities on the local arterial will also help. | a) Agree with Designer
b) Agree with Designer
c) Agree with Designer |
| c. <i>If prohibition of cyclists is not an option, ensure that the design is modified to maximise safety for cyclists, particularly at the on and off ramps</i> | | c) Agreed. If cyclists are not prohibited, best practice solutions will be incorporated at the on and off ramps. | |

Cycle network continuity and safety

- | | | | |
|--|--------------|--|---|
| a. <i>Ensure that the pedestrian/cyclist shared paths have no discontinuity in terms of fitting into the overall pedestrian/cyclist network.</i> | 2.2
Minor | a) Agreed.
b) Agreed, crossing points will be carefully located as designs develop so as not to introduce unsafe situations.
c) This was identified as a preferred solution from a safety perspective, however there are clear stakeholder and NZTA preferences for a path to the west. Attention to crossing details will be input to the SH1 revocation project in the next phase of the | a) Agree
b) Agree
c) Agree with Designer.
Special attention will required where the cyclepath intersects with driveways to minimises the |
|--|--------------|--|---|

- all crossing points are located to maximise safety.*
- c. *If a path is to be provided adjacent to the arterial road (old SH1), make that provision on the eastern side of the road.*
- d. *Provide good guidance signage.*

project.

impact on cyclists

- d) This will be developed as the detailed design develops.

- d) Agree

Street lighting

- a. *Provide lighting between the south and north Otaki interchanges as well as at the interchanges.*
- b. *Provide lighting for transition zones between the well-lit interchanges and the unlit expressway to enable drivers' eyes to adjust to the change in environment.*
- c. *Ensure that the north Otaki interchange lighting extends to Taylors Road to highlight the change in environment as well as the intersection.*
- d. *Provide lighting of the shared use pedestrian/cycle paths where these are likely to have use in the dark, having regard to the hours of darkness in the winter months.*

The general rule for the project is that where possible the expressway will not be lit.

- a) The interchange on and off ramps will be lit. These are areas where decision making occurs. There seems to be no current need to light the mainline interchange (the local road over would be lit anyway), Otaki river bridge and the section between, but will be considered further as part of the detailed design stage.
- b) Agreed, appropriate transition zones from well-lit to unlit zones will be provided.
- c) Agreed, we will extend the proposed lighting along this transitional area to Taylors Road.
- d) It is not expected that the pedestrian/cycle paths will be lit but the provision of lighting in busy frequent use areas may be considered at the detailed design stage.

- a) Agree with Designer
- b) Agree
- c) Agree
- d) Agree. Consideration is to be given to lighting those areas likely to be used by commuter cyclists.

2.3

Significant

Shape and planting of expressway median

- a. *Ensure that medians are not crowned.*
- b. *Where medians are planted, use low maintenance ground cover.*

- a) Medians are expected to have a maximum slope of 1:10 and this is not expected to result in significant run-off. This detail should be considered further as part of the detailed design, recognising that additional drainage may be required if the median is dished over its full length.
- b) Agreed. The intention is to use low maintenance planting within the median. This point will be considered further during detailed design development of the landscaping plans.

2.4

Significant

- a) Agree with Designer
- b) Agree

Shoulder width alongside barriers	2.5	Provide 3m shoulders adjacent to any safety barrier.	Agreed, however the discussion on 'Safe System' approach (see 3.2) is likely to suggest that the barrier offset should be increased to 4m. The barrier can be offset within the verge to provide a 3m sealed shoulder and the typical sections will be updated accordingly. Increasing this offset to 4m will require additional shoulder width but will enable steepening of the earthworks slope beyond this point.	Agree with Designer
Positioning of destination signage	2.6	<ul style="list-style-type: none"> a. Ensure that all ADS and VMS signage are located so that each can be clearly read in advance for safe decision making. b. Install a M1-4 EXIT sign at the southbound off-ramp at north Otaki. 	<ul style="list-style-type: none"> a) Agreed. b) M1 – 4 EXIT signs will be installed for all exit ramps in accordance with MOTSAM Part 3. 	<ul style="list-style-type: none"> a) Agree b) Agree
Use of bridge kerbs	2.7	Do not specify bridge kerbs for use on bridges (or anywhere else). (Note that the draft revision of the Bridge Manual no longer recommends their use.)	Kerbs will not be used on expressway structures. In lieu of the revised Bridge Manual updates and its recommendation on bridge kerbs, kerbs on local road bridges (with lower operating speeds) will have standard kerbs and channels.	c) Agree with Designer
Forward sight distance at Bridge 9	3.1	Ensure that there is sufficient shoulder width to provide the required forward sight distance at this location over the Mary Crest overpass.	We will check the forward sight distance required and amend the shoulder width if required.	Agree
Hazard protection per safe system principles	3.2	<ul style="list-style-type: none"> a. Assess all hazards for protection including those outside clear zones. b. Either make culvert inlet and outlet structures traversable, or protect them with barriers. 	Advice from NZTA is that a 'safe system' approach is likely to be adopted in the coming months. The current design and designation proposed provides the space and flexibility for either a clear zone or 'safe system' solution moving forward. The current design is to be retained at present but further design development is likely to require some modification to meet the 'safe system' proposals.	<ul style="list-style-type: none"> a) Agree b) Agree c) A Safe System Approach is to be implemented on this project.

c. Where protection is considered necessary for hazards outside the clear zone, review the adjacent clear zone design.

- a) Agreed.
- b) Agreed
- c) Allowance has been made with the proposed designation width to allow for flattening of earthworks or bunding to remove the need for barriers, and retain flexibility to also implement a 'safe system' approach.

Location of median barrier relative to drain

- a. Position the median barrier central between the carriageways and as close to the median drain as possible without compromising its performance.
- b. In achieving a. above, check that the forward sight distance on curves is not compromised by the barrier and relocate the barrier if necessary to obtain the required sight distance, but then also relocate the drain to ensure it is not offset more than 350mm from the barrier.

- a) Agree, this will be undertaken in conjunction with (b) such that the required sight distances are achieved and where a median drain is required, it will be incorporated into the scheme at the detail design phase
- b) Agree, refer response above.

3.3
Significant

- a) Agree
- b) Agree

Barrier type used on approaches to bridge barriers

Undertake a risk analysis to assess how far any given hazard's barrier protection should be maintained along the length of need before reducing the barrier test level.

- 3.4
Significant
- Agreed. A risk assessment will be carried as part of the detail design as bridge extents and approach earthwork slopes are finalised.

Agree

Passing lane beyond the northern tie in

Remove the southbound passing lane on SH1 north of Taylors Road.

- 4.1
Significant
- Agreed. It is recommended that this passing lane is closed as part of this project. NZTA should also consider including a median wire rope barrier from north of the Taylors Road intersection until the end of the passing bay that is to be removed.

Agree

Feasibility Designs are proceeding on the RoNS expressway between Otaki and Levin. It is recognised that the proposed extension to the Expressway may occur at some time after the PP20 project so a tie in to the existing arrangement is required.

An off ramp connecting to Waitohu Valley Rd was considered & workshopped, however there was a strong preference by key stakeholders to retain the existing Otaki entranceway and to minimise further impact on culturally sensitive dunescapes.

At some point the Expressway will need to transition in to the existing SH and this will always result in some safety concerns. Improvements at this location will provide as safe a situation as practical and are highlighted below.

1) A southbound right turn bay (currently no facility exists at this intersection) is proposed that will provide a safe area for vehicles to wait until safe merging can occur.

2) Further measures will be considered during the next design phase.

Providing a raised central island beyond the private access will provide separation between opposing vehicles.

3) Providing a raised central island to guide the driver towards the private access with appropriate delineation/signage/lighting will aid in driver awareness as to the road layout ahead and reduce driver confusion.

4) Visibility for all movements will be checked and where proposed landscaping is required, this will be placed outside of the visibility envelopes.

5) Utilising the existing seal width to provide a wide shoulder will offer extra space for the driver to slow down and turn into the private access way.

6) Signage will be provided to ensure that the interchange exit ramp is clearly legible to drivers and can be used safely.

To address some of the concerns above it is proposed to shift the property access (transition from one to two directions) further south

Taylor's Road and off-ramp
 Construct an off-ramp at about ch 1000 that terminates at a roundabout¹ at the intersection of old SH1/Waitohu Valley Road.

4.2

Significant

Agree with Designer

¹ A roundabout would help reduce speeds, provide a threshold into the urban area and assist safe access to/from the school on Waitohu Valley Road.

<p>towards the Waitohu Bridge, to be located with the next property access. This will improve the visibility of this intersection and locate it further from the SH off-ramp.</p> <p>These minor alterations can be incorporated as part of the preliminary design stage.</p>		
<p>Power poles south of Taylors Road</p>	<p>4.3 Significant</p>	<p>Power poles that restrict sight distance will be relocated and when necessary protected if within clear zone.</p> <p>Refer 3.2 above - protect the power poles.</p>
<p>New driveway parallel to SH1 south of Taylors Road</p>	<p>4.4 Minor</p>	<p>Agreed. Screen planting will be considered as a measure to reduce headlight glare.</p> <p>This comment is also relevant for the property accesses located to the east of the southbound off-ramp, near this location.</p> <p>Agree</p>
<p>Provide some screening adjacent to the driveway, ensuring that it does not restrict visibility from the Taylors Road limit line.</p>		<p>Agree</p>
<p>Northbound on-ramp taper length</p>	<p>4.5 Minor</p>	<p>Agreed, the pavement width is already provided for the future four lane expressway. The taper length needs to be increased to meet MOTSAM standards for the long term scenario. This can be added as part of the preliminary design stage.</p> <p>Agree</p>
<p>Conspicuousness of the roundabout</p>	<p>5.1 Significant</p>	<p>We agree with the principles of this comment but are not sure that the solution proposed is right for this location. The position and elevation of the roundabout is determined by the approach levels over the rail and proposed expressway. As the design is developed final levels will be confirmed and the visibility to the roundabout can be confirmed. Mounding within the central island will be considered if required.</p> <p>The current roundabout is too small to be mounded and other options need to be investigated. This should be checked prior to detailed design to ensure sufficient land is available to make changes</p>
<p>Ensure that the roundabout is conspicuous from the uphill northern approach in particular, with the central island mounded and planted with colour differentiation outside the required sight triangles.</p>		
<p>Sight distance to and at the right turn onto the on-ramp</p> <p>a. Check that there is sufficient approach sight distance to the right</p>	<p>5.2 Minor</p>	<p>a) We will check and confirm the required ASD has been achieved in this location. Agree</p> <p>b) Sight distance and visibility requirements have been checked and confirmed. Agree</p>

turn bay markings at the southbound on-ramp for the expected speed of traffic on Otaki Gorge Road.

b. Ensure that there is adequate intervisibility between northbound traffic on Otaki Gorge Road and vehicles turning right onto the on-ramp.

accommodated within the scheme design.

Design of left turn onto the on-ramp

Design the left turn onto the on-ramp so that the Give Way limit line is at 70° to the on-ramp carriageway.

5.3
Minor

Agreed, We will incorporate this into final design.

Agree

Visibility to the right at the off-ramp limit line

- a. Design the bridge barriers so that visibility to the right at the off-ramp limit line is not restricted in terms of safe stopping.
- b. Ensure that a Stop control is in place at the end of the off-ramp.

5.4
Significant

a) The current design of the ramp has an approach grade that descends to the limit line to increase visibility over and across any bridge barriers present. In discussion with NZTA it was agreed that this design which would provide some visibility and then lose it, as the driver moves past the bridge barrier, is undesirable. It was agreed that the design should be amended to be a constant approach up to the Stop line. This approach will have limited visibility with the intention of managing speed on the off-ramp. Adequate visibility must be provided at the Stop line. The barrier position, height and handrail will be assessed as the design is developed to ensure maximum visibility is achieved.

a) Agree with Designers comments. This issue needs to be resolved early to ensure that any changes that may need to be made to the structures can be undertaken.

b) Agree

b)

Agreed, we will include this in the final design.

Access to parking/rest areas

Provide new accesses to the parking/rest areas south of the Otaki River bridge and ensure that they are designed for safe ingress/egress.

5.5
Minor

This has been raised in discussion with KCDC and will be incorporated into the preliminary design. Options to consider will include fourth leg on the roundabout and focus for rest area on the west side of the local arterial, as suggested by NZTA.

Agree

Future form of retained sections of SH1

- a. *Revise the layout of those sections of the existing SH1 so that they are consistent with the new section of arterial road.*
- b. *Introduce measures to keep speeds down to the desired speed environment on the arterial road.*
- c. *Where the old SH1 is to be used as an access to private properties, reduce the carriageway width to that of a driveway.*

- a) Discussions on treatment of the existing state highway continue with KCDC. Consistency and treatments for the intended operational speed will be further developed as part of the SH1 Revocation Project (At present the DPS intends a similar form).
- b) Agreed, this will be done in consultation with NZTA and KCDC as the future road owner (SH1 Revocation Project).
- c) We have provided sufficient road width to meet the standards of a private way (serving between 4 to 6 properties) as recommended in KCDC Subdivision and Development standards.

- a) Agree
- b) Agree
- c) Agree with Designer

6.1
Significant

There are two local road widths proposed.

Carriageway width of local roads

For local roads in high speed environments use a 7 m seal width (3 m lanes and 0.5 m shoulders).

- a) New local Arterial – 3.5m lanes and minimum 1.8m sealed shoulder.

- b) New local road in lower speed environment and property access. These are currently proposed with a 6m seal width. Most will be in a lower speed environment. If there is a risk of higher operating speeds then further seal width should be considered. It will be important that the proposed sections of new road are consistent in width with adjacent stretches of existing road and that any changes are only altered after discussion and agreement with KCDC.

6.2
Significant

Agree with Designer

Use of chicanes on higher speed local roads

Use traffic calming treatments other than chicanes on higher speed roads to reduce speeds.

- Appropriate treatment of local roads has been discussed with KCDC in the development of the scheme design. We will continue to liaise with KCDC on whether traffic calming measures should be considered on their network.

Agree – Careful consideration will be required of any traffic calming measure that will be used on a road that has an environment that would otherwise support a high speed.

6.3
Significant

County Road and on-ramp intersections on old SH1

Check that there is sufficient approach

- The exiting state highway is posted at 50km/h through this area. ASD checks have been undertaken on the current design and meet the distances for the current environment.

Agree with designer. Confirm that conditions will not change following the opening of the expressway.

6.4
Minor

sight distance to the pavement markings at the northbound on-ramp and County Road intersections for the expected speed of traffic on the old SH1.

Footpath on old SH1 at northbound on-ramp

Ensure that the design of the start of the northbound on-ramp at old SH1 provides a safe staged crossing of the on-ramp for pedestrians.

The layout and width at the start of the on ramp is driven by the vehicle tracking paths and design of the proposed bridge structures. Safe crossing points for pedestrians will be carefully considered as the design is further developed. No further action is required.

Agree with Designer

6.5
Minor

Rahui Road shared paths on bridge

Provide shared paths on both sides of the Rahui Road bridge with widths preferably greater than 2.5 m.

Wide shoulder lanes (4.2m) to accommodate cyclists and a 2.5m (Nth) plus 2m (Sth) path have been provided based on a balance between demands, and value for money. Path widths have been discussed with KCDC and no further action is recommended at this stage.

Agree with Designer

6.6
Minor

Te Horo Beach Road – School Road alignment

- a. Provide clear definition and warning of the 100 mR horizontal curve on the eastern side of Bridge 8 through the use of guardrail, PW-67, PW-66 and PW-18 signs.
- b. Consider the need to provide a PW-65 sign at the 60 mR curve to the west of Bridge 8 facing westbound traffic.

Detailed signage layout has not been developed at this stage. Further design refinement of the curve radii will be carried out during the detail design and we will include the necessary signage at these locations.

Agree

6.7
Significant

Inconsistency between drawings re footpath on School Road

The shared path at School Road will be added to the cross section drawing.

Agree

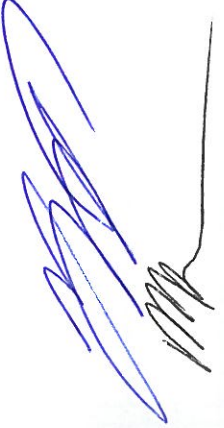
6.8
Comment

* Audit team leader to complete, attach to the report, and send electronically to the project manager.

Signed by project manager

Signed by traffic and safety engineer

Project manager to send completed decision-tracking form to: designer, Audit team leader, traffic and safety engineer (NZTA), project file.



Date:

22.12.11.

Date:

22/12/11

Date

For additional rows, click in the bottom right cell of the table above, choose Table from the menu toolbar > Insert > Rows Above or Rows Below.

To delete a row, right-click anywhere in the row and then choose delete cells, delete entire row from the table menu.