

Gerringong upgrade



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PRINCES HIGHWAY

In January 2011, two individuals approached the Roads and Traffic Authority (RTA) seeking a more detailed response to the road safety issues raised by the Princes Highway Safety Group in the RTA's Review of Environmental Factors (REF), which were displayed in June and July 2010.


The RTA believes these issues were appropriately addressed in the November 2010 REF Submission Report (you can view this file at http://www.rta.nsw.gov.au/roadprojects/projects/princes_hwy/gerringong/documents/gerringong_submissions_report.pdf) however, the RTA did agree to reformat this information in order to detail the road safety issues raised by the Princes Highway Safety Group and assist these community members understand the RTA's response. It does not replace or contradict the REF Submissions Report.

The following pages were handed to two individuals in March 2011. In the interests of transparency, the response is available for your information.



Document Controls

Gerringong upgrade – Detailed Submissions Response to PHASE Group submission

Approval and authorisation

Prepared by:	Roads and Traffic Authority
Accepted by:	Ron de Rooy
	
	Signed:
	Date: 25/3/11

Revision History

Revision	Revision Date	Revision Details	Name/Position	Signature
1	1/6/11	For publication purposes, removal of words confidential, without prejudice and not for reproduction	Ron de Rooy	
2	1/6/11	Insertion of text on page 1 to explain publication	Ron de Rooy	

Part 2: Accident Risk Points and Solutions

Several of the properties on our County Lane solution routes are severely impacted by the RTA's proposed widening of the road alignment at their locations, to the extent that some lose near to 50% of their land, or where they lose a lesser amount, the new alignment by the shape of their land brings the road very significantly closer to their residences. In such circumstances the owners may prefer that the RTA instead resumes the entirety of their property, in which case our provisions for access may not be needed.

In previous studies in 2007, the RTA's consultants identified high level risks associated with various routes then being considered. In the current Concept Plan (June 2010), a more detailed Road Safety Audit deals with the concept design for Stage 1 (Mt Pleasant to Toolijooa) and lists 39 Audit Findings. Of these, the majority identify issues with design geometry, potential perceptions of motorists using the designed highway and possible ramifications of crashes occurring at various locations. Several of these items deal with Left-On, Left-Off movements at public and private access points but no detailed analysis has been reported for every access point.

This section of the PHS submission deals specifically with safety risks at every access point, and we recommend that these details be taken into account in considering our recommendation for removal of access points from the design. But first we wish to highlight those Audit Findings from the June 2010 Road Safety Audit (Section 5.0 Audit Findings) that apply to the issues we are raising. They are:

5.1.5 There is a potential for unfamiliar drivers to exit the local property accesses via a wrong way turn onto the highway. (This applies to local property access along the entire route)

Drivers exiting local properties and unfamiliar with the location may mistake the two lane carriageways as operating for two-way movements. Poor weather and lighting conditions would exacerbate this potential. Frequency: Improbable (1 in 3 years), Severity: Major (likely death or serious injury), Risk: Medium

PHS comment: While the frequency dictates that this risk is only medium, the fact that there are more than 20 such locations in Stage 1 can be taken to imply that the likelihood of this happening at some point along the entire route of Stage 1, several times per year is very high. Therefore this should be a High Risk that can be reduced with each reduction in the number of direct access points along the route.

RTA response: Where a wire rope median barrier is provided, the median is proposed to be planted with low vegetation (grass), which will give people entering the highway a clear view of both carriageways. Also, while details are not yet developed it is expected that there will be signage to indicate "left only" in the median opposite property accesses, and the Sims Road junction. This will reduce the frequency and hence the risk of vehicles mistakenly entering the traffic in the wrong direction.

5.1.7 The proposed Omega Lane junction at CH 600 is located in a section of deep cut with 1:1 batter slopes, where the provision of adequate sight distance and approach grades on the lane would be important for exiting drivers to safely junction/merge with northbound traffic.

The Omega Lane junction is also located towards the end of the merge lane for the Rose Valley Road northbound on-load ramp. The potential for slow-moving farm trucks using the access would require adequate sight distance to safely junction, accelerate on the upgrade and merge with northbound traffic. Frequency: Improbable (1 in 3 years), Severity: Major (likely death or serious injury), Risk: Medium.

PHS comment: This issue is also a problem at the Sims Road junction (5.1.27 & 5.1.29) and at the proposed private access at Chain CH 3100, CH 3300 (5.1.25), CH 6050 (5.1.36) and CH 5700 (not listed in the Audit).

RTA response: The Omega Lane junction is now located north of the proposed cut / fill interface at CH540 to provide sight distances that are compliant with current road design standards and to minimise earthworks. The uphill gradient on approach to Omega Lane will assist with deceleration into the junction. The northbound climbing lane which continues past Omega Lane allows vehicles to accelerate outside the two through lanes before merging with northbound traffic.

The sight lines from Sims Road meet current road design standards. The concept design now includes a deceleration lane at the Sims Road junction as shown in Appendix D of the REF Submissions Report.

5.1.15 Drivers exiting a local property near CH1080 at the start of the Rose Valley Road slip lane may attempt to drive across the slip lane onto the main southbound carriageway with potential conflict with southbound traffic.

Frequency: Improbable (1 in 3 years), Severity: Major (likely death or serious injury), Risk: Medium

PHS comment: The placement of private access points on or near the beginning of off-load ramps at several other locations raises similar risks, that is drivers may be tempted to drive the wrong way in the off-load ramp in order to access the carriageway rather than proceeding to the interchange and the on-load ramp. A similar issue is raised regarding local property access junctions to the Fern Street ramp (5.1.20).

RTA response: There is no reason for drivers to turn across the offload ramp to join the highway as this ramp connects directly to the southbound onload ramp which provides a much better acceleration opportunity before merging. Consideration will be given to appropriate signage as part of the detailed design process.

The accesses onto the Fern St ramp at Renfrew Park will not experience the same risk as the two accesses have been combined into one access point directly opposite the Rose Valley Rd junction, as shown in the Submissions Report.

5.1.38 [In part] The Toolijooa Road junction may be subject to increased intersection crashes due to u-turning traffic and intersection movements.

Frequency: Occasional (1 in each year), Severity: Moderate (likely minor injuries and major property damage), Risk: Medium

PHS comment: The potential for Severity of accidents at this location is underestimated. The likelihood of driver factors such as fatigue and frustration coming into play at this location is quite high so this risk should be reassessed as High.

RTA response: The proposal includes the construction of the southbound offload ramp to separate traffic turning into Toolijooa Rd from through traffic. The junction has also been revised in response to community concerns, with a right turn bay provided for traffic entering Toolijooa Rd from the south and a dedicated northbound lane for traffic turning right from Toolijooa Road that will only cross a single lane of highway traffic compared with the current two lanes.

5.1.39 Construction Staging

[In part] The design of temporary access for local properties would also need to maintain adequate sight lines in areas of significant level differences between existing and proposed carriageways, e.g. CH 3070, CH 3300, Sims Rd, CH 4700, CH 6030, CH 6250.

Frequency: Occasional (1 in each year), Severity: Moderate - Major, Risk: Medium-High

PHS comment: This also applies at CH 5700. The potential for service roads, integrated into the project at detail design level, to eliminate many of the issues of access during construction should not be underestimated.

RTA response: All temporary accesses will be designed to appropriate standards and will form part of an approved traffic control plan. Where service roads form part of the approved design, consideration would be given to their early construction.

Extra Section - Lookout at Exit from Kiama Bends

Chain minus 200: Mt Pleasant Lookout. RFP: 3

The Lookout at Mt Pleasant is a spectacular spot for visitors to gain their first glimpse of the coastline from Gerringong southward to Nowra. Aesthetically it's the gateway to Gerringong and attracts many visitors, the evidence of which can be found in the number photographs from the lookout posted on the web.

Risk - This locale has already been identified in the Concept Plan safety Audit (Section 5.1.1) as a High Risk with Frequency Occasional and Severity Major, citing the hazard of the horizontal curve proximity to the start of works, and any gap in existing and proposed median barriers contributing to unsafe u-turn/ right-turn movements at the northern extremity of the proposed work.

While this locale is not included in the upgrade project, consideration should be given to including road safety improvements at the lookout as part of the upgrade. The main issues are the safety of exit from the highway and re-entry.

This is a Southbound Left-Off, Left-On access only, and the current speed limit is 80kph. It is also the point at which southbound traffic merges to one lane and starts its downhill run towards Gerringong.

RTA response: The safety performance of the section of highway between Weir Street and Mount Pleasant is being monitored by the RTA's Southern Regional Road Safety and Traffic Management Unit. Annual reviews of crash data are carried out as well as specific reviews when warranted by issues or events.

Completion of the project will remove the southbound merge immediately south of this access and will result in a continuous median barrier preventing U-turns. The U-turn facility immediately north of the access has been closed for safety.

Section A - Southbound From Mount Pleasant To Rose Valley

In this section, the highway is Southbound from CH 000 downgrade at up to 8% to the Rose Valley Road intersection. We recommend a two-way service road to pick up these properties and connect to the eastern side of the Rose Valley Rd intersection at CH 1450, where vehicles can turn left to Gerringong or cross the bridge to head northwards on the highway.

This service road would be approximately 1,300m in length.

CH 175 Southbound: D. Burrell, W&J Miller. RFP: 1

These properties (Lots 100 & 101 DP 817304) D. Burrell and (Lot 102* DP 817304) W & J Miller (*Lot ID not annotated on the Concept Plan) have a joint access at CH 175 Southbound. The access serves a farm and three residences – A. Burrell (owner of Lots 100 & 101) with two houses, one occupied by Craig & Fiona Baxter (caretakers) and one owned Bill & Jeanette Miller (owners of the un-annotated concessionary rural lot 200m East of the access point enclosed within Lot 100). The third house is operated as a luxury holiday rental residence.

Risks – We identify the following significant risks in this locale.

- The Left-On manoeuvre poses a high risk to Southbound traffic especially in peak weekend traffic conditions. This has already been identified in the Concept Plan safety Audit (Section 5.1.1) as a High Risk with Frequency Occasional and Severity Major. The Audit states: “Increased speeds in the southbound travel direction may occur due to the downgrade, with potential rear-end crashes with vehicles decelerating to enter premises”

RTA response: The concept design addresses this risk with the revised property access design included as Appendix C in the REF Submissions Report, which includes shoulder widening, property specific turning geometry and sign posting. This design allows vehicles to accelerate outside the two through lanes.

- For a dual stream of Southbound traffic on Friday late afternoons-early evenings, any Left-On manoeuvre at this point will leave right-lane motorists with their view of Left-On vehicles entering, obscured by traffic in the left lane.

RTA response: Behaviour of motorists would be as per standard, with left-on traffic giving way to through traffic when entering the highway. Traffic would enter the left lane without influencing traffic in the right lane. If traffic in the left hand lane is obscuring entering traffic from the view of traffic in the right hand lane, there would not be an adequate gap for traffic to enter the left hand lane.

- Any sudden deceleration of a left-lane vehicle planning to Left-Off exit will often leave following vehicles no room to pass since the right-lane vehicles will often be travelling at or above the posted limit at this point.

RTA response: The revised property access design, included as Appendix C in the REF Submissions Report, eliminates the risk of drivers making sudden decelerations to access an adjacent property.

- The risk of drivers, especially the elderly and less experienced, incorrectly judging the approach speed of Southbound vehicles as they exit Kiama Bends only 175m away at CH 000, is very significant.

RTA response: The design of the accesses gives drivers a good position to view and assess oncoming traffic having approximately 10 seconds of travel time (at 80kph) from the time a vehicle first appears. This provision meets current design standards.

- The entering vehicle's sight-line is poor at this point and the vehicle is obscured to southbound traffic prior to arrival at the shoulder. The risk will be higher also for visitors to the holiday accommodation since they will be less familiar with the risk of entering the highway at this point.

RTA response: The proposal has been designed with improvements to signposting, existing shoulders and lateral drainage so that all sight lines and sight distances meet or exceed current road design standards. Vehicles entering the highway from an access point would be required to stop and wait for a gap before entering the traffic. They would therefore come into view of passing traffic before they attempt to enter the highway traffic.

- Heavy vehicles entering as a Left-On at this point will take at least 800m to accelerate to 80 kph, posing a serious difficulty for southbound drivers in higher flow conditions, especially in the first 300m from this entrance.

RTA response: The RTA's calculations show that heavy vehicles at this location would need approximately 200 metres to accelerate to 80 km/h. (See Fig 12.2 from the Concept Design GU Geometric Parameters).

- There is a serious sun-glare risk at this point for Left-On drivers, making visibility of Southbound traffic difficult in the early morning.

RTA response: There is potential for some sun glare for a short duration during some periods of the year. Sun glare is an issue at specific locations on a number of roads within the road network, however its frequency and duration does not warrant a change to the road design. It is not possible to eliminate this potential, but it can be mitigated by travelling at different times of the day.

CH 300 Southbound: R&S Hewitt. RFP: I

This property (Lot 99 DP 747922) is owned and occupied by Russell & Sue Hewitt and has a single access at CH 300 Southbound.

Risks – We identify the following significant risks in this locale.

- The Left-On manoeuvre poses a high risk to Southbound traffic especially in peak weekend traffic conditions. This has already been identified in the Concept Plan safety Audit (Section 5.1.1) as a High Risk with Frequency Occasional and Severity Major. The Audit states: "Increased speeds in the southbound travel direction may occur due to the downgrade, with potential rear-end crashes with vehicles decelerating to enter premises"

RTA response: The concept design addresses this risk with the revised property access design included as Appendix C in the REF Submissions Report, which includes shoulder widening, property specific turning geometry and sign posting. This design allows vehicles to accelerate outside the two through lanes.

- For a dual stream of Southbound traffic on Friday late afternoons/early evenings, any Left-On manoeuvre at this point will leave right-lane motorists with their view of Left-On vehicles entering, obscured by traffic in the left lane.

RTA response: Behaviour of motorists would be as per standard, with left-on traffic giving way to through traffic when entering the highway. Traffic would enter the left lane without influencing traffic in the right lane. If traffic in the left hand lane is obscuring entering traffic from the view of traffic in the right hand lane, there would not be an adequate gap for traffic to enter the left hand lane.

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- Any sudden deceleration of a left-lane vehicle planning to Left-Off exit will often leave following vehicles no room to pass since the right-lane vehicles will often be travelling at or above the posted limit at this point.

RTA response: The revised property access design, included as Appendix C in the REF Submissions Report, eliminates the risk of drivers making sudden decelerations to access an adjacent property.

- The entering vehicle's sight-line is poor at this point and the vehicle is obscured to southbound traffic prior to arrival at the shoulder. The risk of drivers, especially the elderly and less experienced, incorrectly judging the approach speed of Southbound vehicles as they judging the approach speed of Southbound vehicles as they exit the Kiama Bends only 300m away at CH 000, is very significant.

RTA response: The proposal has been designed with improvements to signposting, existing shoulders and lateral drainage so that all sight lines and sight distances meet current road design standards. Vehicles entering the highway from an access point would be required to stop and wait for a gap before entering the traffic. They would therefore come into view of passing traffic before they attempt to enter the highway traffic.

The design of the accesses gives drivers a good position to view and assess oncoming traffic. This provision meets current design standards.

- Heavy vehicles entering as a Left-On at this point will take at least 800m to accelerate to 80 kph, posing a serious difficulty for southbound drivers in higher flow conditions, especially in the first 300m from this entrance.

RTA response: The RTA's calculations show that heavy vehicles at this location would need approximately 200 metres to accelerate to 80 km/h. (See Fig 12.2 from the Concept Design GU Geometric Parameters).

- There is a serious sun-glare risk at this point for Left-On drivers, making visibility of Southbound traffic difficult in the early morning.

RTA response: There is potential for some sun glare for a short duration during some periods of the year. Sun glare is an issue at specific locations on a number of roads within the road network, however its frequency and duration does not warrant a change to the road design. It is not possible to eliminate this potential, but it can be mitigated by travelling at different times of the day.

CH 450 Southbound: F&V Tynan, RFP: I

This property (Lot 10 DP 853156) is owned and occupied by Frank & Val Tynan and has a single access at CH 450 Southbound.

Risks – We identify the following significant risks in this locale.

- The Left-On manoeuvre poses a high risk to Southbound traffic especially in peak weekend traffic conditions. This has already been identified in the Concept Plan safety Audit (Section 5.1.1) as a High Risk with Frequency Occasional and Severity Major. The Audit states: "Increased speeds in the southbound travel direction may occur due to the downgrade, with potential rear-end crashes with vehicles decelerating to enter premises"

RTA response: The concept design addresses this risk with the revised property access design included as Appendix C in the REF Submissions Report, which includes shoulder widening, property specific turning geometry and sign posting. This design allows vehicles to accelerate outside the two through lanes.

- For a dual stream of Southbound traffic on Friday late afternoons/early evenings, any Left-On manoeuvre at this point will leave right-lane motorists with their view of Left-On vehicles entering, obscured by traffic in the left lane.

RTA response: Behaviour of motorists would be as per standard, with left-on traffic giving way to through traffic when entering the highway. Traffic would enter the left lane without influencing traffic in the right lane. If traffic in the left hand lane is obscuring entering traffic from the view of traffic in the right hand lane, there would not be an adequate gap for traffic to enter the left hand lane having approximately 5.5 seconds of travel time (at 100kph) from the time a vehicle first appears.

- Any sudden deceleration of a left-lane vehicle planning to Left-Off exit will often leave following vehicles no room to pass since the right-lane vehicles will often be travelling at or above the posted limit at this point.

RTA response: The revised property access design, included as Appendix C in the REF Submissions Report, eliminates the risk of drivers making sudden decelerations to access an adjacent property.

- The entering vehicle's sight-line is poor at this point and the vehicle is obscured to southbound traffic prior to arrival at the shoulder. This is further exacerbated by the horizontal curve at CH 350. The risk of drivers, especially the elderly and less experienced, incorrectly judging the approach speed of Southbound vehicles as they exit the Kiama Bends, is very significant.

RTA response: The proposal has been designed with improvements to signposting, existing shoulders and lateral drainage so that all sight lines and sight distances meet current road design standards. Vehicles entering the highway from an access point would be required to stop and wait for a gap before entering the traffic. They would therefore come into view of passing traffic before they attempt to enter the highway traffic.

The design of the accesses gives drivers a good position to view and assess oncoming traffic. This provision meets current design standards.

- Heavy vehicles entering as a Left-On at this point will take at least 800m to accelerate to 80 kph, posing a serious difficulty for southbound drivers in higher flow conditions, especially in the first 300m from this entrance.

RTA response: The RTA's calculations show that heavy vehicles at this location would need approximately 200 metres to accelerate to 80 km/h. (See Fig 12.2 from the Concept Design GU Geometric Parameters).

CH 1000 Southbound: BG Miller. RFP: 2

This property (Lot 23 DP 584907) is a Dairy with a residence and has a single access at CH 1000 Southbound.

Risks – We identify the following significant risks in this locale.

- The Left-On manoeuvre poses a high risk to Southbound traffic especially in peak weekend traffic conditions. This has already been identified in the Concept Plan safety Audit (Section 5.1.1) as a High Risk with Frequency Occasional and Severity Major. The Audit states: "Increased speeds in the southbound travel direction may occur due to the downgrade, with potential rear-end crashes with vehicles decelerating to enter premises"

RTA response: The property owner has agreed to the permanent closure of this access.

CH 1075 Southbound: BG Miller. RFP: 2

This property (Lot 22 DP 584907) is a residence located next to a dairy and has a single access at CH 1075 Southbound.

Risks – We identify the following significant risks in this locale.

- The Left-On manoeuvre poses a high risk to Southbound traffic especially in peak weekend traffic conditions. This has already been identified in the Concept Plan safety Audit (Section 5.1.1) as a High Risk with Frequency Occasional and Severity Major. The Audit states: "Increased speeds in the southbound travel direction may occur due to the downgrade, with potential rear-end crashes with vehicles decelerating to enter premises"

RTA response: This access is connected to the southbound off ramp for the Fern Street service road. The concept design has mitigated the risk of the conflict of high speed traffic entering the offload ramp close to the property access by extending the ramp diverge an additional 50m and including the revised property access design included as Appendix C in the REF Submissions Report, which includes shoulder widening, property specific turning geometry and sign posting.

CH 1375 Southbound: D Burrell. RFP: 3

This property (Lot 23 DP 584907) has a residence with a single access at CH 1375 Southbound. Currently the concept plan has excised this property's access gate. It appears that the Concept Plan assumes that vehicles from this property will access the Rose Valley Rd intersection via the access provided at CH 1450. Our risk analysis therefore is the same as for the entrance at CH 1450.

RTA response: The accesses at CHI375 and CHI500 have been redirected into one access at CHI450. This access will enter the Fern St service road opposite Rose Valley Road giving safe access from all directions.

CH 1500 Southbound: D Burrell. RFP: 3

This property (Lot 71 DP 101340) contains a Historic House – “Renfrew Park” and has a single access at CH 1500 Southbound.

Risks – The following analysis assumes that entering traffic will be permitted to cross the Southbound through traffic on the highway exit ramp, as it flows through to the Fern street service road. We identify the following significant risks in this locale.

- The main risks for traffic performing Left-On, Left-Off at this point lie in failing to give way to through traffic on the exit ramp to Fern St.

RTA response: The design of the combined accesses gives drivers a good position to view and assess oncoming traffic from all directions. The greatest risk is crossing the southbound off ramp to travel north using the bridge over the highway and northbound on ramp. Vehicles from this access will have visibility beyond the commencement of the ramp diverge area 440 meters to the north. Safe intersection sight distance for 80 km/h is 160 metres and for 100 km/h is 255 metres.

- Additionally there is some risk that sudden deceleration of a vehicle planning to Left-Off exit will result in rear-end collisions as this is a single lane and there is no room to pass a Left-Off vehicle.

RTA response: The revised property access design, included as Appendix C in the REF Submissions Report, provides an opportunity for vehicles to move out of the through lane as they decelerate on approach to a property access.

Section B - North From Rose Valley to Mount Pleasant

In this section, the highway is Northbound from Rose Valley Road intersection up Mt Pleasant to CH 0000. We recommend a two-way service road to pick up these properties and connect to the Rose Valley Rd, West of the Bus Loop. This road would be approximately 1,150m in length.

CH -50 Northbound : M.J Roche. RFP: 1

CH 350 Northbound : M.J Roche. RFP: 2

The Roche property, (Lot 104 DP 817304) has two gates Northbound, the first at approx. CH minus 50 is outside the project area, the second at CH 350 has a direct entrance on the Concept Plan. We understand that the owners may also have had a third entrance inserted into the RTA's draft plan.

Risks – The CH-50 locale is not included in the upgrade project; consideration should be given to including road safety improvements at this gate as part of the upgrade. Sight distance to the south from both is reasonable however entering vehicles are unsighted by Northbound motorists, especially where engaging in passing. An entering vehicle turning right Southbound from CH-50 is at extreme risk of collision since they have less than 50m sight of Southbound traffic exiting the Kiama Bends. If the road is divided, the right-turn risk is removed, however the following serious hazards remain:

the Left-On manoeuvre poses a high risk to Northbound traffic especially in peak weekend traffic conditions. At CH 350 it is very common to observe a dual stream of Northbound traffic on weekend

- mid-late afternoons, so any Left-On manoeuvre at this point will leave motorists with their views of the gate obscured by traffic in the left lane.

RTA response: A concrete median barrier will prevent right turns in for southbound traffic.

Behaviour of motorists would be as per standard, with left-on traffic giving way to through traffic when entering the highway. Traffic would enter the left lane without influencing traffic in the right lane. It is only traffic in the right hand land that could have its view of entering traffic obscured. In this event, there would not be an adequate gap for traffic to enter the left hand lane. The speed limit for this section of the upgrade will be reduced to 80 km/h so that drivers are prepared to negotiate the Kiama Bends which has an 80 km/h speed limit.

- Any sudden deceleration of a left-lane vehicle will often leave following vehicles no room to pass since the right-lane vehicles are usually driving at or near the posted limit at this point, accelerating at the apex of the RH curve.

RTA response: This access will have the revised property access design, included as Appendix C in the REF Submissions Report, which eliminates the risk of drivers making sudden decelerations to access an adjacent property.

- There is additionally a serious sun glare issue for Northbound motorists in morning peak periods, which again poses hazards if vehicles are entering on a Left-On.

RTA response: There is potential for some sun glare for a short duration during some periods of the year. Sun glare is an issue at specific locations on a number of roads within the road network, however its frequency and duration does not warrant a change to the road design. A vehicle entering from this access will appear as a silhouette against the sun. It is not possible to eliminate this potential, but it can be mitigated by travelling at different times of the day.

CH 550 Northbound – Omega Lane: BG Miller. RFP: 2

Lots 1,2,3,4 of DP 719744 (BG Miller) This group of properties accesses at Omega Lane, has a residence (Jack & Jodie Miller) plus 2 rural residential lots which have been subdivided but as yet not built on.

Risks – Omega lane is a signposted public road which will in the future have multiple residences and farm vehicles requiring access to the highway.

RTA response: The two undeveloped concessional lots accessing Omega Lane will be extinguished. The likelihood of multiple residences has been significantly reduced. The cattle underpass at CH1000 will provide access for farm machinery as well, eliminating the need for farm equipment (tractors etc) to access the highway, thus reducing the risks associated with low speed traffic.

- The Left-On manoeuvre poses a high risk to Northbound traffic especially in peak weekend traffic conditions. At CH 550 Omega Lane's entrance as shown on the concept plan will appear between two cuttings, leaving Northbound vehicles completely unsuspected of an entering vehicle's approach until appearing at the edge of the carriageway.

RTA response: The Omega Lane junction is now located north of the proposed cut / fill interface at CH540 to minimise earthworks and to provide sight distances that are compliant with current road design standards. The gradient on approach to Omega Lane will assist with deceleration into the junction and the northbound climbing lane will assist motorists to merge back with northbound traffic.

Vehicles entering the highway from Omega Lane would be required to stop and wait for a gap before entering the traffic. They would therefore come into view of passing traffic before they attempt to enter the highway traffic.

- Further, for a dual stream of Northbound traffic on weekend mid-late afternoons, any Left-On manoeuvre at this point will leave motorists with their views of the Omega Lane intersection obscured by traffic in the left lane.

RTA response: Behaviour of motorists would be as per standard, with left-on traffic giving way to through traffic when entering the highway. Traffic would enter the left lane without influencing traffic in the right lane. If traffic in the left hand lane is obscuring entering traffic from the view of traffic in the right hand lane, there would not be an adequate gap for traffic to enter the left hand lane.

- Any sudden deceleration of a left-lane vehicle will often leave following vehicles no room to pass since the right-lane vehicles are usually driving at or near the posted limit at this point, accelerating out of the apex of the RH curve at CH 650.

RTA response: Omega Lane will have the revised property access design, included as Appendix C in the REF Submissions Report that eliminates the risk of drivers making sudden decelerations to access the lane.

- There is additionally a sun glare issue for Northbound motorists in morning peak periods, although this is not as serious as the glare problem at CH 350.

RTA response: There is potential for some sun glare for a short duration during some periods of the year. Sun glare is an issue at specific locations on a number of roads within the road network, however its frequency and duration does not warrant a change to the road design. A vehicle entering from this access will appear as a silhouette against the sun. It is not possible to eliminate this potential, but it can be mitigated by travelling at different times of the day.

CH 800 Northbound: R&M Miller. RFP: 2

Lots 1 & 2 DP 595572 (R&M Miller) This pair of properties have two residences and a single direct access plus a farm gate directly onto the Northbound carriageway at CH 800.

Risks – We identify the following significant risks in this locale.

- The Left-On manoeuvre poses a high risk to Northbound traffic especially in peak weekend traffic conditions.

RTA response: The three accesses will be reduced to two and possibly one access. Left-On traffic will be able to turn onto the northbound climbing lane, without impacting the two through lanes.

- Further, for a dual stream of Northbound traffic on weekend mid/late afternoons, any Left-On manoeuvre at this point will leave motorists with their view of Left-On vehicles entering, obscured by traffic in the left lane.

RTA response: Behaviour of motorists would be as per standard, with left-on traffic giving way to through traffic when entering the highway. Traffic would enter the left lane without influencing traffic in the right lane. If traffic in the climbing lane is obscuring entering traffic from the view of traffic in the centre or right hand lane, there would not be an adequate gap for traffic to enter the climbing lane.

- Any sudden deceleration of a left-lane vehicle will often leave following vehicles no room to pass since the right-lane vehicles are usually driving at or near the posted limit at this point, accelerating out of the apex of the RH curve at CH 650.

RTA response: The revised property access design, included as Appendix C in the REF Submissions Report, eliminates the risk of drivers making sudden decelerations to access an adjacent property.

CH 1100 Northbound: BG Miller. RFP: 3

Lot 11, DP 614874 and Lot 132, DP 1091996 (BG Miller) These two properties access are run as part of BG Miller's dairy farm. There is a cattle underpass to Griff Miller's dairy at CH 1000, and a direct entrance gate to the Northbound flow at CH 1100. The farm in total has two direct entrances – one each northbound and southbound at CH 1100, as well as the 3.4m wide cattle/machinery underpass.

At issue here from a traffic management viewpoint is the fact that the Northbound entrance is on the North end of the Rose Valley Northbound entrance ramp, at a point at which there is only a single lane for traffic and ramp traffic will have accelerated to near merging speed. A truck entering at this point in front of an on-ramp vehicle will pose a risk.

Additionally any truck needing to enter this property from Northbound will need to follow a circuitous and convoluted route to the gate – firstly exiting at the Rose Valley off-ramp, then negotiating a right turn onto RV Rd followed by a left onto the Northbound on-ramp, and finally a left turn off the On-Ramp near the point that it merges to the Northbound carriageway.

Risks – We identify the following significant risks in this locale.

- The Left-Off manoeuvre poses some risk since on-ramp traffic will need to be at or near merge speed at this point. A truck turning into the entrance will slow following ramp vehicles to a point from which they will lose all of the benefit of the ramp as an acceleration lane, forcing them to merge into the Northbound traffic without the ramp's benefit.

RTA response: Property access arrangements have been redesigned since the display of the REF to include a wider shoulder at each property access, which will allow safe deceleration without interference with through traffic and minimise the potential for rear-end crashes. The on ramp at this point continues as a climbing lane and will provide sufficient length for vehicles to accelerate if they are slowed by turning traffic.

- Similarly, while the Left-On manoeuvre can safely be performed to the ramp if the driver waits for on-ramp traffic to pass first, a truck driver will face a long slow climb into the Northbound lanes with absolutely no benefit of the ramp as an acceleration lane.

RTA response: The on ramp continues beyond its required length as a climbing lane for slower vehicles. This will provide vehicles using this access with sufficient distance to accelerate or travel up the incline without impeding the two lanes of highway traffic. The access is a low volume traffic generator and will have negligible impact on the overall operation and efficiency the upgrade.

- To Northbound traffic especially in peak weekend traffic conditions. At CH 550 Omega Lane's entrance as shown on the concept plan will appear between two cuttings, leaving Northbound vehicles completely unsighted of an entering vehicle's approach until appearing at the edge of the carriageway.

RTA response: See CH 550 northbound – Omega Lane above.

- There is also possibly a sun-glare problem for Northbound vehicles approaching a truck entering from this gate.

RTA response: There is potential for some sun glare for a short duration during some periods of the year. Sun glare is an issue at specific locations on a number of roads within the road network, however its frequency and duration does not warrant a change to the road design. The curvature of the highway at Omega Lane reduces the exposure to sun glare issues. It is not possible to eliminate this potential, but it can be mitigated by travelling at different times of the day.

Section C - Northbound Condon To Rose Valley Road

In this section, the highway is Northbound from CH 2450 to CH 1800 where the concept plan shows a short 75m local access road to a new entrance on the Northbound Exit Ramp at the Rose Valley Road intersection. We recommend a two-way service road to pick up these properties and connect as already planned to the Northbound Exit Ramp. This road would be approximately 600m in length.

CH 1875 Northbound: G Chittick. RFP: 2

This property (Lot 100 DP 811659), owned by Gus Chittick, is a Dairy with a residence and has a single access at CH 1875 Northbound. At issue here from a traffic management viewpoint is the fact that the property exit is on the South end of the Rose Valley Northbound exit ramp, at a point at which there is only a single lane for traffic and ramp traffic, while decelerating, may still be travelling at a speed close to the posted 100kph. A truck entering the ramp at this point in front of an on-ramp vehicle will pose a risk.

Risks – We identify the following significant risks in this locale.

- The Left-Off manoeuvre poses significant risk since the farm gate is only 50m along the ramp from the carriageway exit and any vehicle approaching this gate will need to decelerate for some distance whilst on the carriageway (cars, 250m+, trucks, 600m+).

RTA response: Direct access to the highway at CH 1875 will be denied and an alternative internal access from Rose Valley Road will be provided subject to agreement with the owner.

At the maximum allowed rate of deceleration (3.5m/s²) light vehicles would require 110m to decelerate to a stop. Comfortable deceleration (2.5m/s²) would require 155m to decelerate. Heavy vehicles require 220m to decelerate, but design standards accept partial deceleration in the through lane due to the low volume of heavy vehicle turns.

- Similarly, a Left-On manoeuvre cannot safely be performed to the ramp since on-ramp traffic will still be travelling at speed and the ramp offers insufficient width for passing.

RTA response: Drivers performing a Left-On manoeuvre would be required to stop and then join the traffic stream through an appropriate gap in the traffic. The current and projected future traffic density would allow an appropriate sized gap in traffic for safe acceleration to the speed of traffic on the off ramp.

The design of the accesses gives drivers a good position to view and assess oncoming traffic.

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CH 2350 Northbound: F&C Condon. RFP: 4

This property (Lot 11 DP 777198), owned by Frank Condon, is grazing land with no residence (but permit to build) and has a single access at CH 2350 Northbound.

Risks – We identify the following significant risks in this locale.

- The Left-On manoeuvre poses a high risk to Northbound traffic especially in peak weekend traffic conditions.

RTA response: The concept design provides 1300m sight distance for vehicles to enter the upgraded highway. The two lane northbound configuration will provide reasonable opportunities for traffic to join the highway up to 20 years after construction has been completed.

- Further, for a dual stream of Northbound traffic on weekend mid/late afternoons, any Left-On manoeuvre at this point will leave motorists with their view of Left-On vehicles entering, obscured by traffic in the left lane.

RTA response: Behaviour of motorists would be as per standard, with left-on traffic giving way to through traffic when entering the highway. Traffic would enter the left lane without influencing traffic in the right lane. If traffic in the left hand lane is obscuring entering traffic from the view of traffic in the right hand lane, there would not be an adequate gap for traffic to enter the left hand lane.

- Any sudden deceleration of a left-lane vehicle will often leave following vehicles no room to pass since both the right-lane and left-lane vehicles are usually driving at or near the posted limit at this point after crossing Omega Flat.

RTA response: The revised property access design, included as Appendix C in the REF Submissions Report, eliminates the risk of drivers making sudden decelerations to access an adjacent property.

Section D - Northbound From Sims Road To Lester Entrance

In this section, the highway is Northbound from SIMS Road at CH 3550 to CH 3175, the current access point to Lester's Roselea Winery and C&L Robinson's residence. We recommend a two-way service road to pick up these properties as well as those of BF & K Preddy and F&C Prestia, and connect to the SIMS Road access as we recommend in Section E. This road would be approximately 600m in length.

CH 3125 Northbound: J&M Lester. RFP: I

This property (Lot 3 DP 603239), owned by J&M Lester is a vineyard and winery with a residence and has a joint access at CH 3125 Northbound. This property poses significant additional risk due to its planned operation of a cellar-door sales – frequent independent visitors plus the potential for busloads of tourists.

Risks – We identify the following significant risks in this locale.

- The Left-On manoeuvre poses a high risk to Northbound traffic especially in peak weekend traffic conditions this would be exacerbated by buses which require longer deceleration and acceleration distances than passenger vehicles.

RTA response: Roselea Winery has not yet submitted a development application to Kiama Council for the planned operational change. There is potential to work with Roselea Vineyard should a development application be lodged in the near future.

The concept design provides the necessary sight distance for vehicles currently expected to enter the upgraded highway. The two lane northbound configuration will provide reasonable opportunities for traffic to join the highway up to 20 years after construction has been completed.

- Further, for a dual stream of Northbound traffic on weekend mid-late afternoons, any Left-On manoeuvre at this point will leave motorists with their view of Left-On vehicles entering, obscured by traffic in the left lane. Visiting commercial passenger buses will require a much longer auxiliary lane in order to get up to a safe merging speed.

RTA response: Behaviour of motorists would be as per standard, with left-on traffic giving way to through traffic when entering the highway. Traffic would enter the left lane without influencing traffic in the right lane. If traffic in the left hand lane is obscuring entering traffic from the view of traffic in the right hand lane, there would not be an adequate gap for traffic to enter the left hand lane.

Vehicles travelling in the left hand lane at most times have sufficient time to move into the right lane to pass a slower vehicle because of the additional capacity a two lane highway provides.

Provisions for buses visiting Roselea Winery would be addressed on the submission of a development application.

- Any sudden deceleration of a left-lane vehicle will often leave following vehicles no room to pass since both the right-lane and left-lane vehicles are usually driving at or near the posted limit at this point after commencing the downgrade section from Sims Road.

RTA response: The revised property access design, included as Appendix C in the REF Submissions Report, eliminates the risk of drivers making sudden decelerations to access an adjacent property.

CH 3125 Northbound: C&L Robinson. RFP: I

This property (Lot 3 DP 603239), owned by C&L Robinson has a residence and has a single joint access with the Lester property at CH 3125 Northbound.

Risks – We identify the following significant risks in this locale.

- The Left-On manoeuvre poses a high risk to Northbound traffic especially in peak weekend traffic conditions and this would be exacerbated by buses visiting the neighbour's winery which require longer deceleration and acceleration distances than passenger vehicles.

RTA response: See response to CH3125 J&M Lester.

- Further, for a dual stream of Northbound traffic on weekend mid/late afternoons, any Left-On manoeuvre at this point will leave motorists with their view of Left-On vehicles entering, obscured by traffic in the left lane. Visiting commercial passenger buses will require a much longer auxiliary lane in order to get up to a safe merging speed.

RTA response: See response to CH3125 J&M Lester.

- Any sudden deceleration of a left-lane vehicle will often leave following vehicles no room to pass since both the right-lane and left-lane vehicles are usually driving at or near the posted limit at this point after commencing the downgrade section from Sims Road.

RTA response: See response to CH3125 J&M Lester.

CH 3300 Northbound: BF & K Preddy. RFP: I

This property (Lot 59 DP 999804), owned by BF&K Preddy is a residence and has a single access at CH 3300 Northbound.

Risks – We identify the following significant risks in this locale.

- The Left-On manoeuvre poses a high risk to Northbound traffic especially in peak weekend traffic conditions.

RTA response: Drivers performing a Left-On manoeuvre will be required to stop and then join the traffic stream through an appropriate gap in the traffic. The current and projected future traffic density would allow an appropriate sized gap in traffic for safe acceleration to the speed of traffic on the upgraded highway.

- Further, for a dual stream of Northbound traffic on weekend midlate afternoons, any Left-On manoeuvre at this point will leave motorists with their view of Left-On vehicles entering, obscured by traffic in the left lane.

RTA response: Behaviour of motorists would be as per standard, with left-on traffic giving way to through traffic when entering the highway. Traffic would enter the left lane without influencing traffic in the right lane. If traffic in the left hand lane is obscuring entering traffic from the view of traffic in the right hand lane, there would not be an adequate gap for traffic to enter the left hand lane.

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- Any sudden deceleration of a left-lane vehicle will often leave following vehicles no room to pass since both the right-lane and left-lane vehicles are usually driving at or near the posted limit at this point after commencing the downgrade section from Sims Road.

RTA response: The revised property access design, included as Appendix C in the REF Submissions Report, eliminates the risk of drivers making sudden decelerations to access an adjacent property.

Section E – Access To Sim's Road

In this section, the highway is Northbound from the Belinda St intersection to the Sims Rd intersection. We recommend a two-way service road to connect all Sims Rd residents plus those in Section D to the Belinda St intersection. This road would be located where the concept plan currently shows a bicycle path (also serving as a bicycle path with suitable posted speed limit) and be approximately 900m in length.

CH 3550 Northbound: Sims Road (public local road). RFP: 1

Sim's Road is a public road currently serving 14 residences with the potential for more in the future.

Risks – We identify the following significant risks in this locale.

- The Left-On manoeuvre poses a high risk to Northbound traffic especially in peak weekend traffic conditions. The risks declared in the Concept Plan safety Audit (Section 5.1.1) for Mt Pleasant Southbound traffic also apply to this locale Northbound, and must be classed as High Risk with Frequency Highly Probable and Severity Major. Paraphrasing the Audit, we can conclude that: "Increased speeds in the Northbound travel direction after Belinda St interchange increase the potential for rear-end crashes with vehicles decelerating to enter Sims Road"

RTA response: Drivers performing a Left-On manoeuvre will be required to stop and then join the traffic stream through an appropriate gap in the traffic. The current and projected future traffic density would allow an appropriate sized gap in traffic for safe acceleration to the speed of traffic on the upgraded highway.

To facilitate safe turning from Sims Road into highway traffic, sight distance appropriate for traffic travelling at 100 kilometres per hour will be provided along the highway. The sight line would be enhanced by the provision of a one metre wide gutter and 1.5 metre debris berm, in addition to the three metre shoulder. The left-out turn would be designed with a 120 degree observation angle that provides adequate sight distance to enable motorists exiting Sims Road to select an appropriate and safe gap in the oncoming traffic.

The road safety audit comment quoted refers to vehicles exiting the highway (Left-off manoeuvre). At the Sims Road at-grade junction, a deceleration lane has been incorporated into the concept design since the display of the REF to facilitate safe turning from the highway onto Sims Road and can be found under Appendix D of the REF Submissions Report.

- For a dual stream of Northbound traffic on Sunday mid-late afternoons-early evenings, any Left-On manoeuvre at this point will leave right-lane motorists with their view of Left-On vehicles entering, obscured by traffic in the left lane.

RTA response: Behaviour of motorists would be as per standard, with left-on traffic giving way to through traffic when entering the highway. Traffic would enter the left lane without influencing traffic in the right lane. If traffic in the left hand lane is obscuring entering traffic from the view of traffic in the right hand lane, there would not be an adequate gap for traffic to enter the left hand lane.

- Any sudden deceleration of a left-lane vehicle planning to Left-Off exit will often leave following vehicles no room to pass since the right-lane vehicles will often be travelling at or above the posted limit at this point.

RTA response: At the Sims Road at-grade junction, a deceleration lane has been incorporated into the concept design since the display of the REF to facilitate safe turning from the highway onto Sims Road.

- The entering vehicle's sight-line is poor at this point and the vehicle is obscured to Northbound traffic prior to arrival at the shoulder. The risk of elderly and younger more inexperienced drivers incorrectly judging the approach speed of Northbound vehicles, is very significant.

RTA response: The comment on sight-line appears to relate to current conditions. The proposal has been designed so that all sight lines and sight distances meet current road design standards. Vehicles entering the highway from Sims Road would be required to stop and wait for a gap before entering the traffic, clearly coming into view of passing traffic.

To facilitate safe turning from Sims Road into highway traffic, sight distance appropriate for traffic travelling at 100 kilometres per hour will be provided along the highway. The sight line would be enhanced by the provision of a one metre wide gutter and 1.5 metre debris berm, in addition to the 3.5 metre deceleration lane and 1.0m shoulder. Details can be found under Appendix D of the REF Submissions Report. The left-out turn would be designed with a 120 degree observation angle that provides adequate sight distance to enable motorists exiting Sims Road to select an appropriate and safe gap in the oncoming traffic.

The design of the accesses gives drivers a good position to view and assess oncoming traffic.

- Heavy vehicles entering as a Left-On at this point will take at least 900m to accelerate to 80 kph, posing a serious difficulty for Northbound drivers in higher flow conditions.

RTA response: The RTA's calculations show that heavy vehicles at this location would need approximately 310 metres to accelerate to 80 km/h. (See Fig 12.2 from the Concept Design GU Geometric Parameters).

CH 3800 Northbound: N&D Budd. RFP: 2

This property (Lot 57 DP 751254), owned by N&D Budd has a residence and is accessed from SIMS Rd. It also has a horse stable and exercise paddock with direct highway access at CH 3800.

Risks – The risk profile for the horse-yard gate at CH 3800 has a lower frequency than that at Sims Road, however the Crash Severity is Major and resultant risk is therefore still High.

RTA response: Direct access to the highway at CH 3800 will be denied and an alternative internal access from Sims Road will be provided.

CH 4000 Northbound: EP Nelson. RFP: No Access

This property (Lot 54 DP 751254), owned by EP Nelson has a residence and is accessed from SIMS Rd.

Risks – No substantial risks identified provided direct access to the northbound carriageway is not permitted.

RTA response: This residence will take access from Sims road only. Sims road has been addressed above.

CH 4400 Northbound: G&L Smith. RFP: 1

This property (Lot 1 DP 997942), owned by G&L Smith has a residence which will be resumed for the highway. Access to the remainder of this property is not shown on the concept plan. A service road leading to Belinda St would provide suitable safe access to this property.

Risks – We identify the following significant risks in this locale (current access point, if RTA intends to provide direct access to the highway).

- The Left-On manoeuvre poses a high risk to Northbound traffic especially in peak weekend traffic conditions.

RTA response: If required, access to the highway will be provided via the Belinda Street interchange.

- For a dual stream of Northbound traffic on Sunday mid-late afternoons-early evenings, any Left-On manoeuvre at this point will leave right-lane motorists with their view of Left-On vehicles entering, obscured by traffic in the left lane.

RTA response: If required, access to the highway will be provided via the Belinda Street interchange.

- Any sudden deceleration of a left-lane vehicle planning to Left-Off exit will often leave following vehicles no room to pass since the right-lane vehicles will often be travelling at or above the posted limit at this point.

RTA response: If required, access to the highway will be provided via the Belinda Street interchange.

- The risk of elderly and younger more inexperienced drivers incorrectly judging the approach speed of Northbound vehicles, is very significant.

RTA response: If required, access to the highway will be provided via the Belinda Street interchange.

- Heavy vehicles entering as a Left-On at this point will take at least 900m to accelerate to 80 kph, posing a serious difficulty for Northbound drivers in higher flow conditions.

RTA response: If required, access to the highway will be provided via the Belinda Street interchange.

CH 4700 Belinda St Service Road: W&V Hindmarsh. RFP: 5+

This property (Lot 1 DP 734816), owned by W&V Hindmarsh is a dairy farm with National Trust listed homestead. The property extends on both sides of the highway and some of the farmland is operated under lease or share/scheme with G&M Bailey. The Concept Plan shows access on the existing chainage to the planned Belinda Street service road on the western side of the highway. It is noted however that the property owners have specific issues with the RTA proposal that they are addressing independently which the group supports.

Risks – This access point satisfies our requirement for removal of direct access from the highway, and its current design holds no significant road safety risks in comparison to all others that we have analysed.

Section F - Southbound Bailey's Road to Falson

In this section, the highway is Southbound from CH 4950 to CH 5750. We recommend a two-way service road to pick up these properties and connect to Baileys Road near CH 4900, with subsequent access to the Belinda St interchange via a highway underpass. This road would be approximately 850m in length.

CH 4950 Southbound: K&R Bailey. RFP: No Access

This property (Lot 1 DP 652817), owned by K&R Bailey has a residence and is part of the Bailey family's dairy farm and is accessed from Baileys Road.

Risks – No substantial risks identified provided direct access to the Southbound carriageway is not permitted.

RTA response: Direct access to the Southbound carriageway is not permitted.

CH 5100 Southbound: Kiama Council. RFP: No Access

This property (Lot 2 DP 129977), is an easement owned by Kiama Council but operates is part of the Bailey family's dairy farm and is accessed from Bailey's Road. This easement may be available for service road access onto Bailey's Road.

RTA response: This easement no longer exists and is owned by the adjoining farmer. If the proposed service road were to be constructed the residence of K&R Bailey would be completely encircled by road and would most likely become unviable as a residence.

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CH 5300 Southbound: G&M Bailey. RFP: No Access

CH 5400 Southbound: G&M Bailey. RFP: 2

This property (Lot 7 DP 579406), is a residence owned by G&M Bailey. Current access to their dairy farm is via the highway. This residence is likely to be resumed by the RTA and we assume the owners will relocate to a new residence at about CH 5650. Currently the Concept plan shows this (assumed) new lot with a joint direct access onto the highway Southbound at CH 5575.

RTA response: Access to the dairy farm is via Bailey's Road. This residence will be demolished and a new residence constructed at an alternative location.

Risks – The proposed joint direct highway access at CH 5575 is characterized, similarly to the Northbound lanes on Mt Pleasant, by an auxiliary (3rd) climbing lane to cater to heavy vehicles merging upgrade out of Belinda Street southbound ramp. This lane is 1,500m long, commencing at CH 4550 and tapering out at CH 6050. The following risks are identified:

- This direct access is on the crest of the vertical curve at CH 5575 and its hazard is evident from the inclusion in the concept plan of four isolated highway floodlight units opposite this entry, some 450m south of the nearest highway lighting at the Belinda St Northbound exit ramp.

RTA response: The location of this access point has been selected so that all sight lines and sight distances meet current road design standards. Direct access to the southbound climbing lane is a bonus as it will have traffic with the lowest approach speed and provides approximately 300 m of downhill acceleration before merging with through traffic is required.

The four isolated lights relate to a previous design iteration of the northbound diverge lane to Willowvale Road only. Their retention in the current design is a minor oversight. The lighting design has not been carried out, and any lights shown are indicative only.

- The current owners regularly use the highway to access their dairy via Bailey's Road intersection, including by road-registered tractor which is actively used for farm work including hay-cutting on this and other properties.

RTA response: Baileys Rd will pass under the upgraded highway at the crooked river bridge and a cattle underpass will also be provided under the bridge, eliminating the need for farm machinery to access the upgraded highway.

- The Left-On manoeuvre poses a high risk to Southbound traffic especially in peak weekend traffic conditions. This entrance as shown on the concept plan will appear between two long, deep cuttings, leaving Southbound vehicles completely unsighted of an entering vehicle's approach until appearing at the edge of the carriageway.

RTA response: The location of this access point has been selected so that all sight lines and sight distances meet current road design standards. Drivers performing a Left-On manoeuvre will be required to stop and then join the traffic stream through an appropriate gap in the traffic. The current and projected future traffic density would allow an appropriate sized gap in the climbing lane for safe entry and acceleration along the climbing lane before merging with high speed traffic.

- Further, for a stream of Southbound traffic on Friday late afternoons and early evenings, any Left-On manoeuvre at this point will leave motorists with their views of the entrance obscured by traffic in the left lanes. With the two inside lanes passing upgrade heavy vehicles driving at or near the posted limit at this point, there is a risk that both Left-On and Left-Off manoeuvre will be obscured by slower heavy vehicles and unsighted by traffic in the higher-speed lanes.

RTA response: Behaviour of motorists would be as per standard, with left-on traffic giving way to through traffic when entering the highway. Traffic would enter the left lane without influencing traffic in the right lane. If traffic in the climbing lane is obscuring entering traffic from the view of traffic in the centre or right hand lane, there would not be an adequate gap for traffic to enter the climbing lane.

Left-Off vehicles will approach the access from the climbing lane and have the benefit of a widened shoulder for deceleration (see Appendix C of the REF Submissions Report), and should therefore not effect traffic in the through lanes

- A heavy vehicle entering at this point does not have sufficient acceleration length to achieve 85% of the posted 100kph limit within the auxiliary lane, as it provides only 550m to the Southbound merge point, where AustRoads recommends at least 1,000m.

RTA response: The RTA's calculations show that heavy vehicles at this location would need approximately 450 metres to accelerate to 85 km/h. (See Fig 12.2 from the Concept Design GU Geometric Parameters).

CH 5700 Southbound: R Christie & J Britten. RFP: 2

This property (Lot A DP 420461) is a residence owned by R Christie & J Britten, with direct access to the highway southbound at CH 5650. The property acts also as a holiday rental property and is gaining popularity as a location for wedding ceremonies, with up to 100 guests. Currently the Concept plan shows this property with a joint direct access onto the highway Southbound at CH 5575.

Risks – On the concept plan, this property has proposed joint direct highway access at CH 5575 with two other properties. The following risks are identified:

- The property operates as a holiday rental residence. Typical tenants are family groups using multiple vehicles, sometimes with caravans and trailers. The risk to visitors, inexperienced with traffic conditions at this location, is significant. The risk of elderly and younger more inexperienced drivers incorrectly judging the approach speed of Southbound vehicles is significant. Even at the current higher grade, heavy vehicles travel southbound at this point at the posted 80kph speed limit, sometimes faster.

RTA response: The access geometry will be designed to accommodate all vehicle types expected to use the access. Drivers will have a deceleration facility as shown in Appendix C of the REF Submissions Report. The design of the accesses gives drivers a good position to view and assess oncoming traffic and the continuation of the climbing lane provides an acceleration lane.

- This direct access is on the crest of the vertical curve at CH 5575 and its hazard is evident from the inclusion in the concept plan of four isolated highway floodlight units opposite this entry, some 450m south of the nearest highway lighting at the Belinda St northbound exit ramp.

RTA response: The location of this access point has been selected so that all sight lines and sight distances meet current road design standards. There is no requirement to provide acceleration lanes for property accesses. Direct access to the southbound climbing lane is a bonus as it will carry traffic with the lowest approach speed and provides approximately 300 m of downhill acceleration before merging with through traffic is required.

RTA response: The four isolated lights relate to a previous design iteration of the northbound diverge lane to Willowvale Road only. Their retention in the current design is a minor oversight. The lighting design has not been carried out, and any lights shown are indicative only.

- The Left-On manoeuvre poses a high risk to southbound traffic especially in peak weekend traffic conditions. This entrance as shown on the concept plan will appear between two long, deep cuttings, leaving southbound vehicles completely unsighted of an entering vehicle's approach until appearing at the edge of the carriageway.

RTA response: The location of this access point has been selected so that all sight lines and sight distances meet current road design standards. Drivers performing a Left-On manoeuvre will be required to stop and then join the traffic stream through an appropriate gap in the traffic. The current and projected future traffic density would allow an appropriate sized gap in the climbing lane for safe entry and acceleration along the climbing lane before merging with high speed traffic.

- Further, for a stream of southbound traffic on Friday late afternoons and early evenings, any Left-On manoeuvre at this point will leave motorists with their views of the entrance obscured by traffic in the left lanes. With the two inside lanes passing upgrade heavy vehicles driving at or near the posted limit at this point, there is a risk that both Left-On and Left-Off manoeuvre will be obscured by slower heavy vehicles and unsighted by traffic in the higher-speed lanes.

RTA response: Behaviour of motorists would be as per standard, with left-on traffic giving way to through traffic when entering the highway. Traffic would enter the left lane without influencing traffic in the right lane. If traffic in the climbing lane is obscuring entering traffic from the view of traffic in the centre or right hand lane, there would not be an adequate gap for traffic to enter the climbing lane.

Left-Off vehicles will approach the access from the climbing lane and have the benefit of a widened shoulder for deceleration (see Appendix C of the REF Submissions Report), and should therefore not effect traffic in the through lanes

- A heavy vehicle entering at this point does not have sufficient acceleration length to achieve 85% of the posted 100kph limit within the auxiliary lane, as it provides only 550m to the Southbound merge point, where AustRoads recommends at least 1,000m.

RTA response: The "Austroads Geometric Design for Trucks, AP-R211" is a discussion paper and has not been adopted by the RTA.

The RTA's calculations show that heavy vehicles at this location would need approximately 450 metres to accelerate to 85 km/h. (See Fig 12.2 from the Concept Design GU Geometric Parameters).

CH 5750 Southbound: G&D Falson. RFP: 2

This property (Lot 1861 DP 715455) is a residence owned by G&D Falson, with direct access to the highway southbound at CH 5650. Currently the Concept plan shows this property with a joint direct access onto the highway southbound at CH 5575.

Risks – On the concept plan, this property has proposed joint direct highway access at CH 5575 with two other properties. The following risks are identified:

- The risk of elderly and younger more inexperienced drivers incorrectly judging the approach speed of southbound vehicles is significant. Even at the current higher grade, heavy vehicles travel southbound at this point at the posted 80kph speed limit, sometimes faster.

RTA response: The design of the accesses gives drivers a good position to view and assess oncoming traffic.

- This direct access is on the crest of the vertical curve at CH 5575 and its hazard is evident from the inclusion in the concept plan of four isolated highway floodlight units opposite this entry, some 450m south of the nearest highway lighting at the Belinda St northbound exit ramp.

RTA response: The location of this access point has been selected so that all sight lines and sight distances meet current road design standards. Direct access to the southbound climbing lane is a bonus as it will have traffic with the lowest approach speed and provides approximately 300 m of downhill acceleration before merging with through traffic is required.

The four isolated lights relate to a previous design iteration of the northbound diverge lane to Willowvale Road only. Their retention in the current design is a minor oversight. The lighting design has not been carried out, and any lights shown are indicative only.

- The Left-On manoeuvre poses a high risk to southbound traffic especially in peak weekend traffic conditions. This entrance as shown on the concept plan will appear between two long, deep cuttings, leaving southbound vehicles completely unsighted of an entering vehicle's approach until appearing at the edge of the carriageway.

RTA response: The location of this access point has been selected so that all sight lines and sight distances meet current road design standards. Drivers performing a Left-On manoeuvre will be required to stop and then join the traffic stream through an appropriate gap in the traffic. The current and projected future traffic density would allow an appropriate sized gap in the climbing lane for safe entry and acceleration along the climbing lane before merging with high speed traffic.

- Further, for a stream of southbound traffic on Friday late afternoons and early evenings, any Left-On manoeuvre at this point will leave motorists with their views of the entrance obscured by traffic in the left lanes. With the two inside lanes passing upgrade heavy vehicles driving at or near the posted limit at this point, there is a risk that both Left-On and Left-Off manoeuvre will be obscured by slower heavy vehicles and unsighted by traffic in the higher-speed lanes.

RTA response: Behaviour of motorists would be as per standard, with left-on traffic giving way to through traffic when entering the highway. Traffic would enter the left lane without influencing traffic in the right lane. If traffic in the climbing lane is obscuring entering traffic from the view of traffic in the centre or right hand lane, there would not be an adequate gap for traffic to enter the climbing lane.

RTA response: Left-Off vehicles will approach the access from the climbing lane and have the benefit of a widened shoulder for deceleration (see Appendix C of the REF Submissions Report), and should therefore not effect traffic in the through lanes

- A heavy vehicle entering at this point does not have sufficient acceleration length to achieve 85% of the posted 100kph limit within the auxiliary lane, as it provides only 550m to the southbound merge point, where AustRoads recommends at least 1,000m.

RTA response: The RTA's calculations show that heavy vehicles at this location would need approximately 450 metres to accelerate to 85 km/h. (See Fig 12.2 from the Concept Design GU Geometric Parameters).

Section G – Euroma Dairy

CH 6250 Southbound: Sydney Water. RFP: 2

The Euroma Dairy currently accesses the highway southbound at CH 6250. We recommend a two-way service road connected to the end of Bailey's Road providing safe access via the Belinda St interchange. This road would be approximately 700m in length.

Risks – This large dairy generates significant heavy traffic for transporting milk, feed and agricultural equipment. At CH 6250 the southbound carriageway has reverted to two-lane and is downgrade. This is a similar situation, albeit the grade being lower, to the dairy entrance southbound at CH 1000/1075.

- The Left-On manoeuvre poses a high risk to southbound traffic especially in peak weekend traffic conditions. This has already been identified in the Concept Plan safety Audit (Section 5.1.1) as a High Risk with Frequency Occasional and Severity Major. The Audit states: "Increased speeds in the southbound travel direction may occur due to the downgrade, with potential rear-end crashes with vehicles decelerating to enter premises"

RTA response: Section 5.1.1 of the Road Safety Audit refers specifically to the northern extent of the works. This access is addressed under Section 5.1.37 which raises a potential issue with sight distance and discontinuity of an outside barrier. The Concept Design Report, in Section 20, Table 20.1, Ref 37, responds to the road safety audit report, indicating adequate safe intersection sight distance for 100 km/h traffic has been provided in the concept design and that no outside barrier has been found necessary.

The concept design addresses the risk of rear-end crashes with decelerating vehicles through the revised property access design included as Appendix C in the REF Submissions Report. This design includes shoulder widening, property specific turning geometry and sign posting.

Gerringong upgrade



Transport
Roads & Traffic
Authority

- The current Leasee of this farm regularly use the highway to access the southern end of the property via the entrance at CH 7200.

RTA response: The concept design along with the revised property access design, included as Appendix C in the REF Submissions Report, provides safe ingress and egress at this access.

- For a dual stream of southbound traffic on Friday late afternoons-early evenings, any Left-On manoeuvre at this point will leave right-lane motorists with their view of Left-On vehicles entering, obscured by traffic in the left lane.

RTA response: Behaviour of motorists would be as per standard, with left-on traffic giving way to through traffic when entering the highway. Traffic would enter the left lane without influencing traffic in the right lane. If traffic in the left hand lane is obscuring entering traffic from the view of traffic in the right hand lane, there would not be an adequate gap for traffic to enter the left hand lane.

- Any sudden deceleration of a left-lane vehicle planning to Left-Off exit will often leave following vehicles no room to pass since the right-lane vehicles will often be travelling at or above the posted limit at this point.

RTA response: The revised property access design, included as Appendix C in the REF Submissions Report, eliminates the risk of drivers making sudden decelerations to access an adjacent property.

- Heavy vehicles and farming equipment entering from the farm as a Left-On at this point will take at least 900m to accelerate to 80 kph, posing a serious difficulty for southbound drivers in higher flow conditions, especially in the first 300m from this entrance.

RTA response: The RTA's calculations show that heavy vehicles at this location would need approximately 300 metres to accelerate to 85 km/h. (See Fig 12.2 from the Concept Design GU Geometric Parameters).

- The risk of younger more inexperienced drivers (e.g. farm workers) incorrectly judging the approach speed of southbound vehicles is very significant.

RTA response: The design of the accesses gives drivers a good position to view and assess oncoming traffic.

- Further, for a stream of southbound traffic on Friday late afternoons and early evenings, any Left-On manoeuvre at this point will leave motorists with their views of the entrance obscured by traffic in the left lane. With the inside lane passing heavy vehicles accelerating downgrade to, or near the posted limit towards the 3rd-lane merge point, there is a risk that both Left-On and Left-Off manoeuvre will be obscured and unsighted by traffic in the right lane.

RTA response: Behaviour of motorists would be as per standard, with left-on traffic giving way to through traffic when entering the highway. Traffic would enter the left lane without influencing traffic in the right lane. If traffic in the left hand lane is obscuring entering traffic from the view of traffic in the right hand lane, there would not be an adequate gap for traffic to enter the left hand lane.

Vehicles performing a Left-Off manoeuvre would have use of a widened shoulder to decelerate, and should therefore not effect traffic in the through lanes.

- A heavy vehicle entering at this point does not have sufficient acceleration length to achieve 85% of the posted 100kph limit, where AustRoads recommends at least 900m for an acceleration lane at 2% downgrade.

RTA response: The RTA's calculations show that heavy vehicles entering at this location on a 5% downgrade would need approximately 300 metres to accelerate to 85 km/h. (See Fig 12.2 from the Concept Design GU Geometric Parameters).

Section H - Southbound Farquhar To Toolijooa Road

In this section, the highway is Southbound from CH 6425 to CH 7350. We recommend a two-way service road to pick up these properties and connect to the currently proposed service road that provides access to the Sydney Water property and thereby onto the southbound Toolijooa Exit Ramp at CH 7350. This road would be approximately 1,100m in length, largely at or near 0% gradient.

CH 6425 Southbound: C Farquhar. RFP: 1

This property (Lot 1 DP 749185), is a residence owned by C Farquhar, with one direct access to the highway southbound at CH 6425.

Risks – The following risks are identified:

- The risk of elderly or younger inexperienced drivers incorrectly judging the approach speed of southbound vehicles is significant. Heavy vehicles, after the downgrade run from CH 5700, travel southbound at this point at the posted 80kph speed limit, sometimes faster.

RTA response: The design of the accesses gives drivers a good position to view and assess oncoming traffic.

- The Left-On manoeuvre poses a high risk to southbound traffic especially in peak weekend traffic conditions. For a stream of southbound traffic on Friday late afternoons and early evenings, any Left-On manoeuvre at this point will leave motorists with their views of the entrance obscured by traffic in the left lanes. With the right lane passing heavy vehicles at this point, there is a risk that both Left-On and Left-Off manoeuvre will be obscured by heavy vehicles in the left lane and unsighted by traffic in the right lane.

RTA response: Behaviour of motorists would be as per standard, with left-on traffic giving way to through traffic when entering the highway. Traffic would enter the left lane without influencing traffic in the right lane. If traffic in the left hand lane is obscuring entering traffic from the view of traffic in the right hand lane, there would not be an adequate gap for traffic to enter the left hand lane.

Vehicles performing a Left-Off manoeuvre would have use of a widened shoulder to decelerate, and should therefore not effect traffic in the through lanes.

- There is no acceleration lane. Any vehicle entering at this point does not have sufficient acceleration length to achieve posted 100kph limit using only the shoulder to merge into southbound traffic.

RTA response: The shoulder is not provided as a merging lane. Drivers performing a Left-On manoeuvre would be required to stop and then join the traffic stream through an appropriate gap in the traffic. The current and projected future traffic density would allow an appropriate sized gap in traffic for safe acceleration to the speed of traffic on the upgraded highway from both local roads and direct property accesses.

CH 6725 Southbound: R&P Graham. RFP: I

CH 6575 Southbound: R&P Graham. RFP: I

This property (Lot 112 DP 1054598), is a residence, commercial Pottery and retail outlet owned by R&P Graham, with two direct accesses to the highway southbound at CH 6725 and 6575. The property is a recognized tourist attraction and is signposted as such. Daily tourist traffic enters and exits the pottery to view the gallery and purchase merchandise.

Risks – The following risks are identified:

- The property operates as a tourist attraction with a number of visitors every day. The risk to visitors (especially elderly visitors with whom the Pottery is very popular), inexperienced with traffic conditions at this location, is significant. The risk of elderly drivers incorrectly judging the approach speed of Southbound vehicles is significant. Heavy vehicles, after the downgrade run from CH 5700, travel southbound at this point at the posted 80kph speed limit, sometimes faster.

RTA response: The design of the single access provided gives drivers a good position to view and assess oncoming traffic.

- The Left-On manoeuvre poses a high risk to southbound traffic especially in peak weekend traffic conditions. For a stream of southbound traffic on Friday late afternoons and early evenings, any Left-On manoeuvre at this point will leave motorists with their views of the entrance obscured by traffic in the left lanes. With the right lane passing heavy vehicles at this point, there is a risk that both Left-On and Left-Off manoeuvre will be obscured by heavy vehicles in the left lane and unsighted by traffic in the right lane.

RTA response: Behaviour of motorists would be as per standard, with left-on traffic giving way to through traffic when entering the highway. Traffic would enter the left lane without influencing traffic in the right lane. If traffic in the left hand lane is obscuring entering traffic from the view of traffic in the right hand lane, there would not be an adequate gap for traffic to enter the left hand lane.

Vehicles performing a Left-Off manoeuvre would have use of a widened shoulder to decelerate, and should therefore not effect traffic in the through lanes.

- There is no acceleration lane. Any vehicle entering at this point does not have sufficient acceleration length to achieve posted 100kph limit using only the shoulder to merge into southbound traffic.

RTA response: The shoulder is not provided as a merging lane. Drivers performing a Left-On manoeuvre would be required to stop and then join the traffic stream through an appropriate gap in the traffic. The current and projected future traffic density would allow an appropriate sized gap in traffic for safe acceleration to the speed of traffic on the upgraded highway from both local roads and direct property accesses.

CH 7200 Southbound: Sydney Water

This property (Lot 2, DP 749185 and Lot 113 DP 1054598), is a dairy farm owned by Sydney Water and leased to J Milne for his large dairying operation. The property is used by Sydney Water as a recycling system for treated wastewater product from the Gerringong-Gerroa Sewage treatment system. Primary access to this farm is via the highway at CH 6250. At this location (CH 7200), Sydney Water's property contains a disused dairy, so the access is mainly for off-property access to the southern sections of the farm. The concept plan shows that the RTA plans to construct a service road for Sydney Water to access its property, connecting to the North end of the southbound exit ramp at the future Toolijooa Road interchange.

It is noted that at a number of meetings with the RTA Project Manager, residents who requested service roads instead of unsafe direct access to the highway, were given as the main reason for refusal, the RTA's concern not to establish a precedent. This service road, provided by the RTA to another government instrumentality, proves that the RTA recognizes the safety value of indirect access via service roads, and establishes this as a precedent. Our group feels that the RTA should now follow this precedent and include service roads into the highway detail design to replace all direct access points.

RTA response: There is no issue of precedent here and the RTA's Project Manager has not given the advice claimed to have been given to residents. The RTA provides service roads when there is justification, as evidenced by the Rose Valley Rd to Fern Street service road and the Willow Vale Road to Belinda Street service road. In the interest of road safety the RTA has combined two accesses for the one property into one reducing the number of conflict points on the upgraded highway. The link shown is part of the internal property access provisions.

At issue here from a traffic management viewpoint is the fact that the property exit is on the North end of the southbound Toolijooa Rd exit ramp, at a point at which there is only a single lane for traffic and ramp traffic, while decelerating, may still be travelling at a speed close to the posted 100kph. A truck entering the ramp at this point in front of an on-ramp vehicle will pose a risk.

RTA response: The revised Toolijooa Road and highway transition arrangement, shown in Appendix E of the REF submissions report, addresses this issue. Vehicles entering the access will be doing so from the southbound offload ramp for Toolijooa road and not from the through lanes of the highway.

The revised property access design, included as Appendix C in the REF Submissions Report, eliminates the risk of drivers making sudden decelerations to access an adjacent property.

Gerringong upgrade

Risks – We identify the following significant risks in this locale.

- The Left-Off manoeuvre poses significant risk since the farm gate is only 20m along the ramp from the carriageway exit and any vehicle approaching this gate will need to decelerate for some distance whilst on the carriageway (cars, 250m+, trucks, 600m+).

RTA response: The Refined Property Access and the Toolijooa Road and Highway Transition Arrangement, shown in Appendices C and E of the REF submissions report, address this issue with the left off manoeuvre occurring after traffic has diverged onto the off load ramp.

- Similarly, a Left-On manoeuvre cannot safely be performed to the ramp since on-ramp traffic will still be travelling at speed and the ramp offers insufficient width for passing.

RTA response: The Refined Property Access and the Toolijooa Road and Highway Transition Arrangement, shown in Appendices C and E of the REF submissions report, address this issue.

Section I - Northbound Sharpe To Toolijooa Comer

This section Northbound between Toolijooa Rd intersection and CH 5700 is comprised of two dairy farms, owned by Don Sharpe and Robert Miller. E have also included our review of the Toolijooa Road intersection in this section.

CH 6100 Northbound: D Sharpe. RFP: 3

This property (Lot 2 DP 876336) has a dairy farm and 2 residences owned by Don Sharpe. Its current access is via a remnant of the earlier highway which adjoins the current alignment at Ch 6100. The concept plan proposes a direct Left-Off Left-On access 300m north of this point at CH 5800. It is likely that the residence will be impacted by the new alignment and it may be Don's choice to move to another house located at the rear of the property. In that case, we recommend he be offered access via Willowvale Road, which runs along the northern boundary of his property.

RTA response: The road reserve boundary has been adjusted to preserve Don Sharpe's residence.

Risks – This is a dairy and as such generates traffic for transporting milk, feed and agricultural equipment. Mr Sharpe is very active in the local community and drives the Mayflower retirement village (Gerringong) bus regularly. The risks remaining if the concept plan's access at CH 5800 is adopted, include:

- The Left-On manoeuvre poses a high risk to Northbound traffic especially in peak weekend traffic conditions. This type of risk has already been identified in the Concept Plan safety Audit (Section 5.1.1).

RTA response: Section 5.1.1 of the Stage 2 Road Safety Audit refers specifically to the northern end of the project. Section 5.1.36 deals with this access when it was located at CH 6050. The access has subsequently been relocated to CH 5780 to address sight distance issues.

The location of this access point has been selected so that all sight lines and sight distances meet current road design standards. Drivers performing a Left-On manoeuvre will be required to stop and then join the traffic stream through an appropriate gap in the traffic. The current and projected future traffic density would allow an appropriate sized gap.

- For a dual stream of Northbound traffic on Sunday afternoons-early evenings, any Left-On manoeuvre at this point may leave right-lane motorists with their view of Left-On vehicles entering, obscured by traffic in the left lane.

RTA response: Behaviour of motorists would be as per standard, with left-on traffic giving way to through traffic when entering the highway. Traffic would enter the left lane without influencing traffic in the right lane. If traffic in the left hand lane is obscuring entering traffic from the view of traffic in the right hand lane, there would not be an adequate gap for traffic to enter the left hand lane.

- Any sudden deceleration of a left-lane vehicle planning to Left-Off exit will often leave following vehicles no room to pass since the right-lane vehicles will often be travelling at or above the posted limit at this point, after crossing the low-lying areas north of Toolijooa Rd.

RTA response: The revised property access design, included as Appendix C in the REF Submissions Report, eliminates the risk of drivers making sudden decelerations to access an adjacent property.

- Heavy vehicles and farming equipment entering from the farm as a Left-On at this point will take at least 900m to accelerate to 80 kph, posing some difficulty for northbound drivers in higher flow conditions, especially in the first 300m from this entrance over the crest of the vertical curve at CH 5600.

RTA response: This access is positioned 255 metres before the crest. The RTA's calculations show that heavy vehicles at this location would need approximately 600 metres to accelerate to 85 km/h. (See Fig 12.2 from the Concept Design GU Geometric Parameters).

Traffic volumes are light at farm accesses. A milk tanker services the neighbouring dairy once every two days and prudent farmers would generally move farm equipment when traffic volumes are light.

- The risk of more elderly drivers entering the highway at this point and incorrectly judging the approach speed of Northbound vehicles is very significant.

The design of the accesses gives drivers a good position to view and assess oncoming traffic.

CH 6900 Northbound: R Miller. RFP: 3

These properties (Lot 21 DP 853159, Lot 53 DP 843071) have a dairy farm and 2 residences owned by Robert Miller. Currently there are two direct highway accesses at CH 6900 and CH 7650, just at the southernmost extent of the project.

Risks – This is a dairy and as such generates traffic for transporting milk, feed and agricultural equipment. The risks remaining if the concept plan's access at CH 6900 is adopted, include:

- The Left-On manoeuvre poses a high risk to Northbound traffic especially in peak weekend traffic conditions. This type of risk has already been identified in the Concept Plan safety Audit (Section 5.1.1).

RTA response: Section 5.1.1 of the Stage 2 Road Safety Audit refers specifically to the northern end of the project. The Stage 2 Road Safety audit found no safety issues at this access.

The location of this access point has been selected so that all sight lines and sight distances meet current road design standards. Drivers performing a Left-On manoeuvre will be required to stop and then join the traffic stream through an appropriate gap in the traffic. The current and projected future traffic density would allow an appropriate sized gap.

- For a dual stream of Northbound traffic on Sunday afternoons-early evenings, any Left-On manoeuvre at this point may leave right-lane motorists with their view of Left-On vehicles entering, obscured by traffic in the left lane.

RTA response: Behaviour of motorists would be as per standard, with left-on traffic giving way to through traffic when entering the highway. Traffic would enter the left lane without influencing traffic in the right lane. If traffic in the left hand lane is obscuring entering traffic from the view of traffic in the right hand lane, there would not be an adequate gap for traffic to enter the left hand lane.

- Any sudden deceleration of a left-lane vehicle planning to Left-Off exit will often leave following vehicles no room to pass since the right-lane vehicles will often be travelling at or above the posted limit at this point, after crossing the low-lying areas north of Toolijooa Rd.

RTA response: The revised property access design, included as Appendix C in the REF Submissions Report, eliminates the risk of drivers making sudden decelerations to access an adjacent property.

- Heavy vehicles and farming equipment entering from the farm as a Left-On at this point will take at least 1000m to accelerate to 85% of the 100kph posted speed, posing some difficulty for northbound drivers in higher flow conditions, especially in the first 300m from this entrance.

RTA response: At this access point, heavy vehicles will have approximately 300m to accelerate before the steeper grade begins at CH6600. This will allow them to accelerate to approximately 60-70km/h. Due to the frequency of this movement, it is not viable to add a climbing lane for these vehicles, however the second lane will provide through traffic passing opportunity. Vehicles in the left lane may be required to decelerate or change lanes as the vehicle enters the traffic, however sightlines would give through traffic ample time to judge the entering vehicle and safely manoeuvre around an entering vehicle. Heavy vehicles will need to travel for approximately 1 km before reaching the crest of the hill and being able to accelerate to the speed of the through traffic.

- The risk of more elderly drivers entering the highway at this point and incorrectly judging the approach speed of Northbound vehicles is very significant.

RTA response: The design of the accesses gives drivers a good position to view and assess oncoming traffic.

CH 7650: Toolijooa Road intersection (Southbound)

The current Concept Plan shows Southbound traffic passing through this intersection on the current alignment, but with the current 2 lanes reduced to a single lane, for the period of construction of Stage 1, and remaining so until the grade separated interchange is eventually constructed and opened at the completion of Stage 2, which is likely to be at least 5 years from the commencement of Stage 1.

This intersection is planned to be the turning point for all southbound traffic that has missed the Gerringong off-ramp at Belinda Street, and additionally for all residential, tourist and dairy traffic entering the highway from the 6 residences, Pottery and Euroma dairy on the eastern side of the highway between Toolijooa and Bailey's Road.

The traffic mixture from the local accesses will include B-Double milk tankers, other heavy vehicles, farm machinery from Euroma dairy, tourists from the Pottery and sometimes significant peaks in visitor/guests who have attended weddings or functions at Aorangi Homestead (CH 5700). There is currently a school bus route which may also be carrying children from those residences.

All southbound traffic executing a u-turn at this point will first be channelled down an exit ramp (CH 7250) to a T-intersection at Toolijooa Road. It will then turn right onto Toolijooa Rd and proceed to a stop sign at the highway, giving way to the southbound traffic stream. On crossing the southbound traffic it will then need to turn right and merge into the Northbound traffic stream before returning to Gerringong or further points northward.

RTA response: The revised Toolijooa Road and highway transition arrangement, shown in Appendix E of the REF submissions report, addresses this issue. Vehicles turning right from Toolijooa Road onto the highway will cross only one lane of highway traffic (currently two) and be provided with a dedicated lane, eliminating the need to merge.

Currently, there is a stop-sign on Toolijooa Rd for all traffic entering the highway. Our group's observation of traffic at this point shows that the stop-sign is rarely obeyed, and it is often used also as a u-turn location for southbound traffic. It is highly likely that motorists will be confused and frustrated by this point, since if they have missed the Gerringong exit ramp, they have travelled 3.55 km from their missed exit at Belinda Street and now face a further 3.2k journey to return to Belinda St. If they fail to take this exit ramp, the next opportunity for a safe u-turn is perhaps at Tindall's Lane.

Risks SOUTHBOUND – The southbound risks remaining if the concept plan's at-grade intersection at CH 7650 is adopted, include:

- Any sudden deceleration of a left-lane vehicle at the southbound exit ramp will often leave following vehicles no room to pass since the two lanes will have merged 150m north at CH 7000 and traffic will often be travelling at or above the posted limit at this point, after crossing the low-lying areas north of Toolijooa Rd.

RTA response: The proposed temporary junction at Toolijooa road will include an off load ramp for southbound traffic exiting to Toolijooa Rd, or using this junction as a U-turn facility. The standard diverge and deceleration provisions for off load ramps will eliminate any need to decelerate suddenly and any associated risks to road safety.

- The right turn from the exit ramp onto Toolijooa Rd has some risk of accident as would any local road T-junction with significant traffic volume decelerating rapidly from a 100kph limit (to say 50kph?).

RTA response: Many highway off load ramps terminate in a T junction with the local road network and operate safely. In this instance, the highway speed limit will be 80 km/h and the current speed zoning for Toolijooa Road is 80 km/h. The offload ramp design provides adequate sight distance and will have adequate sign posting for vehicles to come to a halt safely at the end of the ramp.

- Vehicles crossing the southbound traffic from Toolijooa Rd will pose a serious hazard to southbound traffic. This intersection layout will be either similar to or more hazardous than the current Fern St gull-wing intersection, where there is an ongoing history of side-impact collisions causing serious injuries and fatalities. The additional implementation of this intersection as a southbound u-turn facility will bring into play heavy transport and farm equipment – not currently permitted on Fern Street, with the consequence that this intersection may in fact prove to be a worse Black Spot than the Fern St intersection.

RTA response: The revised Toolijooa Road and highway transition arrangement, shown in Appendix E of the REF submissions report, addresses this issue.

Vehicles turning right from Toolijooa Rd will have safe intersection site distance and the U-turn manoeuvre will be carried out by two separate successive right hand turns.

- Having crossed the southbound traffic, the design appears to provide no separation of the right-turn merging traffic from the northbound through traffic. There is not even provision for a median based acceleration and merging lane. This is a serious oversight and must be rectified.

RTA response: The revised Toolijooa Road and highway transition arrangement, shown in Appendix E of the REF submissions report, addresses this issue.

Vehicles turning right from Toolijooa Rd will cross a single lane of 80 km/h traffic into a dedicated northbound lane without the need to merge.

Risks NORTHBOUND – The northbound risks remaining if the concept plan's at-grade intersection at CH 7650 is adopted, include:

- As stated in the southbound risks above, this intersection layout will be either similar to or more hazardous than the current Fern St gull-wing intersection, where there is an ongoing history of side-impact collisions causing serious injuries and fatalities. The additional implementation of this intersection as a northbound u-turn facility will bring into play heavy transport and farm equipment – not currently permitted on Fern Street, with the consequence that this intersection may in fact prove to be a worse Black Spot than the Fern St intersection.

RTA response: The revised Toolijooa Road and highway transition arrangement, shown in Appendix E of the REF submissions report, addresses this issue.

Vehicles turning right from Toolijooa Rd will have safe intersection site distance and the U-turn manoeuvre will now be replaced by two separate successive right hand turns.

- The design appears to provide no separation of the right-turn merging traffic from Toolijooa Rd from the flow of northbound through traffic. There is not even provision for a median based acceleration and merging lane. This is a serious oversight and must be rectified.

RTA response: The revised Toolijooa Road and highway transition arrangement, shown in Appendix E of the REF submissions report, addresses this issue.

Vehicles turning right from Toolijooa Rd will cross a single lane of 80 km/h traffic into a dedicated northbound lane without the need to merge.

- On the northbound entry ramp, it may be necessary to implement a low speed zone because of the difficulty that Toolijooa Rd traffic has in merging, and this will be especially hazardous on winter afternoons when there is a serious sun-glare problem for the entering drivers. This type of risk has already been identified as High-Risk in the Concept Plan safety Audit (Section 5.1.1), with the risk of frequent rear-end collisions.

RTA response: The revised Toolijooa Road and highway transition arrangement, shown in Appendix E of the REF submissions report, addresses this issue.

Vehicles turning right from Toolijooa Rd will cross a single lane of 80 km/h traffic into a dedicated northbound lane without the need to merge.

There is potential for some sun glare for a short duration during some periods of the year. Sun glare is an issue at specific locations on a number of roads within the road network, however its frequency and duration does not warrant a change to the road design. It is not possible to eliminate this potential, but it can be mitigated by travelling at different times of the day.

Section 5.1.1 of the Stage 2 Road Safety Audit refers specifically to the northern end of the project. Section 5.1.38 of the audit report and Section 20 Table 20.1, Ref 38 deal with the Toolijooa Rd junction.

- Heavy vehicles and farming equipment entering and travelling northbound from Toolijooa Rd at this point will take at least 900m to accelerate to 80 kph, posing difficulty for northbound drivers in higher flow conditions, especially in the first 300m from this entrance.

RTA response: The revised Toolijooa Road and highway transition arrangement, shown in Appendix E of the REF submissions report, addresses this issue.

Vehicles turning right from Toolijooa Rd will cross a single lane of 80 km/h traffic into a dedicated northbound lane without the need to merge.

- Northbound motorists wishing to turn right at Toolijooa Rd will have a short (70m) right-turn lane – this length provides insufficient deceleration distance for vehicles at 100 kph or even at 80kph. The right-turn lane should be lengthened.

RTA response: The Toolijooa Rd junction has been modified following the display of the REF. The right turn bay provided for the Gerringong Upgrade and operating until completion of the grade separated interchange under the next project will be 145m in length. This section of the highway has an 80km/h speed zone which will not be increased during the construction period.

The deceleration length required in an 80km/h zone is 100m (RTA Road Design Guide). At this point on the highway, there is a small up-grade (< 2%), which will not affect the required deceleration distance.

Therefore the 145m right turn bay will be sufficient to allow for deceleration, and storage of turning vehicles.

- There is an extreme risk to through traffic posed by elderly drivers entering the highway at this point and incorrectly judging the approach speed of northbound vehicles.

RTA response: Following the display of the REF the RTA has incorporated features in the design that addresses this issue. Under this arrangement traffic turning right from Toolijooa Road would be required to give way to the single southbound traffic stream before entering a dedicated northbound lane without the need to merge with northbound highway traffic. This is a high standard at-grade junction arrangement with southbound and northbound traffic limited to a speed of 80 kilometres per hour in the vicinity of Toolijooa Road.