Appendix 6

Traffic Impact Assessment

prepared by
Constructive Solutions Pty Ltd

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DARRYL MCCARTHY
CONSTRUCTIONS PTY LTD

ABN: 86 001 646 028

Dowe's Quarry

Traffic Impact Assessment

Prepared by

constructive solutions

September 2019

Appendix 6

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DARRYL MCCARTHY CONSTRUCTIONS PTY LTD

ABN: 86 001 646 028

Traffic Impact Assessment

Prepared for:

R.W. Corkery & Co. Pty Limited
1st Floor, 12 Dangar Road
PO Box 239
BROOKLYN NSW 2083

Tel: (02) 9985 8511
Email: brooklyn@rwcorkery.com

On behalf of:

Darryl McCarthy Constructions Pty Ltd
ABN: 86 001 646 028
PO Box 246
TENTERFIELD NSW 2372

Tel: (02) 6736 1988
Fax: (02) 6736 1385
Email: dmccarthy@nqq.com.au

Prepared by:

Constructive Solutions Pty Ltd
PO BOX 1498
TAMWORTH NSW 2340

Tel: (02) 6762 1969
Email: admin@constructivesolutions.com.au

Ref No: 201942

September 2019

constructive solutions

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COMMONLY USED ACRONYMS

AADT	Average Annual Daily Traffic
AUL	Auxiliary left turn lane
CHL	Channelised left turn lane
CHR	Channelised right turn lane
RMS	Roads and Maritime Services
SEARs	Secretary's Environmental Assessment Requirements
SISD	Safe intersection sight distance

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EXECUTIVE SUMMARY

This report has been prepared for R.W. Corkery & Co. Pty Ltd on behalf of Darryl McCarthy Constructions Pty Ltd ("the Applicant") to assess traffic related impacts of the proposed continued operation (and extension) of Dowe's Quarry ("the Proposal"). The report will form part of an *Environmental Impact Statement* for the Proposal.

The Applicant is proposing to continue operating the Quarry within an expanded footprint and increase the rate of extraction from the existing limit of 150 000tpa to 230 000tpa. In doing so, the existing daily limit on laden truck despatch of 28 trucks per day would be retained and the weekly limit on laden truck despatch of 120 trucks would also be retained but averaged over a four-week period.

The purpose of this report is to assess the existing road network, the existing operations and the proposed ongoing transportation of raw materials to Sunnyside Crushing and Screening Plant and destinations beyond, and back-loading of fines for stockpiling within the Project Site.

The Dowe's Quarry is located 8km north-east of Tenterfield and is accessed via Mt Lindesay Road.

The assessment has been prepared in accordance with the NSW Roads and Traffic Authority's (RTA) (2002) Guide to Traffic Generating Developments (now Roads and Maritime Services) and Austroads Road Design Guide and addresses the Secretary's Environmental Assessment Requirements issued by the Department of Planning and Environment, as well as requirements nominated by Roads and Maritime Services (RMS) and Tenterfield Shire Council.

The scope of the transport assessment has been limited to the local and regional road network utilised to and from the Dowe's Quarry i.e. until these roads intersect with the State road network (the New England Highway). The New England Highway has only been considered at its intersection with Naas Street and Old Ballandean Road.

An appreciation of the existing traffic situation relating to Dowe's Quarry was gained by examining the existing road network, undertaking a road safety audit, reviewing available traffic volume data and liaising with relevant stakeholders. These aspects are discussed in this report. The roads inspected and discussed in this report include the relevant sections of Naas Street, Mt Lindesay Road, Old Ballandean Road the New England Highway and the Quarry Access Road.

This assessment has concluded that the amendments to the existing transport arrangements can be successfully mitigated for the Proposal.

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1. INTRODUCTION

1.1 BACKGROUND

Darryl McCarthy Constructions Pty Ltd ("the Applicant"). is proposing the continued operation (and extension) of Dowe's Quarry ("the Proposal") located 1.1km west of the Mt Lindesay Road, approximately 8km northeast of Tenterfield. **Figure 1** displays the location of the existing quarry and the surrounding road network.

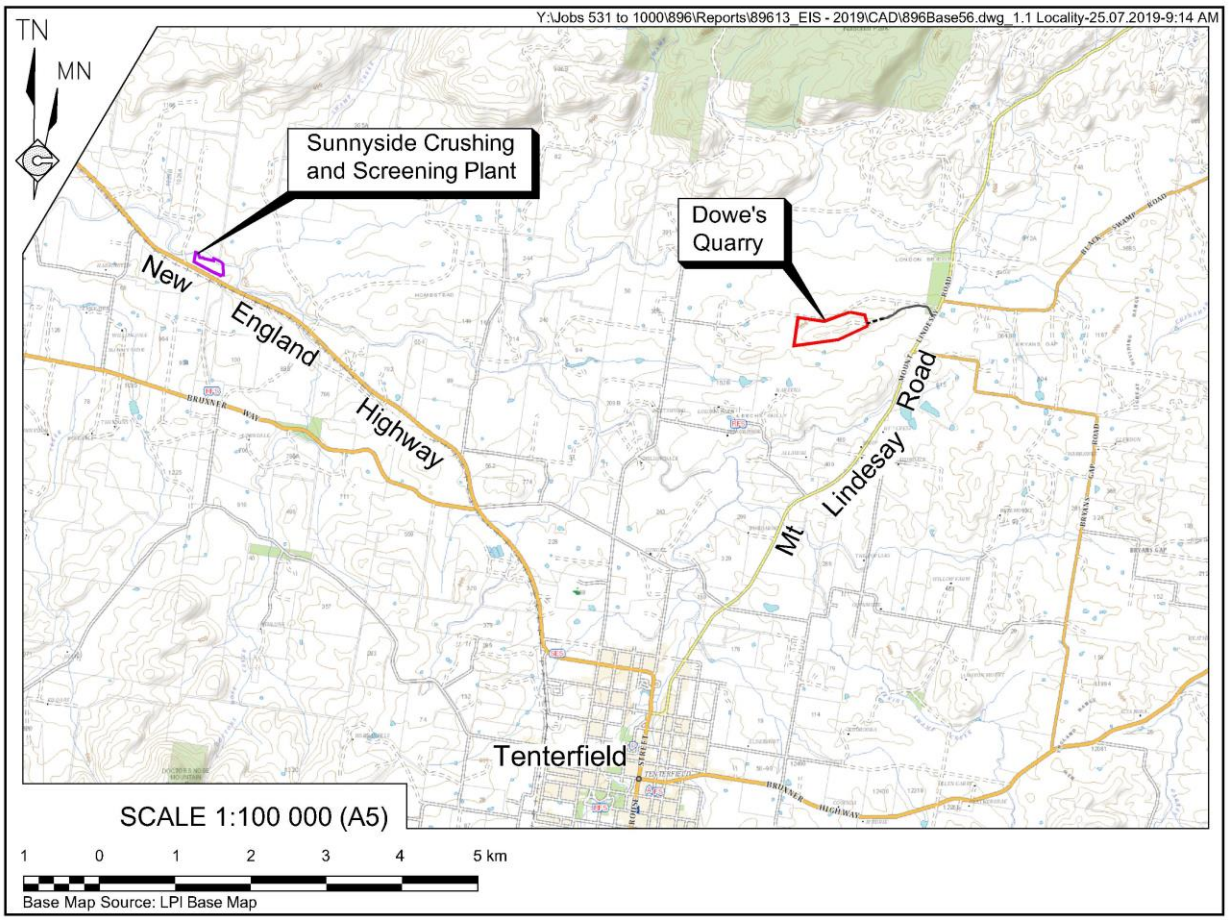

Figure 1 - Locality Map
(source RW Corkery 2019)

The Proposal currently generates heavy vehicle traffic between Dowe's Quarry and the New England Highway with the majority of the quartzose rock being transported to the Sunnyside Crushing and Screening Plant located on the New England Highway approximately 10km north-west of Tenterfield.

Figure 2 shows the current route utilised by heavy vehicle traffic in both the incoming and outgoing directions.

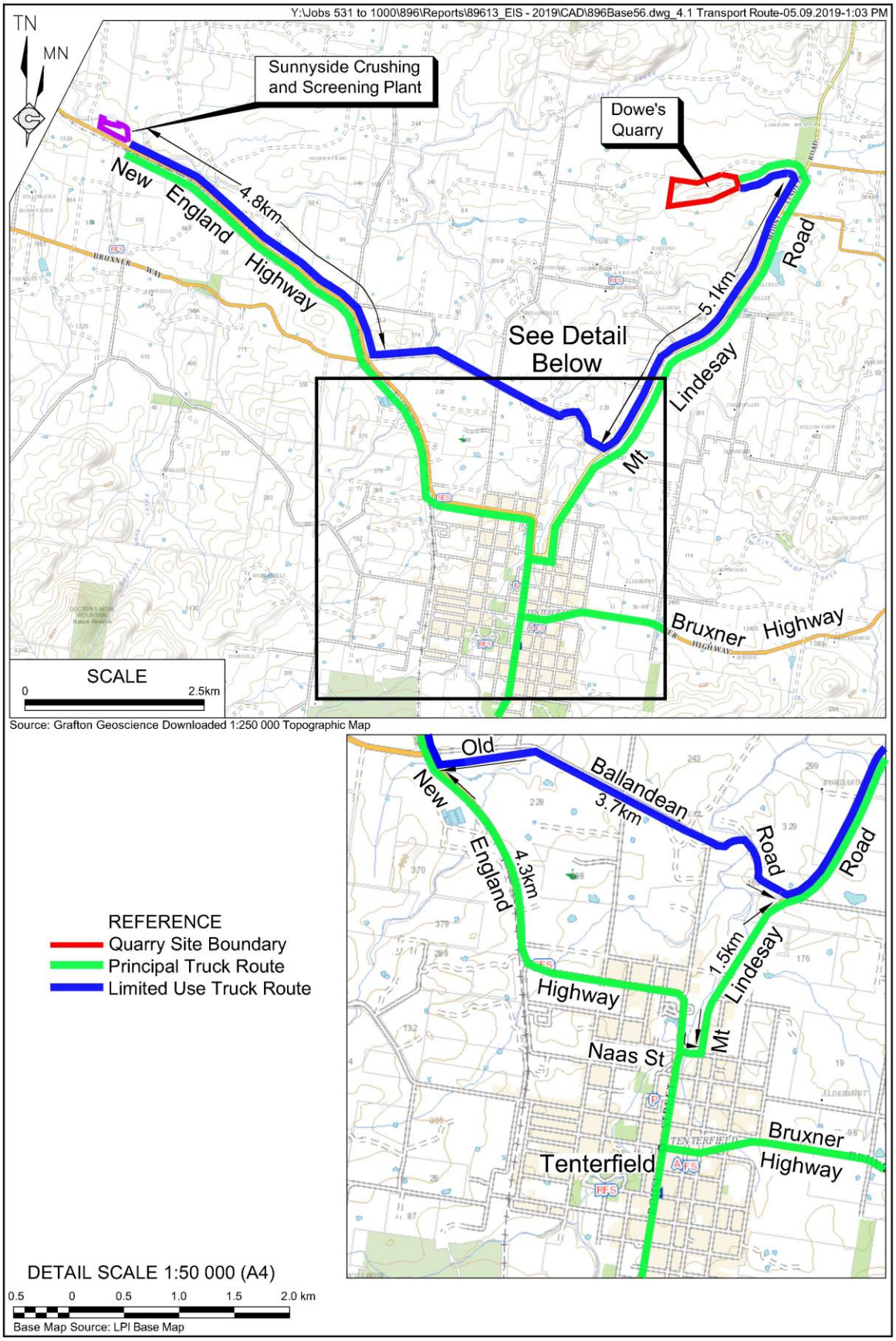

Figure 2 - Dowe's Quarry Transport Routes
(source RW Corkery 2019)

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The quarry originally commenced operations in 1987 and is currently operating under a development consent originally issued by the Joint Regional Planning Panel on 19 March 2015 and subsequently amended on 21 January 2016. The existing approval allows extraction of up to 150 000tpa of quartzose material. The existing approval also allows a maximum of 28 laden truck loads (56 truck movements) of quartzose to be transported daily (principally Monday to Friday) from Dowe's Quarry to the Sunnyside Crushing and Screening Plant with no more than 120 laden truck loads per week.

The Proposal seeks approval for an expansion of the Quarry extraction area, inclusion of on-site processing and reconfiguration of stockpiling and overburden management areas. It is also proposed to increase the annual extraction rate from 150 000tpa to 230 000tpa. However, the increased production would be accommodated within the existing limits to transport activities. That is, the Applicant would not change the existing limit of 28 truck loads per day and 120 truck loads per week. To permit a degree of flexibility to manage weather-affected or high demand period with limit of 120 trucks per week is proposed to be calculated as an average over a period of four consecutive weeks.

Under this scenario, a possible maximum of 168 trucks may occur in any week (28 truck loads over six operating days). However, operations in the following three weeks must occur at reduced levels to satisfy the four consecutive week average limit.

To cater for the increase in annual production volume, the Applicant intends to introduce a fleet of high mass limit trucks with performance based standards certification. The transportation route has been approved[1] for Higher Mass Limits (HML) therefore the fleet would be progressively upgraded to improve haulage efficiencies. The Applicant currently has approval to operate a similar configuration to their current fleet with an increased gross combined mass of 57.45 tonne which could result in an improved payload of approximately 7 tonne.

1.2 SCOPE OF REPORT

This report has been prepared to accompany the Environmental Impact Statement for Darryl McCarthy Constructions Pty Ltd, prepared by R.W Corkery & Co. Pty Ltd, in accordance with Part 4 of the Environmental Planning & Assessment Act 1979 (EP&A Act), and assesses the related impacts of the Proposal on the surrounding road network that would be affected for the duration of the Proposal. This report asses the traffic related impacts in accordance with the RMS's Guide to Traffic Generating Developments, the Department of Planning EIS Guidelines Roads and related Facilities, and the specific requirements nominated by the RMS and Tenterfield Shire Council and accompanying the Secretary's Environmental Assessment Requirements (SEARs) prepared for the Proposal by the Department of Planning and Environment.

[1] Permit Number 26072 v6 valid from 08/08/19 to 07/08/20

1.3 OVERVIEW OF EXISTING TRANSPORT ARRANGEMENTS

Laden trucks transporting quartzose rock from Dowe's Quarry follow Mt Lindesay Road south-west for approximately 6.6km into Tenterfield, turning right at Naas Street and travelling a distance of approximately 0.25km before turning right onto the New England Highway. Trucks would predominantly travel northwards for approximately 8.3km to the Sunnyside Crushing and Screening Plant. This route is displayed on **Figure 2**.

Unladen or back-loading trucks travel from the Sunnyside Crushing and Screening Plant for a distance of 4.8km along the New England Highway before turning left into Old Ballandean Road and travelling a distance of 3.7km before turning left onto Mt Lindesay Road, and returning to Dowe's Quarry. The return route is also shown on **Figure 2**.The Transport Assessment for the Environmental Impact Assessment (previous assessment) is referred to in this report as the proposed route and some aspects of transport operations remains similar to that previously assessed and approved.

2. CONSULTATION

Consultation with Tenterfield Shire Council (TSC), Roads & Maritime Services (RMS), DPI – Agriculture and Department of Planning & Environment was undertaken by RWC. **Table 1** provides a summary of transport related matters requested by each stakeholder and the relevant section reference in the TIA.

Table 1
Coverage of Issues Identified by Government Agencies for Consideration

Agency / Organisation	Paraphrased Relevant Requirement	Relevant Section(s)
TRAFFIC AND TRANSPORT		
Department of Planning & Environment (28/05/2019)	Predict the road traffic generated by the construction and operation of the development, including a description of the types of vehicles likely to be used for transportation of quarry products;	Section 3.3
	Assess potential traffic impacts on the capacity, condition, safety and efficiency of the local and State road networks, detailing the nature of the traffic generated, transport routes, traffic volumes and potential impacts on local and regional roads;	Section 4
	Describe the measures that would be implemented to maintain and/or improve the capacity, efficiency and safety of the road network (particularly the proposed transport routes) over the life of the development;	Section 4 Section 4.9
	Include evidence of any consultation with relevant roads authorities, regarding the establishment of agreed contributions towards road upgrades or maintenance; and	Not applicable
	Describe access roads to the quarry, specifically in relation to the road corridor crossing Crown Reserve 1149 (Lot 245 DP 751540) and fire trails, having regard to advice received from DoI Crown Lands and RMS (see Attachment 2);	Section 3
Tenterfield Shire Council (23/05/2019)	Assess the capacity of the road and safety of Mt Lindesay (especially between Leeches Gully Road and Bryans Gap Rd) and Old Ballandean Road.	Section 4 Annexure 1
	Assess the capacity of bridges, including large culverts, to cater for increased traffic and the impact of the higher mass vehicles.	NA
	Assess the safety of intersections such as Boundary Road, Sommerlads Road, Leeches Gully Road and Bryans Gap Road.	Annexure 1 Section 4.2
DPI – Agriculture (24/05/2019)	Consider the route for movements so that impacts on sensitive receptors are minimised. This should include consideration of Travelling Stock Reserves1 (TSR) and the movement of livestock or farm vehicles along / across the affected roads.	Section 4.2
Roads & Maritime Services (22/05/2019)	Include a Traffic Impact Assessment (TIA) be prepared by a suitably qualified person/s in accordance with the Austroads Guide to Traffic Management Part 12, the complementary Roads and Maritime Supplement and RTA Guide to Traffic Generating Developments which includes:	This report
	• The total impact of existing and proposed development on the road network with consideration for a 10 year horizon.	Section 3.3

Table 1 (Cont'd)
Coverage of Issues Identified by Government Agencies for Consideration

Agency / Organisation	Paraphrased Relevant Requirement	Relevant Section(s)
Roads & Maritime Services (22/05/2019) (Cont'd)	• The volume and distribution of traffic generated by the proposed development.	Section 3.3
	• Existing traffic volumes and background traffic growth expected along the proposed haulage routes.	Section 3.3
	• Identification of impacted intersections along the proposed haulage routes; including the intersections with the New England Highway.	Section 3.2 Section 4.3
	• Consideration of turning lane warrants and identification of appropriate intersection treatments for the identified intersections along the proposed haulage routes, based on Austroads Guide to Traffic Management Part 6 and Austroads Guide to Road Design Part 4A.	Section 4.3
	• Swept path analysis for the largest design vehicle at identified intersections along the proposed haulage routes, at accesses to the quarry and crushing plant.	NA
	• Sight distance measurements at identified intersections along the proposed haulage routes.	Table 3 Table 4
	• Details of proposed improvements required at identified intersections and accesses to mitigate impacts on safety and capacity.	Section 4.3
	• Impact on public transport (public and school bus routes) and consideration for alternative transport modes such as walking and cycling.	Section 4.5
	• Impacts of road traffic noise and dust generated along the proposed haulage routes. • Consideration for Clause 16(1) of the Mining SEPP regarding; – Impact on school zones and residential areas. – Code of Conduct for haulage operators. – Road safety assessment of approved haulage routes.	NA
	• Consideration of an Operations Traffic Management Plan (OTMP).	Section 4.4
	• Consideration of condition 26 Point.1 of Tenterfield Shire Council's development approval dated 26 March 2015 which requires that in order to retain the northern access further consideration of its use and design will need to be demonstrated and approved by Roads and Maritime.	See note 1
	Include a targeted Road Safety Audit where road safety concerns are identified at a specific location along the proposed haulage routes.	Annexure 1

Note 1: The operations associated with the Sunnyside Crushing and Screening Plant are not part of the proposed expansion or approval. Access arrangements for the Sunnyside Crushing and Screening Facility are managed under the consent for that facility.

3. EXISTING ROAD NETWORK

3.1 ROADS

3.1.1 Mt Lindesay Road

The Mt Lindesay Road is a Regional Road which provides a link between Tenterfield and the localities of Legume and Woodenbong. The road also provides an alternate route to areas over the border into Queensland around the Beaudesert region. Mt Lindesay Road becomes Logan Street as it enters the town boundary. Between the intersection north of Boundary Street and Naas Street, the road is regularly used to transport cattle departing the Tenterfield Saleyards.

Dowe's Quarry is located approximately 6.8km from the New England Highway along the Mt Lindesay Road. This section of Mt Lindesay Road varies in standard and condition. The pavement width is variable although generally between 6.5 to 7.0m wide. The alignment is generally reasonable considering the undulating to steep terrain along this section of road. The shoulder is unsealed, and the verge is generally narrow. The speed limit is 50km/h within the town boundary, 70km/h between CH0.8 and CH2.0 and 100km/h between CH2.1 and the Dowe's Quarry Access Road, heading north-east respectively.

Worn and faded centreline marking is present where reseals have not been undertaken and there are no edge lines. Delineation is provided by guide posts however they are sparse and not always duplicated on both sides of the road. There are numerous intersections and property accesses adjacent to the road. The road condition is fair although there is some evidence of rutting, edge break and some potholing.

Table 2
Mt Lindesay Road Intersection Estimated Sight Distances

Chainage#	Intersecting Road	Sight Distance North (m)	Sight Distance South (m)	Speed Zone (km/h)	SISD* (m)	Plate Ref.
CH1.8	Old Ballandean Road	260	210	70	151	Plate 13
CH3.7	Leechs Gully Road	220	240	100	248	
CH4.6	Sommerlads Road	450	265	100	248	Plate 1
CH6.2	Bryans Gap Road	260	110	100	248	
CH6.8	Quarry Access Road	250	250	100	248	
# Chainage commencing at New England Highway * Safe Intersection Sight Distance based on reaction time of 2.0 seconds (Austroads 2017)						

Plate 1 - Mt Lindesay Road and Sommerlads Road Intersection

Plate 2 - Pothole Patches near the Quarry Access Road

3.1.2 Naas Street

Naas Street, between Logan Street and the New England Highway, is a Regional Road which links Mt Lindesay Road to the New England Highway. Between the intersection with Logan Street and the New England Highway, the road is regularly used for access to the Tenterfield Saleyards.

This section of Naas Street is approximately 7m wide although it narrows over the large culvert structure which has substandard safety barrier treatment. Centreline marking is provided, although it is worn and faded in sections. The seal associated with the pavement is in reasonable condition between the intersection with Mt Lindesay Road and the culvert structure with minor patching and cracking evident in proximity to the culvert structure. The pavement seal between the culvert structure and the intersection has large sections of longitudinal cracking associated with rutting in the travel path as can be seen in **Plate 3** and **Plate 4**. There are several sections with pot hole patching and edge break.

Within the town limits, there are only a few adjacent residences with the majority of the land being vacant. The associated intersections with Logan Street (Mt Lindesay Road) and the New England Highway are discussed in sections 3.2.2 and 3.2.3 respectively.

Plate 3 - Naas Street Seal Cracking

Plate 4 - Naas Street Seal Cracking and Pavement Deformation

3.1.3 Old Ballandean Road

Old Ballandean Road is a local road which links Mt Lindesay Road with the New England Highway opposite the Bruxner Way. The road provides a link between these two transportation routes and provides localised access for a number of rural holdings along the length of the road. It is also understood that Old Ballandean Road is used for access to the Tenterfield Saleyards on Boundary Street.

In comparison with other rural roads it is of a reasonable to good standard. There is a relatively low incidence of pavement defects and the seal condition is considered to be good. There is a relatively narrow shoulder and verge and in some sections there is edge break located predominantly on the northern side of the road which is presumably due to heavy vehicles providing room for oncoming traffic to pass. The speed limit is not signposted from the western end however it is signposted as 100km/h from the eastern end.

There are two causeways, one with depth markers and flood boom gates, and the other without depth markers. There are several tight radius curves without curve and speed advisory signs. There is no line marking and limited guideposts. There are also a number of crests with no advanced warning signs in place and no centreline marking over the crest.

Table 3 lists the public road intersections with Old Ballandean Road and the estimated sight distances.

Table 3
Old Ballandean Road Intersection Estimated Sight Distances

Chainage#	Intersecting Road	Sight Distance East (m)	Sight Distance West (m)	Speed Zone (km/h)	SISD* (m)	Plate Ref.
0.9	Homestead Road	230	330	100	248	
1.9	Washpool Creek Road / Pelham Street	380	100	100	248	
2.8	Rouse Street	Not assessed	360	100	248	

Chainage commencing at New England Highway

* Safe intersection sight distance based on reaction time of 2.0 seconds (Austroads 2017)

Plate 5 - Old Ballandean Road Tight Radius Horizontal Curve

Plate 6 - Old Ballandean Road Eastern Causeway

Plate 7 - Crest along Old Ballandean Road

3.2 INTERSECTIONS

3.2.1 Quarry Access and Mt Lindesay Road

The quarry access road heads to the north-west off Mt Lindesay Road and is located approximately 6.8km from the New England Highway. The quarry access is sealed for approximately 120m from Mt Lindesay Road through to the property access gate.

The intersection was recently upgraded by the Applicant. Confirmation of acceptance of the intersection upgrade was received from Tenterfield Council in January 2016. The intersection upgrades included road widening at the mouth and of the approach to enable trucks to approach Mt Lindesay Road closer to 90 degrees, Reconstruction of the pavement and provision of an asphalt seal, and provision of give way controls.

There is edge line and centre line marking on approach to the intersection on the quarry access road and lane continuity marking on Mt Lindesay Road. There are truck warning signs along Mt Lindesay Road in both directions on approach to the quarry access road intersection.

The sight distance in either direction along Mt Lindesay Road is reasonable to the north and south at approximately 250m in either direction. Safe intersection sight distance (SISD) for 100km/hr speed zone as per the Austroad Guides is 248m and as a result, the available sight distance is considered to be adequate.

Plate 8 - Dowe's Quarry Access Road looking east towards Mt Lindesay Road

3.2.2 Naas Street and Logan Street (Mt Lindesay Road)

Naas Street and Logan Street form a four way intersection at their junction and Naas Street has right of way. The intersection is basic in its configuration and is controlled by give way signs and hold lines on both approaches along Logan Street. There is a slip lane in place for vehicles approaching from the west along Naas Street turning left into Logan Street.

There is centreline road marking provided on all approaches and street lighting from one pole located on the north-western corner. Light from this pole would only provide minimal lighting and would not provide adequate lighting along the slip lane. The sight distance in either direction along Naas Street is approximately 360m to the east and approximately 210m to the west. Safe intersection sight distance (SISD) for a 50km/h speed zone is as per the Austroad Guides is 97m and as a result, the available sight distance is considered to be adequate.

The pavement is in average condition with rutting prevalent however, a thin layer of asphaltic concrete surfacing has been applied and is likely assisting in avoiding excessive pavement defects as a result of screwing from vehicles undertaking turning manoeuvres. **Plate 9** shows the layout of the four way intersection.

Plate 9 - Naas Street and Logan Street (Mt Lindesay Road) Intersection

3.2.3 New England Highway and Naas Street

Naas Street forms a four way intersection with the New England Highway. The sign posted speed limit is 50km/h on all approaches.

The New England Highway consists of one lane in each direction with a sealed shoulder approximately 1.5m wide between the edge line and the kerb and gutter. The Naas Street approaches are controlled by duplicated stop signs and hold lines.

The pavement condition is reasonable, and the line marking is in good condition along the highway with some centre line fading in proximity of the intersection. There is street lighting provided down the eastern side of the highway to the north and the western side of the highway to the south.

A safety barrier is provided along the western side of the highway to the north extending around the corner into Naas Street heading west. The sight distance in either direction along the New England Highway is approximately 350m to the north 190m to the south. Safe intersection sight distance (SISD) for a 50km/h speed zone is as per the Austroad Guides is 97m and as a result, the available sight distance is considered to be adequate.

Plate 10 - New England Highway and Naas Street Intersection

3.2.4 New England Highway and Old Ballandean Road

The Old Ballandean Road intersects with the New England Highway at its western end opposite the Bruxner Highway. The New England Highway is the through road and the posted speed limit is 100km/h on all approaches.

Both approaches on the highway have Auxiliary Right (AUR) turn treatments approximately 120m in length.

The intersections are controlled by duplicated give way signs on the Old Ballandean Road approach although they are set well back from the intersection. There are faded holding lines for the Bruxner Highway and Old Ballandean Road as well as faded continuity lines for the through lanes on the highway. The pavement and line marking along the highway is considered to be in good condition and there is adequate dimensional capacity for all turning manoeuvres.

The sight distance along the New England Highway is limited to approximately 160m at the top of a crest to the north and is greater than 500m to the south. Safe intersection sight distance (SISD) for 100km/h is 248m as per the Austroad Guides and as a result, the available sight distance to the north in this speed environment is considered to be deficient. **Plate 12** shows the crest limiting sight distance to the north.

Plate 11 - New England Highway and Old Ballandean Road Intersection

Plate 12 - Limited sight distance due to crest looking north along the New England Highway

3.2.5 Mt Lindesay Road and Old Ballandean Road

The Old Ballandean Road intersects with the Mt Lindesay Road at its eastern extremity forming a four way intersection with Boundary Road. Mt Lindesay Road has the right of way. The speed limit along Mt Lindesay Road at this location is 70km/h. Both the Old Ballandean and Boundary Road approaches are controlled by give way signs with holding lines and there are speed advisory pavement markings on both approaches to Mt Lindesay Road. Advanced warning for the intersections is provided on both approaches along Mt Lindesay Road.

There is reasonable dimensional capacity for most turning manoeuvres although articulated vehicles turning right into Old Ballandean Road would likely track across the road centreline. The pavement condition is fair to reasonable with some evidence of rutting. Safe intersection sight distance (SISD) for a 70km/h speed zone is 151m as per the Austroad Guides and as a result, the available sight distance is considered to be adequate.

Plate 13 - Mt Lindesay Road & Old Ballandean Road Intersection

3.2.6 Other Intersections

There are other intersections along the haulage routes as identified in sections 3.1.1 and 3.1.3 however, vehicles travelling on Mt Lindesay Road have right of way at these intersections. Most resemble a basic left (BAL) / basic right (BAR) configuration with no designated turn lanes which would not be warranted given the low traffic volumes. As shown in Table 2 and Table 3 the SISD is not available at all of the intersections.

3.3 TRAFFIC VOLUMES

3.3.1 Current Traffic Volumes

Traffic volume data for the road network potentially affected by the Proposal was obtained from the Tenterfield Heavy Vehicle Bypass Route Assessment (GHD, 2014). The counts referenced were undertaken between 1998 and 2012.

Upon request, TSC provided traffic counts for Old Ballandean Road from 2016 which validated the existing count, suggesting there had been no background growth in traffic volumes. The assumed existing traffic volumes are shown in **Table 4**.

Table 4
Traffic Volumes

		Existing Traffic		
Road	**Site**	**LV**	**HV**	**Total**
New England Highway	Rouse Street#			6,321
	North of Bruxner Way*	2,044	483	2,527
Mt Lindesay Road	North of Old Ballandean Road*	340	85	425
Old Ballandean Road	West of Mt Lindesay Road*	149	42	191

Notes: Estimated traffic volumes have been calculated relying on the traffic counts from the previous assessment as there is only one count from 2016 which collaborates with the 2014 figures. A count provided by TSC for Old Ballandean Road from July 2016 of 191 vpd aligns with the 191vpd assumed above.

* October 2012 surveys of traffic volumes for Tenterfield Heavy Vehicle Bypass investigation (GHD 2014)

2011 survey provided by RMS. No split in LV and HV. Rouse Street is the closest count location to Naas Street available.

3.3.2 Quarry Operation Traffic

Forecast traffic volumes have been calculated for each of the nominated sections of the route. The following assumptions have been made in relation to vehicle movements associated with Dowe's Quarry:

1. At maximum quarry production rate (230,000 tonne per annum), maximum daily truck movements are anticipated to remain at 28 laden trips (or 56 movements) per day, with a weekly average maximum of 120 laden trips (or 240 movements) per week, calculated over a 4 week rolling period.
2. The traffic volumes obtained from the GHD (2014) report during October 2012 are presumed to include an average of 16 loads or 32 heavy vehicle movements per day and four light vehicle movements per day based on quarry related activity during this time.

Expected light and heavy vehicle daily traffic volumes are listed in **Table 5**. Current and forecast combined traffic volumes are shown **Table 6** and **Table 7** respectively with the presumed quarry activity during 2012 subtracted from the actual traffic volume counts. The traffic volumes presumed for the quarry operations have been assumed to be at maximum production to reflect the worst case scenario.

Table 5
Daily Range in Quarry Related Traffic Movements

	Daily Range LV	**Daily Range HV**
Mt Lindesay Road (north of Old Ballandean Road)	0 to 8	0 to 56
Mt Lindesay Road* (south of Old Ballandean Road)	0 to 4	0 to 28
Old Ballandean Road	0 to 4	0 to 28

* Including Logan Street and Naas Street

3.3.3 Quarry Operation Traffic

Table 6 summarises the existing current traffic combined with the quarry operation traffic, at maximum production, for the roads and locations shown. **Table 7** provides a 10 year forecast (2029) as per the requirement of the SEARs. An average annual growth estimate of 1.5% per annum for background traffic has been assumed.

Table 6
Quarry Operation, Estimated Current Traffic and Combined Traffic Volumes at Maximum Production

	Existing Traffic (less Proposal traffic)		Maximum Quarry Traffic Levels		Combined Traffic		Quarry Contribution to Total Traffic (%)	Quarry Contribution to Heavy Vehicle Traffic (%)
Road	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**		
Mt Lindesay Road*	362	57	8	56	370	113	11.6	49.5
Mt Lindesay Road#	364	74	4	28	368	102	6.0	27.4
Old Ballandean Road	158	28	4	28	162	56	12.8	50.0

* Mt Lindesay Road north of Old Ballandean Road.

Mt Lindesay Road south of Old Ballandean Road. For the purposes of this assessment the current traffic volumes on Mt Lindesay Road to the south of Old Ballandean Road are presumed to be the same as those to the north of Old Ballandean Road

Table 7
Quarry Operation, Forecast Traffic (Year 2029) and Combined Traffic Volumes at Maximum Production

	Forecast Traffic (less Proposal traffic)		Maximum Quarry Traffic Levels		Combined Traffic		Quarry contribution to total traffic (%)	Quarry Contribution to Heavy Vehicle Traffic (%)
Road	**LV**	**HV**	**LV**	**HV**	**LV**	**HV**		
Mt Lindesay Road*	420	66	8	56	428	122	10.2	45.8
Mt Lindesay Road#	423	86	4	28	427	114	5.2	24.5
Old Ballandean Road	184	33	4	28	188	61	11.3	46.3

* Mt Lindesay Road north of Old Ballandean Road.

Mt Lindesay Road south of Old Ballandean Road. For the purposes of this assessment the current traffic volumes on Mt Lindesay Road to the south of Old Ballandean Road are presumed to be the same as those to the north of Old Ballandean Road

As can be seen from **Table 6** and **Table 7** above, the percentage increase in heavy vehicle movements varies between 24.5% and 50% even at maximum production, as the majority of movements associated with the quarry are already included in the counts conducted in 2014. The roads all have relatively low traffic volumes well below their capacity, however it is anticipated that Logan Street and Naas Street would have higher volumes although no traffic volume counts are available to substantiate this.

3.4 ACCIDENT (CRASH) DATA

Detailed crash reports were obtained from NSW Transport Centre for Road Safety. The data obtained summarises crashes on the subject roads over the 5 year period 2013 to 2017. The location and summary of the data is contained in **Figure 3** and **Table 8** below. Crash data has only been incorporated into **Table 8** where it is known to occur on the road network considered as part of the scope of this report.

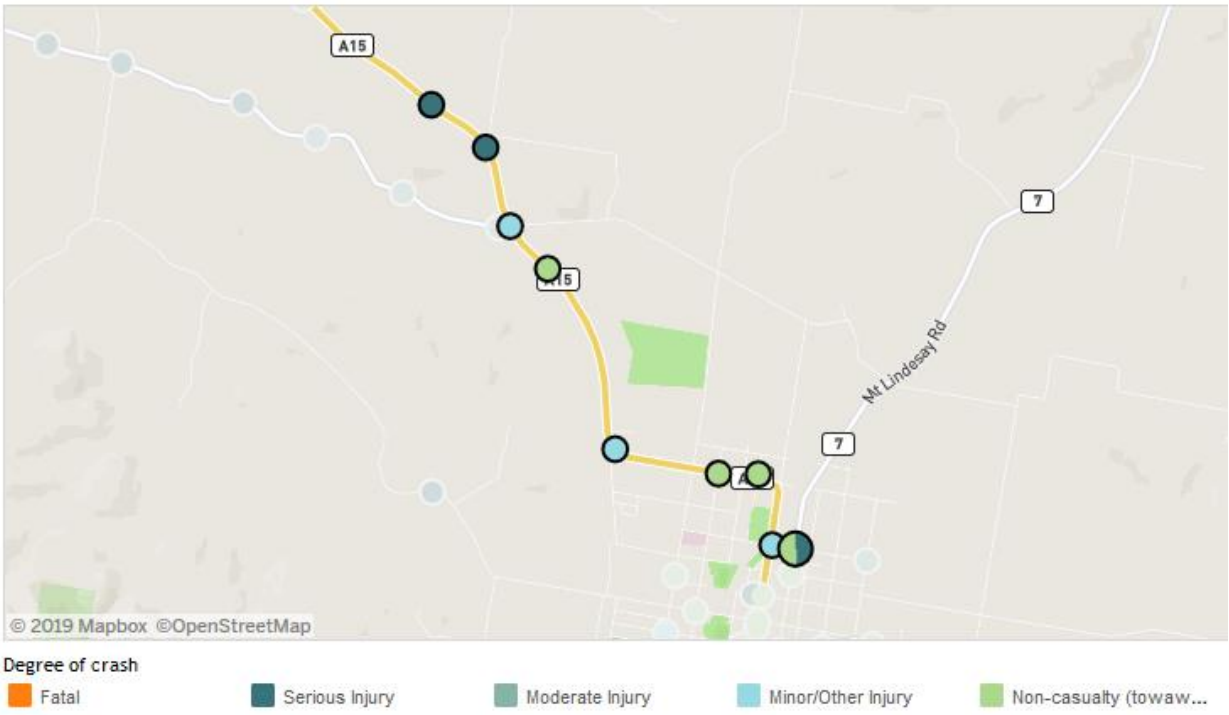

Figure 3 - Crash locations over the past 5 years (source RMS 2019)

Table 8
Summarised Crash Data

Road	Description	Year	Fatal	Injury
Logan Street / Naas Street Intersection	Crash into vehicle travelling from adjacent direction during daylight hours.	2014	0	0
	Crash into vehicle travelling from adjacent direction during daylight hours.	2015	0	2
New England Highway / Naas Street Intersection	Driver travelling south came off the carriageway left on a right bend into an object/parked vehicle at night.	2014	0	1
New England Highway / Duncan Street Intersection	Crash into vehicle travelling from adjacent direction at night.	2013	0	0
New England Highway / Western Boundary Road Intersection	Driver travelled through T-junction at night.	2017	0	1
New England Highway	Vehicle struck an animal at night.	2013	0	0
New England Highway / Bruxner Highway / Old Ballandean Road Intersection	Crash into vehicle travelling from adjacent direction during daylight hours.	2016	0	1
New England Highway / Geyers Road Intersection	Vehicle out of control on bend during daylight hours.	2016	0	4
New England Highway	Vehicle out of control on carriageway during daylight hours.	2016	0	1
	Vehicle off the road left into object during daylight hours.	2014	0	1

Of the eight crashes in five years two involve intersections that are used by the Applicant. The turning manoeuvres utilised at these locations are not anticipated to exacerbate the risk of a traffic related incident beyond the increase in likelihood associated with a minor increase in traffic volumes associated with the Proposal.

The left turn manoeuvre made from the New England Highway onto Old Ballandean Road should not exacerbate safety issues associated with the crest as the trucks will not be queued and offer improved forward sight distance given the height of the trailers.

The Applicant has advised that there have been no incidents or near misses associated with traffic since the inception of quarry operations.

4. ASSESSMENT AND RECOMMENDATIONS

4.1 ROAD SAFETY AUDIT

A road safety audit (RSA) was undertaken by Michael Bloem (Level 3 RSA) and Jerome Malvern (Level 2 RSA) on the 29th and 30th April 2019. The report is included as Appendix 1.

The corrective action requests (CARs) are summarised in **Table 9**.

Table 9
Road Safety Audit Corrective Action Requests

CAR No.	Category and Description	Mt Lindesay Road	Naas Street	New England Highway	Old Ballandean Road
001	**Road Safety Category - Delineation** Longitudinal Line Marking Warn or Missing	X			X
002	**Road Safety Category - Roadside Hazards** Objects within the Clear Zone	X		X	X
003	**Road Safety Category - Road Alignment and Cross Section** Steep Batters	X		X	X
004	**Road Safety Category - Traffic Signs** Missing or Damaged Signs	X		X	X
005	**Road Safety Category - Safety Barriers** Non conforming Barrier or End Terminals	X	X	X	
006	**Road Safety Category – Delineation** Guide Posts Missing or Damaged	X		X	X

The following general observations have been made:

- Mount Lindesay road is a school bus route however there are no school bus route signs in place.
- Whilst there are a number of pavement failures including pavement deformation, it was considered that the severity of these failures were only minor in terms of road safety.

4.2 ROADS

The amendments to the haulage frequencies and payloads associated with the Proposal are not anticipated to exacerbate issues associated with:

- The existing standard of road provided.
- The inherent safety issues which are consistent with the previous assessment.
- Traffic interaction at the existing intersections.

Improvements to delineation, particularly centreline markings along the route should be implemented along with the treatment of various safety hazards identified, including but not limited to, hazards within the clear zone and either missing or non-conforming safety barriers where drop offs or steep embankments exist.

Pavement deformations, edge break and other minor pavement defects should be rectified, in accordance with Council's intervention requirements, to prevent a vehicle losing control or the pavement ravelling. The bituminous seals should also be monitored to ensure moisture ingress is limited and a reasonable surface texture is maintained.

There are four intersections, all within 100km/h speed zone, along the haul route that have substandard SISD (<248m). They include:

- Leechs Gully Road and the Mt Lindesay Road Intersection – 240m looking south.
- Bryans Gap Road and the Mt Lindesay Road Intersection – 110m looking south.
- Washpool Creek Road / Pelham Street / Old Ballandean Road Intersection – 100m looking west.
- Homestead Road and Old Ballandean Road Intersection – 230m looking east.

Where possible improvements should be investigated by adjusting the roadside formation, vegetation removal, or adjusting the approach alignment of the side road to maximise the available sight distance.

Issues identified in the Road Safety Audit should be considered by Tenterfield Shire Council and the Applicant with a works strategy developed to rectify the issues raised utilising funds from the Section 94 Contributions.

As recommended in the previous assessment a self-imposed speed limit of 80km/h should be maintained for the following reasons:

- The SISD on approach to some of the intersections is less than the requirements nominated in Austroads.
- There remains numerous private property accesses, some of which are obscured, along the haul route.
- Braking distances under HML may be compromised however this may be addressed as part of the fleet upgrades.

Consideration should be given to the implementation of a GPS monitoring system if complaints or issues arise associated with the speed of the haulage vehicles on the nominated haul route.

As required by the Department of Primary Industries, contact was made with the Northern Tablelands Local Lands Services with respect to livestock movements and travelling stock reserves. Subsequent advice was received via email confirming that no impact was anticipated to either grazing or walking stock.

4.3 INTERSECTIONS

4.3.1 Old Ballandean Road and the New England Highway

The Old Ballandean Road intersection with the New England Highway is considered suitable for left turn movements for southbound HVs turning left onto Old Ballandean Road. Right turn movements across the southbound lane of the New England Highway should not be undertaken by HVs associated with the quarry operations as the sight distance is limited and the laden vehicles will be slow to accelerate on an uphill grade.

The approved route for laden HVs via Tenterfield should be adhered to without exception. It is recommended that all drivers be tool boxed in relation to the issues associated with the SISD at this intersection to ensure it is not utilised and the inherent risks are known particularly given the recent crash history associated with the intersection.

Traffic generated by the Proposal would not meet the warrant, in accordance with Austroads, for intersection treatments beyond the AUL already provided.

4.3.2 Old Ballandean Road and the Mt Lindesay Road

The Old Ballandean Road intersection with the Mt Lindesay Road is considered suitable for the intended purpose. Heavy vehicles turning left out of Old Ballandean Road have adequate sight distance in a relatively low speed environment.

It is recommended that a centreline and hold line be provided on the Old Ballandean Road approach to encourage the HV drivers to stay on the left hand side and stop at a suitable location when required. This would assist in preventing the HVs taking up too much of the mouth of the intersection leaving insufficient room for vehicles turning right from the Mt Lindesay Road onto Old Ballandean Road.

Traffic generated by the Proposal would not meet the warrant for intersection treatments beyond a basic left (BAL).

4.3.3 Naas Street and the New England Highway

This intersection is considered adequate for the Proposal given the low speed environment and the relatively low turning volume of traffic turning right into the northbound lane of the New England Highway. If there was significant growth in turning traffic originating from Naas Street SIDRA analysis would be recommended to ensure a reasonable level of service is maintained for this intersection.

The available sight distance facilitates traffic interactions at this intersection, particularly HVs turning right, that have approximately double the recommended SISD for a 50km/h speed zone.

4.3.4 Naas Street and Logan Street (Mt Lindesay Road)

This intersection is utilised by the laden HVs turning right from Logan Street onto Naas Street. The tracking path of the HVs through the intersection is prevalent as shown in the drone imagery (**Plate 9**). Where possible the laden HVs should be encouraged to remain in the left lane without crossing the centreline on the approach to the intersection via Logan Street. The linemarking is worn and is unlikely to withstand repeated screwing.

Thermoplastic linemarking of the give way hold line and the centreline are recommended for the Logan Street approach. Some localised shoulder widening would also assist by providing improved dimensional capacity for the HVs to remain on the left hand side.

The condition of the pavement is deteriorating, therefore should be monitored to ensure a suitable pavement surface is maintained. Ideally the pavement in the intersection would be stabilised and an asphaltic concrete wearing course applied to avoid ongoing maintenance issues.

The deterioration of the pavement is likely exacerbated by heavy vehicle movements from the saleyards therefore the contribution made should remain in line with the s94 contributions leveed.

Two crashes have occurred at this intersection however given that there have been no accidents or near miss incidents associated with the quarry's haulage operations it can only be assumed that they are unrelated to quarry haulage operations.

The HV Drivers should be made aware that they are to remain in the left hand lane on approach and stop at the give way line where required. This should be monitored, and if not rectified, physical controls such as a raised centre median on the Logan Street approach be investigated.

4.3.5 Quarry Access and the Mt Lindesay Road

The upgraded intersection is considered adequate for the intended use of the intersection. The pavement and linemarking are in good condition. Monitoring of the linemarking and pavement should be undertaken to ensure defects are rectified as required.

Traffic generated by the Proposal would not meet the warrant for intersection treatments beyond a basic left (BAL) and basic right (BAR) already provided.

4.4 DRIVERS AND HAULAGE VEHICLES

The drivers code of conduct, previously developed by the Applicant, should be updated to reflect changes to the Dowe's Quarry Operations. As a minimum the following should be encompassed:

- Known hazards updated where applicable to cover the aspects raised in this assessment.
- Vehicle checking and maintenance procedures.
- School bus routes and pick up and drop off locations (updated where applicable).

- Revised load limits (per axle and gross) for each HML configuration.
- Reasons why a self-imposed speed limit of 80km/h has been adopted.
- Chain of responsibility requirements relating to fatigue.

If the Applicant has not considered Chain of Responsibility requirements it is recommended they are investigated and implemented as a matter of priority not only for compliance purposes but also for the effective management of driver fatigue.

The National Heavy Vehicle Regulator (NHVR) has approved the use of a 3 axle truck and 4 axle dog trailer for the nominated haul route. The permit allows for a higher mass limit (HML) of 57.45 tonnes. The only condition imposed by Tenterfield Shire Council is that the vehicle must remain on the sealed sections of the road and avoid travelling off the edge (except in cases of emergency).

It has been presumed by the issue of the HML permit that TSC has considered the impact that this HV configuration will have on the associated structures. Although the gross combined mass (GCM) will increase by 6.95 tonne over the 4 axle groupings the HML performance based standards should result in improvements to suspension characteristics, potentially negating the impact of the additional weight on the pavement and associated structures.

It would be considered advantageous for the Applicant to develop an Operations Traffic Management Plan encompassing the aspects discussed in this section to ensure an integrated approach is taken to address the risks associated with the haulage operations.

It is noted that the Quarry truck fleet utilises a GPS monitoring system to ensure that driver behaviour is monitored. Overall, the GPS fleet management provides the Quarry operator oversight of all trucking activity in real time tracking. Alerts are sent to the management staff in circumstances where truck drivers behave in a non-compliant manner such as speeding, exceeding fatigue limits and turning or braking aggressively. This enables the Quarry operator to enforce compliance with the Driver Code of Conduct and take the appropriate corrective actions. If the school bus operator elects to install GPS trackers, this system will be used to warn drivers when they are within 900m proximity of a school bus to ensure the appropriate safety protocol is followed.

4.5 SCHOOL BUS SERVICES

There are currently two school bus routes operated by Hillier's that utilise this section of Mt Lindesay Road. The first operating between Naas Street and Leech's Gully Road with two stops on Mt Lindesay Road and the second route operating between Sommerlads Road and Black Swamp Road with no stops on Mt Lindesay Road.

Consideration of the school bus operations is required particularly where there is a change to the pick up and drop off locations. In such instances a suitable check is required to ensure the suitability of the location and that this information is conveyed to all HV drivers.

All school bus routes should be sign posted and ideally all school bus pick up and drop off locations should be identified, sign posted and communicated to the HV drivers.

It is noted that the Applicant intends to continue to liaise with school bus route operators to determine whether local school buses will be fitted with the same GPS tracking technology used by the Quarry's truck fleet. This would enable truck drivers to be audibly notified of school bus activities along the designated haulage route. For example, truck drivers will be alerted when school buses are stopping so that drivers can slow down to prevent the need to overtake the school bus and increase the awareness of any alighting passengers. Proximity detectors would ensure trucks always keep a 50m safe distance from school buses during haulage activities.

4.6 PEDESTRIAN AND CYCLIST ACTIVITY

There was no pedestrian or cycling activity observed along the road network, however it is noted that some school children were observed walking along the southern side of Naas Street during the inspection for the previous assessment.

If significant pedestrian or cyclist activity is anticipated in the future consideration of the impacts would need to be considered.

4.7 CUMULATIVE TRAFFIC IMPACTS

There are no known cumulative traffic impacts that are likely to affect the roads considered in this report. There are no major projects listed on the Major Projects portal other than the Dumaresq to Lismore Transmission Line which has been withdrawn.

The Tenterfield Heavy Vehicle Bypass preferred route heads west from the southern end of Tenterfield until it meets the rail line, which it then runs parallel with, heading north to re-join the New England Highway. Should it proceed minimal traffic generation, as a result of this project, is considered likely on the Shire roads being assessed in this report. The quarry may provide materials however this would be within the limits specified as part of the Proposal.

It is assumed that the traffic generated by the Saleyards would be highly variable depending on seasonal conditions and market forces. Significant volumes of heavy vehicles are likely when large yardings (total numbers of cattle) are experienced.

Other projects, considered minor in nature, that may result in cumulative traffic impacts include:

- DA 2019.038 – 6 Lot Stage Rural Subdivision – Mt Lindesay Road Liston
- DA 2019.033 – Three Lot Rural Subdivision – 7137 & 7266 Mt Lindesay Road

These developments will likely generate future traffic movements on the Mt Lindesay Road however are considered within the allowance made for annual growth in background traffic of 1.5%.

4.8 ROAD MAINTENANCE

Maintenance of the roads utilised for the Proposal would be an ongoing requirement of TSC or RMS as the respective Road Authorities. The intent of Council's s94 Contribution Plan appears to have remained the same with a contribution leveed at a rate of $0.04 per tonne per km to the nearest State or National Highway.

There is no definitive guidance as to the intended dedication of funds, however it is presumed that it encompasses all road related expenditure deemed to be associated with the Proposal .

4.9 MITIGATION SUMMARY

Table 10
Summary of Mitigation Measures

Page 1 of 2

Location	Recommendations	Responsibility
All	• Follow the transport route as is currently being utilised as described in Figure 2.	Applicant
	• Address the findings of the Road Safety Audit included as Appendix C.	Council / Applicant
	• Place a self-imposed speed limit of 80km/hr on Mt Lindesay Road and Old Ballandean Road except where the regulatory speed limit is less.	Applicant
	• Continue to implement the existing Drivers Code of Conduct.	Applicant
	• Continue to liaise with the school bus operators regarding the fitting of GPS tracking technology and associated procedures.	
	• Address the following in driver training and induction and through regular toolbox meetings: – Known hazards to cover the aspects raised in this assessment. – Vehicle checking and maintenance procedures. – School bus routes and pick up and drop off locations (updated as applicable). – Revised load limits (per axle and gross) for each HML configuration. – Reasons why a self-imposed speed limit of 80km/h has been adopted. – Chain of responsibility requirements relating to fatigue.	
	• Continue to operate in accordance with Chain of Responsibility requirements.	Applicant
	• Continue to adopt the servicing plan for all trucks travelling to and from the Dowe's Quarry and pre start inspections.	Applicant
	• Maintain the existing Loadrite Weighing Scales for spot weighing loads placed onto road trucks.	Applicant
	• Consider developing an Operations Transport Management Plan to encompass all relevant procedures and controls.	Applicant
	• The Applicant pay a levee as identified in TSC's s94 Contributions plan of $0.04 cents per tonne per km to mitigate the road related impacts of this project. No contributions for capital upgrades have been identified.	

Table 10 (Cont'd)
Summary of Mitigation Measures

Location	Recommendations	Responsibility
TSC Roads	• Improve delineation, particularly centreline markings, prioritise and address hazards in the clear zone and prioritise and address non-conforming safety barriers. • Regularly assess and address pavement deformations, edge break and other pavement defects. • Monitor bituminous seals for integrity and surface texture.	Council
Old Ballandean Road / New England Highway Intersection	• Maintain existing transport arrangements. • Ensure that the requirement for no HV right turn movements onto the Highway is strictly adhered to.	Applicant
Naas Street / New England Highway Intersection	• Maintain existing transport arrangements.	Applicant
Naas Street / Logan Street Intersection	• Consider stabilising the existing pavement and provide an asphaltic concrete wearing course to rectify defects in the intersection potentially incorporating some localised shoulder widening. • Provide thermoplastic linemarking for the hold line and centreline on the Logan Street approach. • Toolbox HV Drivers to keep left and remain in the lane provided, monitor and if unable to rectify investigate the inclusion of a raised centre median.	Council Council Council / Applicant
Quarry Access / Mt Lindesay Road Intersection	• Maintain existing transport arrangements. • Undertake regular monitoring of the linemarking and condition of the pavement and rectify where necessary.	Applicant

5. CONCLUSION

Assessment of the proposed operations and the local road network has identified that the Applicant could continue to operate with no significant impact to the road network, local users of the road and in light of potential cumulative traffic impacts provided the mitigation measures are adopted for the life of the project.

There are some indications of wear on the local road network that require maintenance. Furthermore, there are safety issues which have been identified that should be addressed. These activities may, in part, be funded through the ongoing contributions paid to TSC by the Applicant.

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Annexure 1

Road Safety Audit

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Stage 5 Road Safety Audit

Dowe's Quarry Transportation Route

Prepared for
Darryl McCarthy Constructions Pty Ltd

September 2019

Report prepared by Constructive Solutions Pty Ltd

PO Box 1498
TAMWORTH NSW 2340

Phone: 02 6762 1969
Fax: 02 6762 1969
Email: admin@constructivesolutions.com.au

DOCUMENT HISTORY AND STATUS

Issue	Rev	Issued To	Date	Reviewed	Approved
1	A	Internal	21/05/2019	J. Malvern	
1	0	Client	22/05/2019	M. Bloem	
1	1	Client	23/09/2019	D. Greentree	B. Rossiter

Author:	Michael Bloem
Project Manager:	Michael Bloem
Project Name:	Dowe's Quarry Transportation Route – Stage 5 Road Safety Audit
Project Number:	201942
Name of Client:	Darryl McCarthy Constructions Pty Ltd

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Audit Report

CLIENT:	R.W. Corkery & Co P/L on behalf of Darryl McCarthy Constructions Pty Ltd
ADDRESS:	PO Box 246, Tenterfield NSW 2372
TELEPHONE:	(02) 9985 8511
PROJECT MANAGER/ PROJECT SPONSOR	Nick Warren R.W. Corkery & Co. Pty Limited
DESIGNER:	N/A
PROJECT:	Dowe's Quarry Transportation Route
DRAWINGS:	N/A
TYPE OF AUDIT:	Stage 5
DATE OF AUDIT:	Night Audit – 29 April 2019 Day Audit – 30 April 2019
AUDIT TEAM:	
Accredited Level 3 Road Safety Auditor in NSW	Michael Bloem
Accredited Level 2 Road Safety Auditor in NSW	Jerome Malvern
COMMENCEMENT MEETING:	Not Required – Works defined by the brief
COMPLETION MEETING:	22 May 2019
PREVIOUS AUDIT:	Nil

Executive Summary

Darryl McCarthy Constructions Pty Ltd (DMC) operates the Dowe's Quarry (referred to herewith as the Quarry) located approximately 8km north-east of Tenterfield on Mount Lindesay Road to recover quartzose material which is transported to the Sunnyside Crushing and Screening Plant (referred to herewith as the Plant) located on the New England Highway approximately 10km north-west of Tenterfield. The quartzose material is used to produce a range of ivory-coloured stone products used in the manufacture of decorative concrete and landscaping products.

DMC has identified a further 4 million tonnes of quartzose material adjacent to and beneath the current approved extraction area of the Quarry for which they intend to seek development consent to extract which will require an Environmental Impact Statement. It is anticipated that, apart from a number of specialist studies, a road safety audit of the existing transportation routes between the Quarry and the Plant will be required.

R.W. Corkery & Co P/L acting on behalf of Darryl McCarthy Constructions Pty Ltd have requested a Stage 5 (Existing Road) Road Safety Audit of the transportation routes between the Quarry and the Plant as follows:

Transportation Route 1 – from the Quarry to the Plant

- Mount Lindesay Road,
- Naas Street and
- New England Highway (inclusive of Rouse Street).

Transportation Route 2 – from the Plant to the Quarry

- New England Highway;
- Old Ballandean Road; and
- Mount Lindesay Road

Refer to **Figure 1** for the locality map indicating the transportation routes.

The purpose of this audit is to report on the potential safety deficiencies and areas of risk associated with the existing road network from a safety perspective for all road users.

The audit consisted of a site inspection for both day and night conditions on 29 and 30 April 2019. The safety issues identified have been scheduled in **Table 1** in Section 5 of the report with 8 Corrective Action Requests (CARs) raised. The safety issues identified fall within the following road safety categories:

- Delineation;
- Road Alignment and Cross Section;
- Roadside Hazards;
- Safety Barriers; and
- Traffic Signs.

The comments listed under the heading 'General Observations' are observations noted whilst carrying out the audit and do not necessarily relate to safety issues. This list is not comprehensive, it is simply a record of some of the additional observations made by the auditors and has been provided purely as an item for additional information for the client. Some of these issues may have already been addressed by the client.

The risk ratings provided in this audit are the assessment of the auditors. Ultimately, it is the client's responsibility to determine the response to risk for each road safety risk identified.

This report does not provide recommendations with regards to addressing the corrective actions identified from this audit.

The CAR forms in **APPENDIX 2** have been provided for the use of the client. The purpose of the form is to formalise the process of attending to the specific safety risk raised, whether it be the "do nothing"

action or what action was taken to address the risk, and then the form can be signed off. CARs have been provided for all audit findings irrespective of the risk rating of the issue raised.

1 Introduction

1.1 Project Description

Darryl McCarthy Constructions Pty Ltd (DMC) operates the Dowe's Quarry (referred to herewith as the Quarry) located approximately 10km north-east of Tenterfield on Mount Lindesay Road to recover quartzose material which is transported to the Sunnyside Crushing and Screening Plant (referred to herewith as the Plant) located on the New England Highway approximately 10km north-west of Tenterfield. The quartzose material is used to produce a range of ivory-coloured stone products used in the manufacture of decorative concrete and landscaping products.

DMC has identified a further 4 million tonnes of quartzose material adjacent to and beneath the current approved extraction area of the Quarry for which they intend to seek development consent to extract which will require an Environmental Impact Statement. It is anticipated that, apart from a number of specialist studies, a road safety audit of the existing transportation routes between the Quarry and the Plant will be required.

The scope of the road safety audit was to assess the length of the transportation routes as follows:

Transportation Route 1(Laden Truck Route) – from the Quarry to the Plant (15.3km)

- Mount Lindesay Road (including Logan Road),
- Naas Street and
- New England Highway (inclusive of Rouse Street).

Transportation Route 2 (Return Truck Route) – from the Plant to the Quarry (13.1km)

- New England Highway;
- Old Ballandean Road; and
- Mount Lindesay Road.

The locality map of the audit is shown in **Figure 1**.

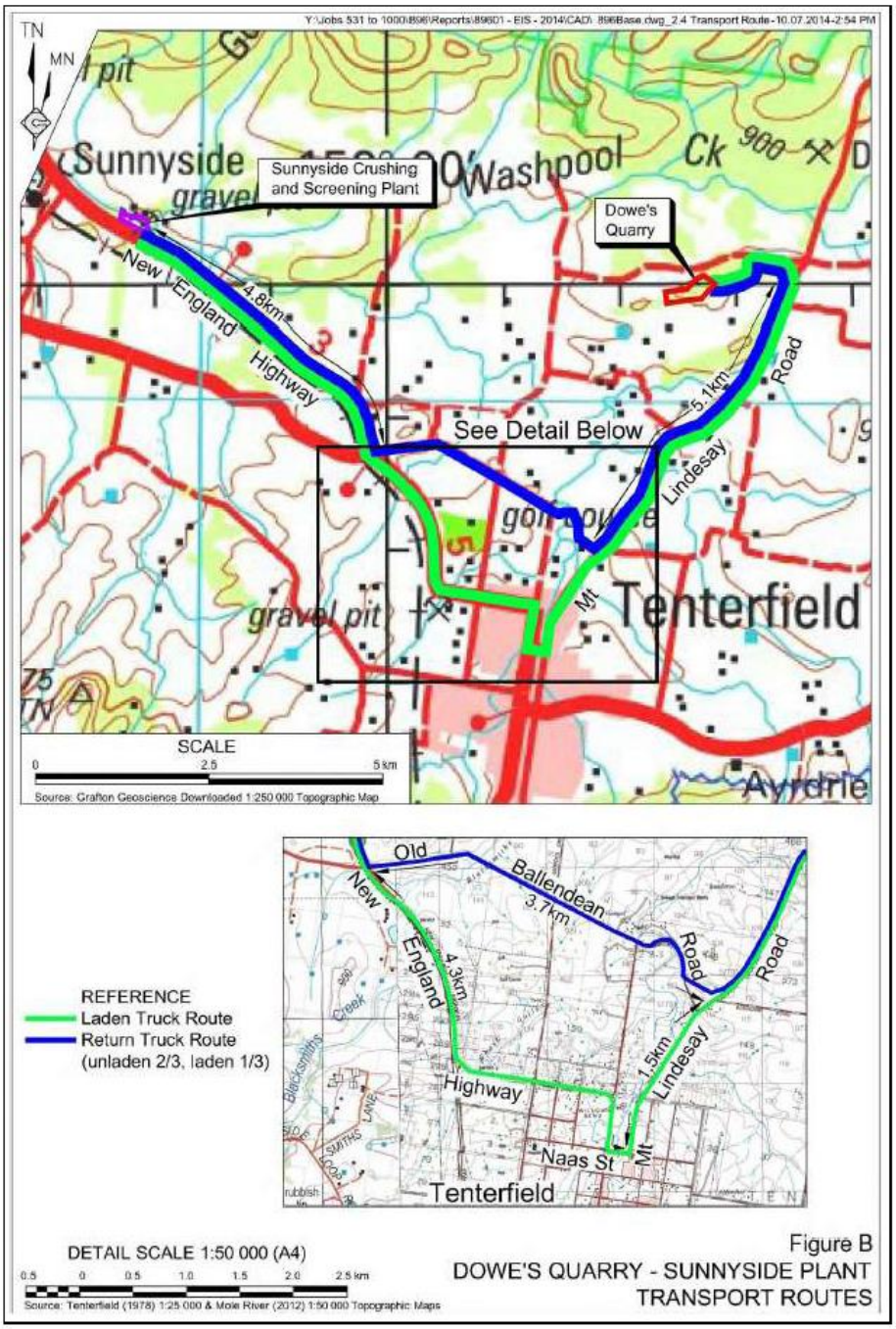

Figure 1: Quarry to Plant Transportation Routes
(Source: RW Corkery 2014)

1.2 Current Status of the Audited Road(s)

Mount Lindesay Road (including Logan Road)

Mount Lindesay Road is a Regional Road which provides a link between Tenterfield and the localities of Legume and Woodenbong. The road also provides an alternate route to areas over the border into Queensland around the Beaudesert region.

For the section of Mount Lindesay Road included in this audit, the road consists of sealed pavement with varying width between 6.5 to 7m with unsealed shoulders. The alignment is generally reasonable considering the undulating to steep terrain along this section of road. Worn and faded centreline marking is present however there are no edge lines. Delineation is provided by guide posts however they are sparse and not always duplicated on both sides of the road. There are numerous intersections and property accesses adjacent to the road. The pavement condition is considered to be fair although there is some evidence of rutting, edge break, deformation and some potholing.

The posted speed limit for Mount Lindesay Road on the audited sections of the road are as follows:

- 100km/h speed zone for approximately 4.6km between the Quarry and 200m north-east of the Old Ballandean Road intersection (Ch 0km to Ch 4.6km);
- 70km/h speed zone for approximately 1.3km from Ch 4.6km to Ch 5.9km; and
- 50km/h speed zone for approximately 600m from Ch 5.9km to the Naas Street Intersection at Ch 6.5km.

Mount Lindesay Road is identified from the RMS online interactive Restricted Access Vehicle Maps1 as approved for B-doubles up to 25/26m in length between Old Ballandean Road and Naas Street.

Naas Street

Naas Street, between Mount Lindesay Road (Logan Street) and the New England Highway, is a Regional Road which links Mount Lindsay Road to the New England Highway. This section of Naas Street has approximately 7m wide seal although it narrows over a large culvert structure.

Centreline marking is provided, although it is worn and faded in sections. The seal associated with the pavement is in reasonable condition between the intersection and culvert structure with minor patching and cracking evident in proximity to the culvert structure. The pavement seal between the culvert structure and the New England Highway intersection has large sections of longitudinal cracking associated with rutting in the travel path and there are several sections with pot hole patching and edge break.

The posted speed limit for Naas Street on the audited section of the road is 50km/h.

Naas Street is identified from the RMS online interactive Restricted Access Vehicle Maps as approved for B-doubles up to 25/26m in length.

New England Highway

The New England Highway is a classified as a State and National Highway consisting of a two lane two way sealed road within the audited section. Centre line and edge line marking is provided as well as guideposts and retroreflective pavement markings. The pavement is considered to be in a good condition.

The posted speed limit for the New England Highway on the audited sections of the road are as follows:

- 50km/h speed zone for approximately 1.6km from the Naas Street intersection at Ch 6.5km to Ch 8.3km;
- 80km/h speed zone for approximately 700m from Ch 8.3km to Ch 9.0km; and
- 100km/h speed zone for approximately 6.3kmfrom Ch 9.0km to the Plant entrance at Ch 15.3km.

The New England Highway is identified from the RMS online interactive Restricted Access Vehicle Maps as approved for B-doubles up to 25/26m in length including HML.

Old Ballandean Road

Old Ballandean Road is a local road which links Mount Lindesay Road with the New England Highway opposite the Bruxner Way. In comparison with other rural roads in the region, it is of a reasonable to good standard. There is a relatively low incidence of pavement defects and the seal condition is considered to be good. There is a relatively narrow shoulder and verge and in some sections there is edge break located predominantly on the northern side of the road which is presumably due to heavy vehicles providing room for oncoming traffic to pass. The speed limit is not signposted from the western end however it is signposted as 100km/h from the eastern end.

Old Ballandean Road is identified from the RMS online interactive Restricted Access Vehicle Maps as approved for B-doubles up to 25/26m in length.

2 Audit Scope and Objectives

The audit consisted of an independent road safety audit for the two transportation routes between the Quarry and the Plant.

The objective of this audit is to identify any potential road safety issues/deficiencies and areas of risk associated with the transportation routes from a safety perspective of all road users which may need to be investigated and rectified within the road network.

This report does not provide recommendations with regards to addressing the corrective actions identified from this audit.

3 Road Safety Audit Program

3.1 Commencement Meeting

No commencement meeting was held as the requirements of the audit were clearly defined in the brief.

3.2 Site Inspection

The night audits were undertaken on 29 April 2019 commencing at 6:00pm and concluding at 6pm. The day audits were undertaken on 30 April 2019 commencing at 7:40am and concluding at 10:30am. Conditions throughout the audit were generally overcast with infrequent light rain.

3.3 Completion Meeting

The completion meeting was held on 22 May 2019 and included Nicholas Warren and Michael Bloem (the lead auditor) with the findings discussed prior to finalising the audit report.

4 Road Safety Audit

4.1 Audit Findings

A summary of the audit findings has been documented in **Table 1** below.

A detailed summary of the specific audit findings has been documented in **APPENDIX 3** which includes:

- Specific details of the nature of the audit findings;
- A risk rating of high, medium or low (refer **APPENDIX 1** for Risk Assessment Tools)
- A reference to a Corrective Action Request (CAR) form (refer **APPENDIX 2**); and
- The CAR forms will facilitate proper close out of each of the potential road safety deficiencies as these require follow up action from the Client Project Manager / Project Sponsor as well as formal close out of each CAR.

Table 1 – Audit Findings

CAR No.	Audit Findings	Photographs	
Mount Lindesay Road			
001	**Road Safety Category - Delineation** <u>Longitudinal Line Marking</u> For the full length of the audited road, the longitudinal line marking, including the dividing lines, continuity lines and edge lines, are faded and in numerous locations, longitudinal line marking has not been reinstalled after heavy patching works. Delineation of the road is compromised due to the faded and missing longitudinal line marking making it difficult for road users to define the travel lanes, particularly at night as reflectivity was considered to be very poor. This is undesirable given the relatively narrow road formation width which may result in road users misjudging the road conditions at night and potentially having an accident.		

CAR No.	Audit Findings	Photographs
002	**Road Safety Category -Roadside Hazards** <u>Objects within the Clear Zone</u> There are a number of trees, culverts and power poles, located within the clear zone that have no protection for road users. The location of these objects creates a hazard as there is a risk that errant drivers may leave the road and collide with unprotected objects within the clear zone which has the potential to cause serious injuries to the occupants of the vehicle.	     

constructive solutions

CAR No.	Audit Findings	Photographs
003	**Road Safety Category - Road Alignment and Cross Section** Steep Batters There are a number of unprotected steep batters and a number of these steep batters are located on the outside of curves: There is a risk that an errant driver may leave the road, have insufficient shoulder width to recover and lose control down a steep batter as there is no safety barrier in place. This has the potential to cause serious injuries to the occupants of the vehicle. There is also an increased risk potential for vehicle rollover type crashes, particularly heavy vehicles, on the verge/batter as the road has batter slopes in numerous locations which are less than the minimum standard of 4:1 and less than the desirable minimum batter of 6:1 for heavy vehicles as per Austroads Guide to Road Design.	  

CAR No.	Audit Findings	Photographs	
004	**Road Safety Category - Traffic Signs** <u>Missing Signs</u> There are a number of locations where intersecting roads are not considered to be obvious to approaching drivers and there are no side road junction signs in place in advance of the intersection. There are a number of crests with no advanced warning signs and a number of curved with missing curve and speed advisory signage. There are number of intersections that have missing sight boards. Signs are provided to alert road users to oncoming features or changes in road condition. There is a risk that road users may not be aware of the oncoming conditions such as intersections or narrow culverts which may result in the possibility of a traffic collision with between and errant driver and merging traffic or an errant driver coming into contact with the substandard safety barriers potentially resulting in serious injuries to occupants of the vehicle. A lack of warning signage can compromise road safety as road users are not properly advised of the changed traffic conditions ahead.		

CAR No.	Audit Findings	Photographs	
005	**Road Safety Category - Safety Barriers** The end terminals for the safety barrier at the Bridge over Branch Creek are below current standards and have timber posts. There are number of locations along the inspected route where the safety barrier is too short and does not provide the maximum protection for road users, particularly adjacent to steep batters. There is a risk that an errant driver could leave the roadway and come into contact with a substandard safety barrier which does not correctly perform at impact due to the poor condition resulting with the potential for causing serious injuries to occupants of the vehicle.		
006	**Road Safety Category – Delineation** <u>Guide Posts</u> There were a number of missing and damaged guide posts as well as guide posts with poor reflectivity observed during the audit. Damaged or missing guide posts can make it difficult for road users to visualise the road alignment, particularly at night. This is undesirable as an errant driver may run off the road and lose control of the vehicle resulting in an accident given the relatively narrow road formation width.		

CAR No.	Audit Findings	Photographs	
Naas Street			
007	**Road Safety Category - Safety Barriers** The culvert has a steep drop off with a substandard railing and no safety barrier and end terminals on the approaches. There is a risk that an errant driver could leave the roadway and come into contact with a substandard safety barrier which does not correctly perform at impact due to the poor condition resulting with the potential for causing serious injuries to occupants of the vehicle.		
New England Highway			
008	**Road Safety Category -Roadside Hazards** <u>Objects within the Clear Zone</u> There are a number of trees and culverts located within the clear zone that have no protection for road users. The location of these objects creates a hazard as there is a risk that errant drivers may leave the road and collide with unprotected objects within the clear zone which has the potential to cause serious injuries to the occupants of the vehicle.		

CAR No.	Audit Findings	Photographs
		  

CAR No.	Audit Findings	Photographs	
009	**Road Safety Category - Road Alignment and Cross Section** <u>Steep Batters</u> There are a number of unprotected steep batters: There is a risk that an errant driver may leave the road, have insufficient shoulder width to recover and lose control down a steep batter as there is no safety barrier in place. This has the potential to cause serious injuries to the occupants of the vehicle. There is also an increased risk potential for vehicle rollover type crashes, particularly heavy vehicles, on the verge/batter as the road has batter slopes in numerous locations which are less than the minimum standard of 4:1 and less than the desirable minimum batter of 6:1 for heavy vehicles as per Austroads Guide to Road Design.		
010	**Road Safety Category - Traffic Signs** <u>Damaged Signs</u> The solar powered intersection ahead sign whilst operational during the day was not illuminated at night. Signs are provided to alert road users to oncoming features or changes in road condition. There is a risk that road users may not be aware of the oncoming conditions such as intersections or narrow culverts which may result in the possibility of a traffic collision with between and errant driver and merging traffic or an errant driver coming into contact with the substandard safety barriers potentially resulting in serious injuries to occupants of the vehicle. A lack of warning signage can compromise road safety as road users are not properly advised of the changed traffic conditions ahead.		

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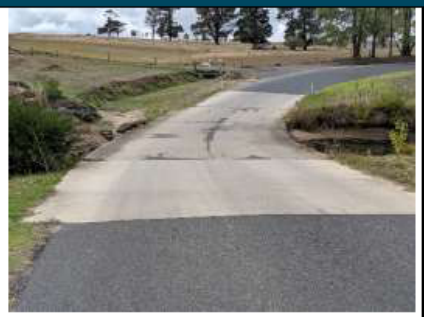
CAR No.	Audit Findings	Photographs	
011	**Road Safety Category - Safety Barriers** The end terminals for some of the safety barriers are substandard. There is a risk that an errant driver could leave the roadway and come into contact with a substandard safety barrier which does not correctly perform at impact due to the poor condition resulting with the potential for causing serious injuries to occupants of the vehicle.		
012	**Road Safety Category – Delineation** <u>Guide Posts</u> There were a number of missing and damaged guide posts as well as guide posts with poor reflectivity observed during the audit. Damaged or missing guide posts can make it difficult for road users to visualise the road alignment, particularly at night. This is undesirable as an errant driver may run off the road and lose control of the vehicle resulting in an accident given the relatively narrow road formation width.		

CAR No.	Audit Findings	Photographs	
Old Ballandean Road			
013	**Road Safety Category - Delineation** Longitudinal Line Marking At a number of crests, there are is no centreline marking through the crest. Delineation of the road is compromised due to the faded and missing longitudinal line marking making it difficult for road users to define the travel lanes, particularly at night as reflectivity was considered to be very poor. This is undesirable given the relatively narrow road formation width which may result in road users misjudging the road conditions at night and potentially having an accident.		
014	**Road Safety Category -Roadside Hazards** Objects within the Clear Zone There are a number of trees, culverts and power poles located within the clear zone that have no protection for road users. The location of these objects creates a hazard as there is a risk that errant drivers may leave the road and collide with unprotected objects within the clear zone which has the potential to cause serious injuries to the occupants of the vehicle.		

CAR No.	Audit Findings	Photographs	
015	**Road Safety Category - Road Alignment and Cross Section** <u>Steep Batters</u> There are a number of unprotected steep batters. There is a risk that an errant driver may leave the road, have insufficient shoulder width to recover and lose control down a steep batter as there is no safety barrier in place. This has the potential to cause serious injuries to the occupants of the vehicle. There is also an increased risk potential for vehicle rollover type crashes, particularly heavy vehicles, on the verge/batter as the road has batter slopes in numerous locations which are less than the minimum standard of 4:1 and less than the desirable minimum batter of 6:1 for heavy vehicles as per Austroads Guide to Road Design.		
016	**Road Safety Category - Traffic Signs** <u>Damaged and Missing Signs</u> Some signs have poor reflectivity at night. There are missing curve and speed advisory signs on the approaches to substandard curves. There are missing advanced warning signs on the approaches to crests. There are missing advanced warning signs on the approaches to obscured intersections. There are missing and obscured flood depth markers at a causeway. Signs are provided to alert road users to oncoming features or changes in road condition. There is a risk that road users may not be aware of the oncoming conditions such as intersections or narrow culverts which may		

CAR No.	Audit Findings	Photographs	
	result in the possibility of a traffic collision with between and errant driver and merging traffic or an errant driver coming into contact with the substandard safety barriers potentially resulting in serious injuries to occupants of the vehicle. A lack of warning signage can compromise road safety as road users are not properly advised of the changed traffic conditions ahead.		
017	**Road Safety Category – Delineation** <u>Guide Posts</u> There were a number of missing and damaged guide posts as well as guide posts with poor reflectivity observed during the audit. Damaged or missing guide posts can make it difficult for road users to visualise the road alignment, particularly at night. This is undesirable as an errant driver may run off the road and lose control of the vehicle resulting in an accident given the relatively narrow road formation width.		

5 General Observations

The following general observations have been included with respect to the project:

- Mount Lindesay Road is a school bus route however there are no school bus route signs in place; and
- Whilst there are a number of pavement failures including pavement deformation, it was considered that the severity of these failures were only minor in terms of road safety.

6 Formal Statement

We, the undersigned, declare that we have reviewed the material listed in this report and identified the potential safety and operational deficiencies.

It should be noted that while every effort has been made to identify potential safety hazards, no guarantee could be made that every deficiency has been identified.

It is recommended that audit findings be investigated with satisfactory corrective actions identified and implemented.

Name: Michael Bloem
Position: Road Safety Auditor Level 3
Auditor ID: RSA-02-0466
Date: 23/09/2019

Name: Jerome Malvern
Position: Road Safety Auditor Level 2
Auditor ID: RSA-02-1169
Date: 23/09/2019

7 References

- Austroads 2009, 'Guide to Road Safety – Part 6: Road Safety Audit'.
- RTA/Pub No. 11.291 (July 2011), 'Guidelines for Road Safety Audit Practices'.
- RTA 2011, 'Road Safety Audit Practices Information Sheet – Road Safety Categories', August 2011 RTA/Pub 11.348.
- RMS Delineation Guide – Section 16: Guide Posts and Delineation for Safety Barrier, Version 1, February 2010.
- Australian Standard, AS 1742.2 (2009) Manual for uniform traffic control devices. Part 2: Traffic control devices for general use.

Appendix 1: Risk Assessment Tools

Measures of Effectiveness

The following table can be used to assess the effectiveness of existing risk treatments, which should then be taken into account when determining the Consequence, Likelihood and therefore the level of Residual Risk.

No.	Level	Communication and documentation	General effectiveness
5	Excellent	Risk treatments and procedures are implemented, with communication and monitoring on a regular basis to determine their level of effectiveness in 'managing' the risk.	Is effective in reducing the risk under all conditions.
4	Good	Risk treatments and procedures are well documented and implemented, but with some room for improvement. Good communication and understanding of treatments with some degree of monitoring.	Is effective in reducing the risk under most conditions.
3	Fair	Risk treatments and procedures documented, but not well implemented, with minimal monitoring to ensure compliance or to determine their level of relevance.	Is effective in reducing the risk under ideal conditions.
2	Marginal	Risk treatments and procedures are informal, not well communicated and are implemented in an inconsistent manner.	Is partially effective in reducing the risk.
1	Poor or non-existent	Risk treatments and procedures are non–existent or ineffective; not communicated, sparsely implemented and of little value.	Makes little impact in reducing the risk.

Measures of Consequence (or Impact)

Level	Financial (Revenue & Costs)	Property	Provision of Service	Reputation	Environment	Road Safety
1. Insignificant	Low financial loss (e.g. < 1% of revenue or budget).	Negligible damage to or loss of assets.	Short-term, localised interruption to service / performance.	Issue of no public concern. Isolated communications expressing concern.	Minor breach of environmental policy / practices. Negligible impact on the environment.	Some low speed single vehicle collisions. Pedestrian walks into object (no head injury). Vehicle reverses into post.
2. Minor	Minor financial loss (e.g. 1% to 2% of revenue or budget).	Minor loss / damage. Some repairs may be required.	Minor, temporary disruption to services; Minor inconvenience to client(s).	Local public concern. May cause some complaints (justified or unjustified).	Minor localised impact; one-off situation easily remedied.	Some low speed vehicle collisions. Cyclist falls from bicycle at low speed. Rear end collision
3. Moderate	High financial loss (e.g. 2% to 5% of revenue or budget).	Moderate to high damage requiring specialist / contractor equipment to repair or replace.	Some serious disruption to services. Some contravention of legal / contractual obligations.	Regional public concern. Significant complaints. Some adverse publicity. Local media coverage.	Moderate impact on the environment; no long term or irreversible damage. May incur cautionary notice or infringement notice.	Medium or slow speed vehicle/vehicle collision. Cyclist falls from bicycle at moderate speed. Rear end collision and pushed into object.
4. Major	Major financial loss (e.g. 5% to 10% of revenue or budget).	Significant / permanent damage to assets and / or infrastructure.	Major, long-term disruption to services. Serious breach of a legal / contractual obligation.	Significant public concern. Adverse publicity in national media. Embarrassment to the organisation. Damage to credibility and confidence in the organisation. Inquiry by regulators. State or regional media coverage.	Severe impact requiring remedial action and review of processes to prevent reoccurrence. Penalties and / or direction or compliance order incurred.	High or medium speed vehicle/vehicle collision. High or medium speed collision with a fixed roadside object. Pedestrian / cyclist struck (minor injuries).

Level	Financial (Revenue & Costs)	Property	Provision of Service	Reputation	Environment	Road Safety
5. Catastrophic	Huge financial loss (e.g. >10% of revenue or budget).	Widespread, substantial / permanent damage to assets and/or infrastructure.	Long term / irreversible impact on ability to deliver client services. Viability of the organisation in its current form is questionable.	Major public concern. Widespread, ongoing national and possibly international media attention. Severe embarrassment to the organisation. Loss of credibility and confidence in the organisation. Adverse findings and/or penalties by regulator.	Long-term, large-scale damage to habitat or environment. Serious / repeated breach of legislation / licence conditions. Cancellation of licence and / or prosecution.	High-speed multiple vehicle crash resulting in fatality. Pedestrian / cyclist struck (fatality). Significant number of casualties.

Measures of Likelihood

No.	Level	Description	Examples
5	Almost certain	The event will occur in most conditions	Expected frequency range: One or more per week
4	Likely	The event will probably occur in most conditions	Expected frequency range:-One or more per year (but less than once per week)
3	Possible	The event should happen at some time	Expected frequency range: Once every five or ten years
2	Unlikely	The event could happen at some time	Expected frequency range: Less often than once every ten years
1	Rare	The event may only occur in exceptional circumstances	Expected frequency range: Unlikely to occur in a 10-year period

Residual Risk Assessment Matrix

Likelihood		Consequence				
		Insignificant	Minor	Moderate	Major	Catastrophic
		1	2	3	4	5
Almost certain	5	M (ii)	H (ii)	E (i)	E (iv)	E (v)
Likely	4	M (i)	H (i)	H (ii)	E (ii)	E (iv)
Possible	3	L (iv)	M (ii)	H (i)	H (iv)	E (iii)
Unlikely	2	L (ii)	L (iv)	M (iii)	H (iii)	E (i)
Rare	1	L (i)	L (iii)	M (ii)	M (iii)	H (iv)

Appendix 2: Corrective Action Requests

Project:	**Dowe's Quarry Transportation Route**							
NCR/CAR No:	**001**							
Issue Identified By:	Audit Team				**Date:**	30 April 2019		
NCR/CAR Issued to:	Daryl McCarthy/RW Corkery & Co				**Date:**	23 September 2019		
NCR/CAR Category:	WHS	☐	Quality	☐	Enviro	☐	Road Safety	☒

Section 1: Details of Non-Conformance/Corrective Action

Mount Lindesay Road - Longitudinal Line Marking

For the full length of the audited road, the longitudinal line marking, including the dividing lines, continuity lines and edge lines, are faded and in numerous locations, longitudinal line marking has not been reinstalled after heavy patching works.

Delineation of the road is compromised due to the faded and missing longitudinal line marking making it difficult for road users to define the travel lanes, particularly at night as reflectivity was considered to be very poor. This is undesirable given the relatively narrow road formation width which may result in road users misjudging the road conditions at night and potentially having an accident.

Name:	Michael Bloem	**Position:**	Level 3 Road Safety Auditor
Signature:		**Date:**	22 May 2019

Section 2: Proposed action to be undertaken to rectify the issue

Name:		**Position:**	
Signature:		**Date:**	

Section 3: NCR/CAR Close out

Action undertaken to rectify the issue (if differing from proposed action):

Was the action taken successful in rectifying the issue?	Yes	☐	No	☐
Was further action necessary? If yes, describe below.	Yes	☐	No	☐

Name:		**Position:**	
Signature:		**Date:**	

Project:	**Dowe's Quarry Transportation Route**							
NCR/CAR No:	**002**							
Issue Identified By:	Audit Team				**Date:**	30 April 2019		
NCR/CAR Issued to:	Daryl McCarthy/RW Corkery & Co				**Date:**	23 September 2019		
NCR/CAR Category:	WHS	☐	Quality	☐	Enviro	☐	Road Safety	☒

Section 1: Details of Non-Conformance/Corrective Action

Mount Lindesay Road - Objects within the Clear Zone

There are a number of trees, culverts and power poles, located within the clear zone that have no protection for road users.

The location of these objects creates a hazard as there is a risk that errant drivers may leave the road and collide with unprotected objects within the clear zone which has the potential to cause serious injuries to the occupants of the vehicle.

Name:	Michael Bloem	**Position:**	Level 3 Road Safety Auditor
Signature:		**Date:**	22 May 2019

Section 2: Proposed action to be undertaken to rectify the issue

Name:		**Position:**	
Signature:		**Date:**	

Section 3: NCR/CAR Close out

Action undertaken to rectify the issue (if differing from proposed action):

Was the action taken successful in rectifying the issue?	Yes	☐	No	☐
Was further action necessary? If yes, describe below.	Yes	☐	No	☐

Name:		**Position:**	
Signature:		**Date:**	

Project:	**Dowe's Quarry Transportation Route**							
NCR/CAR No:	**003**							
Issue Identified By:	Audit Team				**Date:**	30 April 2019		
NCR/CAR Issued to:	Daryl McCarthy/RW Corkery & Co				**Date:**	23 September 2019		
NCR/CAR Category:	WHS	☐	Quality	☐	Enviro	☐	Road Safety	☒

Section 1: Details of Non-Conformance/Corrective Action

Mount Lindesay Road - Steep Batters

There are a number of unprotected steep batters and a number of these steep batters are located on the outside of curves:

There is a risk that an errant driver may leave the road, have insufficient shoulder width to recover and lose control down a steep batter as there is no safety barrier in place. This has the potential to cause serious injuries to the occupants of the vehicle.

There is also an increased risk potential for vehicle rollover type crashes, particularly heavy vehicles, on the verge/batter as the road has batter slopes in numerous locations which are less than the minimum standard of 4:1 and less than the desirable minimum batter of 6:1 for heavy vehicles as per Austroads Guide to Road Design.

Name:	Michael Bloem	**Position:**	Level 3 Road Safety Auditor
Signature:		**Date:**	22 May 2019

Section 2: Proposed action to be undertaken to rectify the issue

Name:		**Position:**	
Signature:		**Date:**	

Section 3: NCR/CAR Close out

Action undertaken to rectify the issue (if differing from proposed action):

Was the action taken successful in rectifying the issue?	Yes	☐	No	☐
Was further action necessary? If yes, describe below.	Yes	☐	No	☐

Name:		**Position:**	
Signature:		**Date:**	

Project:	**Dowe's Quarry Transportation Route**							
NCR/CAR No:	**004**							
Issue Identified By:	Audit Team				**Date:**	30 April 2019		
NCR/CAR Issued to:	Daryl McCarthy/RW Corkery & Co				**Date:**	23 September 2019		
NCR/CAR Category:	WHS	☐	Quality	☐	Enviro	☐	Road Safety	☒

Section 1: Details of Non-Conformance/Corrective Action

Mount Lindesay Road - Missing Signs

There are a number of locations where intersecting roads are not considered to be obvious to approaching drivers and there are no side road junction signs in place in advance of the intersection.

There are a number of crests with no advanced warning signs and a number of curved with missing curve and speed advisory signage.

There are number of intersections that have missing sight boards.

Signs are provided to alert road users to oncoming features or changes in road condition. There is a risk that road users may not be aware of the oncoming conditions such as intersections or narrow culverts which may result in the possibility of a traffic collision with between and errant driver and merging traffic or an errant driver coming into contact with the substandard safety barriers potentially resulting in serious injuries to occupants of the vehicle.

A lack of warning signage can compromise road safety as road users are not properly advised of the changed traffic conditions ahead.

Name:	Michael Bloem	**Position:**	Level 3 Road Safety Auditor
Signature:		**Date:**	22 May 2019

Section 2: Proposed action to be undertaken to rectify the issue

Name:		**Position:**	
Signature:		**Date:**	

Section 3: NCR/CAR Close out

Action undertaken to rectify the issue (if differing from proposed action):

Was the action taken successful in rectifying the issue?	Yes	☐	No	☐
Was further action necessary? If yes, describe below.	Yes	☐	No	☐

Name:		**Position:**	
Signature:		**Date:**	

Project:	**Dowe's Quarry Transportation Route**							
NCR/CAR No:	**005**							
Issue Identified By:	Audit Team				**Date:**	30 April 2019		
NCR/CAR Issued to:	Daryl McCarthy/RW Corkery & Co				**Date:**	23 September 2019		
NCR/CAR Category:	WHS	☐	Quality	☐	Enviro	☐	Road Safety	☒

Section 1: Details of Non-Conformance/Corrective Action

Mount Lindesay Road – Safety Barriers

The end terminals for the safety barrier at the Bridge over Branch Creek are below current standards and have timber posts.

There are number of locations along the inspected route where the safety barrier is too short and does not provide the maximum protection for road users, particularly adjacent to steep batters.

There is a risk that an errant driver could leave the roadway and come into contact with a substandard safety barrier which does not correctly perform at impact due to the poor condition resulting with the potential for causing serious injuries to occupants of the vehicle.

Name:	Michael Bloem	**Position:**	Level 3 Road Safety Auditor
Signature:		**Date:**	22 May 2019

Section 2: Proposed action to be undertaken to rectify the issue

Name:		**Position:**	
Signature:		**Date:**	

Section 3: NCR/CAR Close out

Action undertaken to rectify the issue (if differing from proposed action):

Was the action taken successful in rectifying the issue?	Yes	☐	No	☐
Was further action necessary? If yes, describe below.	Yes	☐	No	☐

Name:		**Position:**	
Signature:		**Date:**	

Project:	**Dowe's Quarry Transportation Route**							
NCR/CAR No:	**006**							
Issue Identified By:	Audit Team				**Date:**	30 April 2019		
NCR/CAR Issued to:	Daryl McCarthy/RW Corkery & Co				**Date:**	23 September 2019		
NCR/CAR Category:	WHS	☐	Quality	☐	Enviro	☐	Road Safety	☒

Section 1: Details of Non-Conformance/Corrective Action

Mount Lindesay Road - Guide Posts

There were a number of missing and damaged guide posts as well as guide posts with poor reflectivity observed during the audit.

Damaged or missing guide posts can make it difficult for road users to visualise the road alignment, particularly at night. This is undesirable as an errant driver may run off the road and lose control of the vehicle resulting in an accident given the relatively narrow road formation width.

Name:	Michael Bloem	**Position:**	Level 3 Road Safety Auditor
Signature:		**Date:**	22 May 2019

Section 2: Proposed action to be undertaken to rectify the issue

Name:		**Position:**	
Signature:		**Date:**	

Section 3: NCR/CAR Close out

Action undertaken to rectify the issue (if differing from proposed action):

Was the action taken successful in rectifying the issue?	Yes	☐	No	☐
Was further action necessary? If yes, describe below.	Yes	☐	No	☐

Name:		**Position:**	
Signature:		**Date:**	

Project:	**Dowe's Quarry Transportation Route**							
NCR/CAR No:	**007**							
Issue Identified By:	Audit Team				**Date:**	30 April 2019		
NCR/CAR Issued to:	Daryl McCarthy/RW Corkery & Co				**Date:**	23 September 2019		
NCR/CAR Category:	WHS	☐	Quality	☐	Enviro	☐	Road Safety	☒

Section 1: Details of Non-Conformance/Corrective Action

Naas St – Safety Barriers

The culvert has a steep drop off with a substandard railing and no safety barrier and end terminals on the approaches.

There is a risk that an errant driver could leave the roadway and come into contact with a substandard safety barrier which does not correctly perform at impact due to the poor condition resulting with the potential for causing serious injuries to occupants of the vehicle.

Name:	Michael Bloem	**Position:**	Level 3 Road Safety Auditor
Signature:		**Date:**	22 May 2019

Section 2: Proposed action to be undertaken to rectify the issue

Name:		**Position:**	
Signature:		**Date:**	

Section 3: NCR/CAR Close out

Action undertaken to rectify the issue (if differing from proposed action):

Was the action taken successful in rectifying the issue?	Yes	☐	No	☐
Was further action necessary? If yes, describe below.	Yes	☐	No	☐

Name:		**Position:**	
Signature:		**Date:**	

Project:	**Dowe's Quarry Transportation Route**							
NCR/CAR No:	**008**							
Issue Identified By:	Audit Team				**Date:**	30 April 2019		
NCR/CAR Issued to:	Daryl McCarthy/RW Corkery & Co				**Date:**	23 September 2019		
NCR/CAR Category:	WHS	☐	Quality	☐	Enviro	☐	Road Safety	☒

Section 1: Details of Non-Conformance/Corrective Action

New England Highway - Objects within the Clear Zone

There are a number of trees and culverts located within the clear zone that have no protection for road users.

The location of these objects creates a hazard as there is a risk that errant drivers may leave the road and collide with unprotected objects within the clear zone which has the potential to cause serious injuries to the occupants of the vehicle.

Name:	Michael Bloem	**Position:**	Level 3 Road Safety Auditor
Signature:		**Date:**	22 May 2019

Section 2: Proposed action to be undertaken to rectify the issue

Name:		**Position:**	
Signature:		**Date:**	

Section 3: NCR/CAR Close out

Action undertaken to rectify the issue (if differing from proposed action):

Was the action taken successful in rectifying the issue?	Yes	☐	No	☐
Was further action necessary? If yes, describe below.	Yes	☐	No	☐

Name:		**Position:**	
Signature:		**Date:**	

Project:	**Dowe's Quarry Transportation Route**							
NCR/CAR No:	**008**							
Issue Identified By:	Audit Team				**Date:**	30 April 2019		
NCR/CAR Issued to:	Daryl McCarthy/RW Corkery & Co				**Date:**	23 September 2019		
NCR/CAR Category:	WHS	☐	Quality	☐	Enviro	☐	Road Safety	☒

Section 1: Details of Non-Conformance/Corrective Action

New England Highway - Objects within the Clear Zone

There are a number of trees and culverts located within the clear zone that have no protection for road users.

The location of these objects creates a hazard as there is a risk that errant drivers may leave the road and collide with unprotected objects within the clear zone which has the potential to cause serious injuries to the occupants of the vehicle.

Name:	Michael Bloem	**Position:**	Level 3 Road Safety Auditor
Signature:		**Date:**	22 May 2019

Section 2: Proposed action to be undertaken to rectify the issue

Name:		**Position:**	
Signature:		**Date:**	

Section 3: NCR/CAR Close out

Action undertaken to rectify the issue (if differing from proposed action):

Was the action taken successful in rectifying the issue?	Yes	☐	No	☐
Was further action necessary? If yes, describe below.	Yes	☐	No	☐

Name:		**Position:**	
Signature:		**Date:**	

Project:	**Dowe's Quarry Transportation Route**							
NCR/CAR No:	**009**							
Issue Identified By:	Audit Team				**Date:**	30 April 2019		
NCR/CAR Issued to:	Daryl McCarthy/RW Corkery & Co				**Date:**	23 September 2019		
NCR/CAR Category:	WHS	☐	Quality	☐	Enviro	☐	Road Safety	☒

Section 1: Details of Non-Conformance/Corrective Action

New England Highway - Steep Batters

There are a number of unprotected steep batters:

There is a risk that an errant driver may leave the road, have insufficient shoulder width to recover and lose control down a steep batter as there is no safety barrier in place. This has the potential to cause serious injuries to the occupants of the vehicle.

There is also an increased risk potential for vehicle rollover type crashes, particularly heavy vehicles, on the verge/batter as the road has batter slopes in numerous locations which are less than the minimum standard of 4:1 and less than the desirable minimum batter of 6:1 for heavy vehicles as per Austroads Guide to Road Design.

Name:	Michael Bloem	**Position:**	Level 3 Road Safety Auditor
Signature:		**Date:**	22 May 2019

Section 2: Proposed action to be undertaken to rectify the issue

Name:		**Position:**	
Signature:		**Date:**	

Section 3: NCR/CAR Close out

Action undertaken to rectify the issue (if differing from proposed action):

Was the action taken successful in rectifying the issue?	Yes	☐	No	☐
Was further action necessary? If yes, describe below.	Yes	☐	No	☐

Name:		**Position:**	
Signature:		**Date:**	

Project:	**Dowe's Quarry Transportation Route**							
NCR/CAR No:	**010**							
Issue Identified By:	Audit Team				**Date:**	30 April 2019		
NCR/CAR Issued to:	Daryl McCarthy/RW Corkery & Co				**Date:**	23 September 2019		
NCR/CAR Category:	WHS	☐	Quality	☐	Enviro	☐	Road Safety	☒

Section 1: Details of Non-Conformance/Corrective Action

New England Highway - Damaged Signs

The solar powered intersection ahead sign whilst operational during the day was not illuminated at night.

Signs are provided to alert road users to oncoming features or changes in road condition. There is a risk that road users may not be aware of the oncoming conditions such as intersections or narrow culverts which may result in the possibility of a traffic collision with between and errant driver and merging traffic or an errant driver coming into contact with the substandard safety barriers potentially resulting in serious injuries to occupants of the vehicle.

A lack of warning signage can compromise road safety as road users are not properly advised of the changed traffic conditions ahead.

Name:	Michael Bloem	**Position:**	Level 3 Road Safety Auditor
Signature:		**Date:**	22 May 2019

Section 2: Proposed action to be undertaken to rectify the issue

Name:		**Position:**	
Signature:		**Date:**	

Section 3: NCR/CAR Close out

Action undertaken to rectify the issue (if differing from proposed action):

Was the action taken successful in rectifying the issue?	Yes	☐	No	☐
Was further action necessary? If yes, describe below.	Yes	☐	No	☐

Name:		**Position:**	
Signature:		**Date:**	

Project:	**Dowe's Quarry Transportation Route**							
NCR/CAR No:	**011**							
Issue Identified By:	Audit Team				**Date:**	30 April 2019		
NCR/CAR Issued to:	Daryl McCarthy/RW Corkery & Co				**Date:**	23 September 2019		
NCR/CAR Category:	WHS	☐	Quality	☐	Enviro	☐	Road Safety	☒

Section 1: Details of Non-Conformance/Corrective Action

New England Highway - Safety Barriers

The end terminals for some of the safety barriers are substandard.

There is a risk that an errant driver could leave the roadway and come into contact with a substandard safety barrier which does not correctly perform at impact due to the poor condition resulting with the potential for causing serious injuries to occupants of the vehicle.

Name:	Michael Bloem	**Position:**	Level 3 Road Safety Auditor
Signature:		**Date:**	22 May 2019

Section 2: Proposed action to be undertaken to rectify the issue

Name:		**Position:**	
Signature:		**Date:**	

Section 3: NCR/CAR Close out

Action undertaken to rectify the issue (if differing from proposed action):

Was the action taken successful in rectifying the issue?	Yes	☐	No	☐
Was further action necessary? If yes, describe below.	Yes	☐	No	☐

Name:		**Position:**	
Signature:		**Date:**	

Project:	**Dowe's Quarry Transportation Route**						
NCR/CAR No:	**012**						
Issue Identified By:	Audit Team			**Date:**	30 April 2019		
NCR/CAR Issued to:	Daryl McCarthy/RW Corkery & Co			**Date:**	23 September 2019		
NCR/CAR Category:	WHS	☐	Quality ☐	Enviro	☐	Road Safety	☒

Section 1: Details of Non-Conformance/Corrective Action

New England Highway - Guide Posts

There were a number of missing and damaged guide posts as well as guide posts with poor reflectivity observed during the audit.

Damaged or missing guide posts can make it difficult for road users to visualise the road alignment, particularly at night. This is undesirable as an errant driver may run off the road and lose control of the vehicle resulting in an accident given the relatively narrow road formation width.

Name:	Michael Bloem	**Position:**	Level 3 Road Safety Auditor
Signature:		**Date:**	22 May 2019

Section 2: Proposed action to be undertaken to rectify the issue

Name:		**Position:**	
Signature:		**Date:**	

Section 3: NCR/CAR Close out

Action undertaken to rectify the issue (if differing from proposed action):

Was the action taken successful in rectifying the issue?	Yes	☐	No	☐
Was further action necessary? If yes, describe below.	Yes	☐	No	☐

Name:		**Position:**	
Signature:		**Date:**	

Project:	**Dowe's Quarry Transportation Route**							
NCR/CAR No:	**013**							
Issue Identified By:	Audit Team				**Date:**	30 April 2019		
NCR/CAR Issued to:	Daryl McCarthy/RW Corkery & Co				**Date:**	23 September 2019		
NCR/CAR Category:	WHS	☐	Quality	☐	Enviro	☐	Road Safety	☒

Section 1: Details of Non-Conformance/Corrective Action

New England Highway - Longitudinal Line Marking

At a number of crests, there are is no centreline marking through the crest.

Delineation of the road is compromised due to the faded and missing longitudinal line marking making it difficult for road users to define the travel lanes, particularly at night as reflectivity was considered to be very poor. This is undesirable given the relatively narrow road formation width which may result in road users misjudging the road conditions at night and potentially having an accident.

Name:	Michael Bloem	**Position:**	Level 3 Road Safety Auditor
Signature:		**Date:**	22 May 2019

Section 2: Proposed action to be undertaken to rectify the issue

Name:		**Position:**	
Signature:		**Date:**	

Section 3: NCR/CAR Close out

Action undertaken to rectify the issue (if differing from proposed action):

Was the action taken successful in rectifying the issue?	Yes	☐	No	☐
Was further action necessary? If yes, describe below.	Yes	☐	No	☐

Name:		**Position:**	
Signature:		**Date:**	

Project:	**Dowe's Quarry Transportation Route**							
NCR/CAR No:	**014**							
Issue Identified By:	Audit Team				**Date:**	30 April 2019		
NCR/CAR Issued to:	Daryl McCarthy/RW Corkery & Co				**Date:**	23 September 2019		
NCR/CAR Category:	WHS	☐	Quality	☐	Enviro	☐	Road Safety	☒

Section 1: Details of Non-Conformance/Corrective Action

New England Highway - Objects within the Clear Zone

There are a number of trees, culverts and power poles located within the clear zone that have no protection for road users.

The location of these objects creates a hazard as there is a risk that errant drivers may leave the road and collide with unprotected objects within the clear zone which has the potential to cause serious injuries to the occupants of the vehicle.

Name:	Michael Bloem	**Position:**	Level 3 Road Safety Auditor
Signature:		**Date:**	22 May 2019

Section 2: Proposed action to be undertaken to rectify the issue

Name:		**Position:**	
Signature:		**Date:**	

Section 3: NCR/CAR Close out

Action undertaken to rectify the issue (if differing from proposed action):

Was the action taken successful in rectifying the issue?	Yes	☐	No	☐
Was further action necessary? If yes, describe below.	Yes	☐	No	☐

Name:		**Position:**	
Signature:		**Date:**	

Project:	**Dowe's Quarry Transportation Route**							
NCR/CAR No:	**015**							
Issue Identified By:	Audit Team				**Date:**	30 April 2019		
NCR/CAR Issued to:	Daryl McCarthy/RW Corkery & Co				**Date:**	23 September 2019		
NCR/CAR Category:	WHS	☐	Quality	☐	Enviro	☐	Road Safety	☒

Section 1: Details of Non-Conformance/Corrective Action

New England Highway - Steep Batters

There are a number of unprotected steep batters.

There is a risk that an errant driver may leave the road, have insufficient shoulder width to recover and lose control down a steep batter as there is no safety barrier in place. This has the potential to cause serious injuries to the occupants of the vehicle.

There is also an increased risk potential for vehicle rollover type crashes, particularly heavy vehicles, on the verge/batter as the road has batter slopes in numerous locations which are less than the minimum standard of 4:1 and less than the desirable minimum batter of 6:1 for heavy vehicles as per Austroads Guide to Road Design.

Name:	Michael Bloem	**Position:**	Level 3 Road Safety Auditor
Signature:		**Date:**	22 May 2019

Section 2: Proposed action to be undertaken to rectify the issue

Name:		**Position:**	
Signature:		**Date:**	

Section 3: NCR/CAR Close out

Action undertaken to rectify the issue (if differing from proposed action):

Was the action taken successful in rectifying the issue?	Yes	☐	No	☐
Was further action necessary? If yes, describe below.	Yes	☐	No	☐

Name:		**Position:**	
Signature:		**Date:**	

Project:	**Dowe's Quarry Transportation Route**							
NCR/CAR No:	**015**							
Issue Identified By:	Audit Team				**Date:**	30 April 2019		
NCR/CAR Issued to:	Daryl McCarthy/RW Corkery & Co				**Date:**	23 September 2019		
NCR/CAR Category:	WHS	☐	Quality	☐	Enviro	☐	Road Safety	☒

Section 1: Details of Non-Conformance/Corrective Action

New England Highway - Steep Batters

There are a number of unprotected steep batters.

There is a risk that an errant driver may leave the road, have insufficient shoulder width to recover and lose control down a steep batter as there is no safety barrier in place. This has the potential to cause serious injuries to the occupants of the vehicle.

There is also an increased risk potential for vehicle rollover type crashes, particularly heavy vehicles, on the verge/batter as the road has batter slopes in numerous locations which are less than the minimum standard of 4:1 and less than the desirable minimum batter of 6:1 for heavy vehicles as per Austroads Guide to Road Design.

Name:	Michael Bloem	**Position:**	Level 3 Road Safety Auditor
Signature:		**Date:**	22 May 2019

Section 2: Proposed action to be undertaken to rectify the issue

Name:		**Position:**	
Signature:		**Date:**	

Section 3: NCR/CAR Close out

Action undertaken to rectify the issue (if differing from proposed action):

Was the action taken successful in rectifying the issue?	Yes	☐	No	☐
Was further action necessary? If yes, describe below.	Yes	☐	No	☐

Name:		**Position:**	
Signature:		**Date:**	

Project:	**Dowe's Quarry Transportation Route**							
NCR/CAR No:	**016**							
Issue Identified By:	Audit Team				**Date:**	30 April 2019		
NCR/CAR Issued to:	Daryl McCarthy/RW Corkery & Co				**Date:**	23 September 2019		
NCR/CAR Category:	WHS	☐	Quality	☐	Enviro	☐	Road Safety	☒

Section 1: Details of Non-Conformance/Corrective Action

New England Highway - Damaged and Missing Signs

Some signs have poor reflectivity at night.

There are missing curve and speed advisory signs on the approaches to substandard curves.

There are missing advanced warning signs on the approaches to crests.

There are missing advanced warning signs on the approaches to obscured intersections.

There are missing and obscured flood depth markers at a causeway.

Signs are provided to alert road users to oncoming features or changes in road condition. There is a risk that road users may not be aware of the oncoming conditions such as intersections or narrow culverts which may result in the possibility of a traffic collision with between and errant driver and merging traffic or an errant driver coming into contact with the substandard safety barriers potentially resulting in serious injuries to occupants of the vehicle.

A lack of warning signage can compromise road safety as road users are not properly advised of the changed traffic conditions ahead.

Name:	Michael Bloem	**Position:**	Level 3 Road Safety Auditor
Signature:		**Date:**	22 May 2019

Section 2: Proposed action to be undertaken to rectify the issue

Name:		**Position:**	
Signature:		**Date:**	

Section 3: NCR/CAR Close out

Action undertaken to rectify the issue (if differing from proposed action):

Was the action taken successful in rectifying the issue?	Yes	☐	No	☐
Was further action necessary? If yes, describe below.	Yes	☐	No	☐

Name:		**Position:**	
Signature:		**Date:**	

Project:	**Dowe's Quarry Transportation Route**						
NCR/CAR No:	**017**						
Issue Identified By:	Audit Team			**Date:**	30 April 2019		
NCR/CAR Issued to:	Daryl McCarthy/RW Corkery & Co			**Date:**	23 September 2019		
NCR/CAR Category:	WHS	☐	Quality ☐		Enviro ☐	Road Safety	☒

Section 1: Details of Non-Conformance/Corrective Action

New England Highway - Guide Posts

There were a number of missing and damaged guide posts as well as guide posts with poor reflectivity observed during the audit.

Damaged or missing guide posts can make it difficult for road users to visualise the road alignment, particularly at night. This is undesirable as an errant driver may run off the road and lose control of the vehicle resulting in an accident given the relatively narrow road formation width.

Name:	Michael Bloem	**Position:**	Level 3 Road Safety Auditor
Signature:		**Date:**	22 May 2019

Section 2: Proposed action to be undertaken to rectify the issue

Name:		**Position:**	
Signature:		**Date:**	

Section 3: NCR/CAR Close out

Action undertaken to rectify the issue (if differing from proposed action):

Was the action taken successful in rectifying the issue?	Yes	☐	No	☐
Was further action necessary? If yes, describe below.	Yes	☐	No	☐

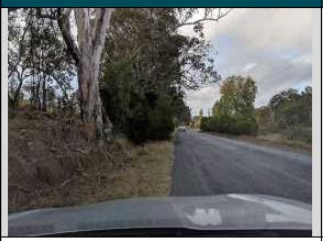
Name:		**Position:**	
Signature:		**Date:**	

Appendix 3: Findings by Chainage

Dowe's Quarry to the Sunnyside Crushing and Screening Plant – Daytime Audit

Chainage Start	Chainage Finish	Day / Night	Travel Direction	Photo No	Category	Hazard Description	Location / notes	Likelihood	Consequence	Risk Rating
							Mount Lindesay Road commencing at Dowe's Quarry Access Road. 100km/h speed zone.			
0.0		day	south		Traffic Signs	sign missing - sight screen	no sight screen for quarry access road intersection	2 Unlikely	3 Moderate	Medium
0.1		day	south		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	Medium
0.0	3.5	day	south		Delineation	line marking faded - centre line		2 Unlikely	3 Moderate	Medium
0.0	3.5	day	south		Road Pavement	pavement condition	poor pavement edges with edge break in some locations	1 Rare	2 Minor	Low
0.0	4.6	day	south		Roadside Hazards	clear zone obstruction - culvert	numerous property access culvert headwalls within the clear zone	2 Unlikely	3 Moderate	Medium
0.4		day	south		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	Medium
0.5		day	south		Roadside Hazards	clear zone obstruction - tree(s)	eastern side of the road at the Brian's Gap Road intersection	2 Unlikely	4 Major	High
0.5		day	south		Traffic Signs	sign missing - intersection ahead	on approach to the Brian's Gap Road intersection which is located near a crest	2 Unlikely	4 Major	High

Dowe's Quarry to the Sunnyside Crushing and Screening Plant – Daytime Audit

Chainage Start	Chainage Finish	Day / Night	Travel Direction	Photo No	Category	Hazard Description	Location / notes	Likelihood	Consequence	Risk Rating
0.7	1.2	day	south		Roadside Hazards	clear zone obstruction - tree(s)	both sides of the road	2 Unlikely	4 Major	High
0.8		day	south		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	Medium
0.9		day	south		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	Medium
1.0		day	south		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	Medium
1.2		day	south		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone with steep drop near a curve	2 Unlikely	4 Major	High
1.6		day	south		Delineation	line marking faded - centre line	through crest	2 Unlikely	3 Moderate	Medium
1.8		day	south		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	Medium
2.0		day	south		Roadside Hazards	clear zone obstruction - power pole	located on the south-eastern corner of the Summerlads Road intersection.	2 Unlikely	4 Major	High
2.0		day	south		Traffic Signs	sign missing - intersection ahead	on approach to the Summerlads Road intersection	2 Unlikely	3 Moderate	Medium
2.1		day	south		Road Alignment and Cross Section	batters steep	eastern side of the road	2 Unlikely	4 Major	High
2.4		day	south		Roadside Hazards	clear zone obstruction - tree(s)	eastern side of the road	2 Unlikely	4 Major	High

Dowe's Quarry to the Sunnyside Crushing and Screening Plant – Daytime Audit

Chainage Start	Chainage Finish	Day / Night	Travel Direction	Photo No	Category	Hazard Description	Location / notes	Likelihood	Consequence	Risk Rating
2.5	2.6	day	south		Road Alignment and Cross Section	batters steep	eastern side of the road	2 Unlikely	4 Major	High
2.6		day	south		Roadside Hazards	clear zone obstruction - tree(s)	eastern side of the road	2 Unlikely	4 Major	High
2.7		day	south		Roadside Hazards	clear zone obstruction - tree(s)	eastern side of the road	2 Unlikely	4 Major	High
2.7		day	south		Road Alignment and Cross Section	batters steep	eastern side of the road	2 Unlikely	4 Major	High
2.8		day	south		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	Medium
2.9		day	south		Traffic Signs	sign missing - intersection ahead	On approach to Leeches Gully Road near crest	2 Unlikely	4 Major	High
2.8	2.9	day	south		Roadside Hazards	clear zone obstruction - cutting batter	cutting with narrow shoulder and steep rock face close to road edge	2 Unlikely	4 Major	High
3.1		day	south		Roadside Hazards	clear zone obstruction - tree(s)	eastern side of the road	2 Unlikely	4 Major	High
3.1		day	south		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	Medium
3.1	3.2	day	south		Roadside Hazards	clear zone obstruction - boulders	eastern side of the road	2 Unlikely	3 Moderate	Medium
3.4		day	south		Safety Barriers	safety barrier end-terminal sub-standard	on approaches to Bridge over Branch Creek (both directions, both sides)	3 Possible	4 Major	High

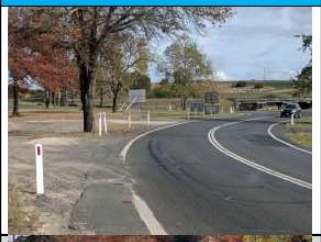
Dowe's Quarry to the Sunnyside Crushing and Screening Plant – Daytime Audit

Chainage Start	Chainage Finish	Day / Night	Travel Direction	Photo No	Category	Hazard Description	Location / notes	Likelihood	Consequence	Risk Rating
3.5	4.1	day	south		Delineation	line marking missing - centre line	no centreline	2 Unlikely	3 Moderate	**Medium**
3.8		day	south		Traffic Signs	sign missing - crest	on approach to crest	2 Unlikely	3 Moderate	**Medium**
3.8		day	south		Delineation	line marking missing - centre line	at crest	2 Unlikely	3 Moderate	**Medium**
3.9		day	south		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	**Medium**
4.1		day	south		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	**Medium**
4.6		day	south				end 100km/h, start 70km/h speed zone			
4.7		day	south		Roadside Hazards	clear zone obstruction - culvert	headwalls in the clear zone	2 Unlikely	3 Moderate	**Medium**
4.8		day	south				Old Ballandean Road intersection			
4.9	5.4	day	south		Roadside Hazards	clear zone obstruction - tree(s)	both sides of the road	2 Unlikely	3 Moderate	**Medium**
5.0		day	south		Roadside Hazards	clear zone obstruction - power pole	eastern side of the road	2 Unlikely	3 Moderate	**Medium**
5.3		day	south		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	**Medium**
5.3		day	south		Safety Barriers	safety barrier missing/substandard	substandard safety barriers at culvert with steep drop off (both directions, both sides)	2 Unlikely	3 Moderate	**Medium**

Dowe's Quarry to the Sunnyside Crushing and Screening Plant – Daytime Audit

Chainage Start	Chainage Finish	Day / Night	Travel Direction	Photo No	Category	Hazard Description	Location / notes	Likelihood	Consequence	Risk Rating
5.4	5.9	day	south		Roadside Hazards	clear zone obstruction - power poles	eastern side of road – approx 3.5m from edge of pavement	2 Unlikely	3 Moderate	Medium
5.6	5.8	day	south		Roadside Hazards	clear zone obstruction - tree(s)	eastern side of the road	2 Unlikely	3 Moderate	Medium
5.6		day	south		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	Medium
5.9		day	south				end 70km/h, start 50km/h speed zone			
6.0		day	south		Roadside Hazards	clear zone obstruction - tree(s)	2m from edge of pavement	2 Unlikely	2 Minor	Low
6.1		day	south		Roadside Hazards	clear zone obstruction - tree(s)	east side of road	2 Unlikely	2 Minor	Low
6.1		day	south		Roadside Hazards	clear zone obstruction - culvert	headwall in clear zone	2 Unlikely	2 Minor	Low
6.2	6.4	day	south		Roadside Hazards	clear zone obstruction - tree(s)	2m from edge of pavement – both sides of the road	2 Unlikely	2 Minor	Low
6.5		day	south				Nass Street intersection. Turn right into Naas Street heading west.			

Dowe's Quarry to the Sunnyside Crushing and Screening Plant – Daytime Audit

Chainage Start	Chainage Finish	Day / Night	Travel Direction	Photo No	Category	Hazard Description	Location / notes	Likelihood	Consequence	Risk Rating
							50km/h speed zone.			
6.6		day	west		Safety Barriers	safety barrier missing	substandard safety barriers at culvert with steep drop off (both directions, both sides)	2 Unlikely	3 Moderate	**Medium**
6.7		day	west				New England Highway (Rouse Street) intersection Turn right into Rouse Street heading north 50km/h speed zone			
7.2		day	north		Delineation	guide post(s) damaged	western side of the road	2 Unlikely	2 Minor	**Low**
8.3		day	north				end 50km/h, start 80km/h speed zone			
8.5		day	north		Roadside Hazards	clear zone obstruction - tree(s)	Tree within clear zone on outside of curve on the western side	2 Unlikely	3 Moderate	**Medium**
8.7		day	north		Roadside Hazard	clear zone obstruction - culvert	headwall within the clear zone with a steep drop located on the outside of a curve on the western side of the road	2 Unlikely	3 Moderate	**Medium**

Dowe's Quarry to the Sunnyside Crushing and Screening Plant – Daytime Audit

Chainage Start	Chainage Finish	Day / Night	Travel Direction	Photo No	Category	Hazard Description	Location / notes	Likelihood	Consequence	Risk Rating
9.0		day	north		Roadside Hazards	clear zone obstruction - culvert	headwall within the clear zone with a steep drop	2 Unlikely	3 Moderate	Medium
9.0		day	north				end 80km/h, start 100km/h speed zone			
9.5		day	north		Roadside Hazards	clear zone obstruction - culvert	headwall within the clear zone at property access.	2 Unlikely	4 Major	High
10.1		day	north		Roadside Hazards	clear zone obstruction - culvert	headwall within the clear zone.	2 Unlikely	4 Major	High
10.2		day	north		Roadside Hazards	clear zone obstruction - culvert	headwall within the clear zone.	2 Unlikely	4 Major	High
10.6		day	north		Roadside Hazards	clear zone obstruction - culvert	Headwall within the clear zone with steep drop off	2 Unlikely	4 Major	High
11.2		day	north		Safety Barriers	safety barrier end-terminal sub-standard	at culvert (both directions, both sides)	2 Unlikely	3 Moderate	Medium
11.9		day	north		Roadside Hazards	clear zone obstruction - culvert	headwall within the clear zone with steep drop off	2 Unlikely	4 Major	High
12.3		day	north		Roadside Hazards	clear zone obstruction - culvert	headwall within the clear zone	2 Unlikely	4 Major	High
13.2		day	north		Roadside Hazards	clear zone obstruction - culvert	headwall within the clear zone	2 Unlikely	4 Major	High
13.4		day	north		Roadside Hazards	clear zone obstruction - culvert	headwall within the clear zone	2 Unlikely	4 Major	High

Dowe's Quarry to the Sunnyside Crushing and Screening Plant – Daytime Audit

Chainage Start	Chainage Finish	Day / Night	Travel Direction	Photo No	Category	Hazard Description	Location / notes	Likelihood	Consequence	Risk Rating
14.9		day	north		Roadside Hazards	clear zone obstruction - culvert	headwall within clear zone at property access	2 Unlikely	4 Major	High
14.9		day	north		Safety Barriers	safety barrier end-terminal sub-standard	both sides of road.	2 Unlikely	3 Moderate	Medium
15.2		day	north		Safety Barriers	safety barrier damaged	single panel on western side of the road	2 Unlikely	2 Minor	Low
15.3		day	north				end audit at crushing and screening plant access			

Sunnyside Crushing and Screening Plant to Dowe's Quarry – Daytime Audit

Chainage Start	Chainage Finish	Day / Night	Travel Direction	Photo No	Category	Hazard Description	Location / notes	Likelihood	Consequence	Risk Rating
0.0							New England Highway commencing at Sunnyside Crushing and Screening Plant Access Point. 100km/h speed zone			
0.1		day	south		Safety Barriers	safety barrier end-terminal sub-standard	eastern side of the road.	2 Unlikely	3 Moderate	**Medium**
0.6		day	south		Roadside Hazards	clear zone obstruction - culvert	headwall within the clear zone	2 Unlikely	3 Moderate	**Medium**
1.5		day	south		Roadside Hazards	clear zone obstruction - culvert	headwall within the clear zone with steep drop	2 Unlikely	4 Major	**High**
1.6		day	south		Roadside Hazards	clear zone obstruction - culvert	headwall within clear zone at property access	2 Unlikely	3 Moderate	**Medium**
1.6	1.7	day	south		Road Alignment and Cross Section	batters steep	eastern side of the road	2 Unlikely	3 Moderate	**Medium**
1.9		day	south		Roadside Hazards	clear zone obstruction - culvert	headwall within the clear zone	2 Unlikely	3 Moderate	**Medium**
2.2		day	south		Roadside Hazards	clear zone obstruction - culvert	headwall within the clear zone	2 Unlikely	3 Moderate	**Medium**
2.6	2.7	day	south		Road Alignment and Cross Section	batters steep	eastern side of the road	2 Unlikely	3 Moderate	**Medium**
3.0		day	south		Roadside Hazards	clear zone obstruction - culvert	Headwall within the clear zone	2 Unlikely	3 Moderate	**Medium**

Sunnyside Crushing and Screening Plant to Dowe's Quarry – Daytime Audit

Chainage Start	Chainage Finish	Day / Night	Travel Direction	Photo No	Category	Hazard Description	Location / notes	Likelihood	Consequence	Risk Rating
3.2		day	south		Roadside Hazards	clear zone obstruction - tree(s)	eastern side of the road at property entrance	2 Unlikely	4 Major	High
3.3		day	south		Roadside Hazards	clear zone obstruction - culvert	headwall within the clear zone	2 Unlikely	3 Moderate	Medium
3.4		day	south		Roadside Hazards	clear zone obstruction - culvert	Headwall within the clear zone with steep drop off	2 Unlikely	4 Major	High
3.5		day	south		Roadside Hazards	clear zone obstruction - culvert	headwall within clear zone with steep drop off	2 Unlikely	4 Major	High
3.8		day	south		Safety Barriers	safety barrier end-terminal sub-standard	eastern side of the road	2 Unlikely	3 Moderate	Medium
4.0		day	south		Safety Barriers	safety barrier end-terminal sub-standard	both sides of the road, both directions	2 Unlikely	3 Moderate	Medium
4.5		day	south				Turn left into Old Ballandean Road. 100km/h speed zone			
4.5		day	east		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone at property access	2 Unlikely	3 Moderate	Medium
4.7		day	east		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone with steep drop.	2 Unlikely	4 Major	High
4.8		day	east		Roadside Hazards	clear zone obstruction - culvert	headwalls within in the clear zone	2 Unlikely	3 Moderate	Medium
4.9		day	east		Traffic Signs	sign missing - crest	on approach to crest	2 Unlikely	3 Moderate	Medium

Sunnyside Crushing and Screening Plant to Dowe's Quarry – Daytime Audit

Chainage Start	Chainage Finish	Day / Night	Travel Direction	Photo No	Category	Hazard Description	Location / notes	Likelihood	Consequence	Risk Rating
4.9		day	east		Delineation	line marking missing - centre line	through crest	2 Unlikely	3 Moderate	**Medium**
5.1		day	east		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	**Medium**
5.2		day	east		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	**Medium**
5.3		day	east				Homestead Road intersection			
5.3		day	east		Traffic Signs	sign missing - intersection ahead	on approach to Homestead Road intersection	2 Unlikely	3 Moderate	**Medium**
5.3		day	east		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone at intersection on northern side of the road	2 Unlikely	3 Moderate	**Medium**
5.3		day	east		Traffic Signs	sign missing - speed advisory	on approach to the curve. no curve warning or speed advisory signage	2 Unlikely	3 Moderate	**Medium**
5.6		day	east		Traffic Signs	sign missing - flood depth marker		2 Unlikely	2 Minor	**Low**
6.0		day	east		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	**Medium**
6.3		day	east		Delineation	line marking missing - centre line	Through the crest	2 Unlikely	3 Moderate	**Medium**

Sunnyside Crushing and Screening Plant to Dowe's Quarry – Daytime Audit

Chainage Start	Chainage Finish	Day / Night	Travel Direction	Photo No	Category	Hazard Description	Location / notes	Likelihood	Consequence	Risk Rating
6.3		day	east		Traffic Signs	sign missing - crest	on approach to crest	2 Unlikely	3 Moderate	Medium
6.4		day	east				Pelham Street intersection			
6.5		day	east		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone with steep drop off	2 Unlikely	4 Major	High
6.7		day	east		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone with steep drop off	2 Unlikely	3 Moderate	Medium
6.9		day	east		Delineation	line marking faded - centre line	through the crest	2 Unlikely	3 Moderate	Medium
6.9		day	east		Traffic Signs	sign missing - crest	on approach to the crest	2 Unlikely	3 Moderate	Medium
6.9	7.2	day	east		Roadside Hazards	clear zone obstruction - power poles	northern side of the road	2 Unlikely	3 Moderate	Medium
7.0		day	east		Roadside Hazards	clear zone obstruction - tree(s)	southern side of the road	2 Unlikely	3 Moderate	Medium
7.1		day	east		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	Medium
7.2		day	east				Rouse Street intersection			
7.2		day	east		Traffic Signs	sign incorrect - intersection sight board	Chevron alignment markers in lieu of sight board	1 Rare	3 Moderate	Medium
7.2		day	east		Traffic Signs	sign missing - speed advisory	on approach to the curve. no curve warning or speed advisory signage	2 Unlikely	3 Moderate	Medium
7.4		day	east		Traffic Signs	sign missing - "road subject to flooding"	on approach to the causeway	2 Unlikely	2 Minor	Low
7.4		day	east				floodway boom gate			
7.5		day	east		Roadside Hazards	clear zone obstruction - power poles	northern side of the road	2 Unlikely	3 Moderate	Medium
7.5		day	east		Traffic Signs	sign missing - speed advisory	on approach to the curve. no curve warning or speed advisory signage	2 Unlikely	3 Moderate	Medium

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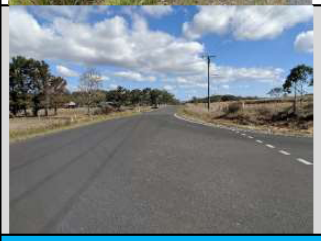
Sunnyside Crushing and Screening Plant to Dowe's Quarry – Daytime Audit

Chainage Start	Chainage Finish	Day / Night	Travel Direction	Photo No	Category	Hazard Description	Location / notes	Likelihood	Consequence	Risk Rating
7.5		day	east		Traffic Signs	sign obscured - flood depth marker	southern side of the road	2 Unlikely	2 Minor	Low
7.5	7.8	day	east		Delineation	guide post(s) missing	northern side of the road on the outside of the curve	3 Possible	3 Moderate	High
7.5		day	east		Roadside Hazards	clear zone obstruction - power pole	southern side of the road	2 Unlikely	4 Major	High
7.9	8.0	day	east		Road Alignment and Cross Section	batters steep	both sides of the road	2 Unlikely	3 Moderate	Medium
7.9		day	east		Roadside Hazards	clear zone obstruction - tree(s)	northern side of the road	2 Unlikely	4 Major	High
7.9		day	east		Roadside Hazards	clear zone obstruction - power pole	south side of road	2 Unlikely	4 Major	High
7.9		day	east		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	Medium
7.9		day	east		Traffic Signs	sign missing - speed advisory	on approach to the curve. no curve warning or speed advisory signage	2 Unlikely	3 Moderate	Medium
7.9		day	east		Roadside Hazards	clear zone obstruction - fencing strainer post	northern side of the road	2 Unlikely	3 Moderate	Medium
8.2		day	east		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone at property access	2 Unlikely	3 Moderate	Medium

Sunnyside Crushing and Screening Plant to Dowe's Quarry – Daytime Audit

Chainage Start	Chainage Finish	Day / Night	Travel Direction	Photo No	Category	Hazard Description	Location / notes	Likelihood	Consequence	Risk Rating
8.2	8.3	day	east		Roadside Hazards	clear zone obstruction - power poles	Northern side of the road	2 Unlikely	3 Moderate	**Medium**
8.2		day	east				end 100km/h, start 70km/h speed zone			
8.3		day	east				Mount Lindsay Road intersection			
8.3		day	north		Delineation	line marking faded - holding line		2 Unlikely	3 Moderate	**Medium**
8.3		day	east				Turn left into Mount Lindesay Road			
8.5		day	north				end 70km/h, start 100km/h speed zone			
8.5		day	north		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone at property access	2 Unlikely	3 Moderate	**Medium**
8.7		day	north		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone at property access	2 Unlikely	3 Moderate	**Medium**
9.0		day	north		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	**Medium**
9.1	9.2	day	north		Roadside Hazards	clear zone obstruction - power poles	eastern side of the road	2 Unlikely	4 Major	**High**
9.2		day	north		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	**Medium**
9.3		day	north		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone at property access	2 Unlikely	3 Moderate	**Medium**
9.7		day	north		Traffic Signs	sign missing - speed advisory	on approach to the curve. no curve warning or speed advisory signage	2 Unlikely	3 Moderate	**Medium**
9.8		day	north		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	**Medium**
9.8	10.1	day	north		Road Alignment and Cross Section	batters steep	western side of the road near outside of curve	2 Unlikely	4 Major	**High**
10.0		day	north		Roadside Hazards	clear zone obstruction - tree(s)	western side of the road	2 Unlikely	4 Major	**High**
10.3	10.4	day	north		Road Alignment and Cross Section	batters steep	western side of the road	2 Unlikely	3 Moderate	**Medium**

Sunnyside Crushing and Screening Plant to Dowe's Quarry – Daytime Audit

Chainage Start	Chainage Finish	Day / Night	Travel Direction	Photo No	Category	Hazard Description	Location / notes	Likelihood	Consequence	Risk Rating
10.8		day	north		Delineation	guide post(s) missing	both sides of the road	2 Unlikely	2 Minor	Low
11.2		day	north		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	Medium
11.0	11.3	day	north		Roadside Hazards	clear zone obstruction - tree(s)	western side of the road	2 Unlikely	4 Major	High
11.6		day	north		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	Medium
11.8		day	north		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	Medium
11.9		day	north		Roadside Hazards	clear zone obstruction - power pole	western side of road	2 Unlikely	4 Major	High
12.0		day	north		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	Medium
12.1		day	north		Roadside Hazards	clear zone obstruction - culvert	headwalls within the clear zone	2 Unlikely	3 Moderate	Medium
12.0	12.2	day	north		Road Alignment and Cross Section	batters steep	western side of the road	2 Unlikely	3 Moderate	Medium
12.3	12.4	day	north		Road Alignment and Cross Section	batters steep	western side of the road	2 Unlikely	3 Moderate	Medium
12.5		day	north		Traffic Signs	sign missing - crest	on approach to the crest	2 Unlikely	3 Moderate	Medium
12.5	12.7	day	north		Road Alignment and Cross Section	batters steep	west side of road	2 Unlikely	4 Major	High
12.7	13.0	day	north		Roadside Hazards	clear zone obstruction - power poles	west side of road	2 Unlikely	4 Major	High
13.1		day	north				Quarry access road intersection			

Dowe's Quarry to the Sunnyside Crushing and Screening Plant – Night Audit

Chainage Start	Chainage Finish	Day / Night	Travel Direction	Photo No	Category	Hazard Description	Location / notes	Likelihood	Consequence	Risk Rating
0.0	0.0	night	south				Mount Lindesay Road commencing at Dowe's Quarry Access Road. 100km/h speed zone.			
0.6		night	south		Delineation	guide post(s) missing	western side of the road	2 Unlikely	2 Minor	Low
1.2		night	south		Delineation	guide post(s) missing reflector	western side at the culvert	2 Unlikely	2 Minor	Low
1.6		night	south		Delineation	guide post(s) missing	crest on both sides of the road	2 Unlikely	3 Moderate	Medium
2.3		night	south		Delineation	guide post(s) missing	crest in the cutting on both sides of the road	2 Unlikely	3 Moderate	Medium
3.0		night	south		Delineation	guide post(s) damaged	western side of the road	2 Unlikely	2 Minor	Low
3.4		night	south		Delineation	safety barrier reflective delineators missing	on approaches to Bridge over Branch Creek (both directions, both sides)	2 Unlikely	2 Minor	Low
3.4		night	south		Delineation	safety barrier reflective delineators missing	on bridge rails (both sides, both directions)	2 Unlikely	2 Minor	Low
3.8		night	south		Delineation	guide post(s) damaged	eastern side of the road	2 Unlikely	2 Minor	Low
4.0		night	south		Delineation	guide post(s) missing	eastern side of the road	2 Unlikely	2 Minor	Low
4.1		night	south		Delineation	guide post(s) damaged	eastern side of the road	2 Unlikely	2 Minor	Low
4.6		night	south				end 100km/h, start 70km/h speed zone			
4.8		night	south		Delineation	guide post(s) missing	western side of the road	2 Unlikely	2 Minor	Low
4.9		night	south		Delineation	guide post(s) missing	eastern side of the road	2 Unlikely	2 Minor	Low
5.0		night	south		Delineation	guide post(s) missing	western side of the road	2 Unlikely	2 Minor	Low
5.6		night	south		Delineation	guide post(s) missing	western side of the road at culvert	2 Unlikely	2 Minor	Low
5.8		night	south		Delineation	guide post(s) missing	western side of the road	2 Unlikely	2 Minor	Low
5.8		night	south				end 70km/h, start 50km/h speed zone			
6.5		night	south				Nass Street intersection. Turn right into Naas Street heading west. 50km/h speed zone.			
6.7		night	west				New England Highway (Rouse Street) intersection Turn right into Rouse Street heading north 50km/h speed zone			
8.1		night	north		Delineation	guide post(s) damaged	western side of the road	2 Unlikely	2 Minor	Low
8.3		day	north				end 50km/h, start 80km/h speed zone			
8.4		night	north		Delineation	guide post(s) damaged	both sides of the road at culvert	2 Unlikely	2 Minor	Low
9.0		night	north				end 80km/h, start 100km/h speed zone			
15.3		night	north				end audit at crushing and screening plant access			

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Sunnyside Crushing and Screening Plant to Dowe's Quarry – Night Audit

Chainage Start	Chainage Finish	Day / Night	Travel Direction	Photo No	Category	Hazard Description	Location / notes	Likelihood	Consequence	Risk Rating
0.0	0.0	night	south				New England Highway commencing at Sunnyside Crushing and Screening Plant Access Point. 100km/h speed zone			
0.3		night	south		Delineation	guide post(s) missing	eastern side of the road	2 Unlikely	2 Minor	Low
1.1		night	south		Delineation	safety barrier reflective delineators missing	eastern side of the road on approach to bridge	2 Unlikely	2 Minor	Low
3.6		night	south		Delineation	guide post(s) poor reflectivity	western side of the road	2 Unlikely	2 Minor	Low
4.2		night	south		Traffic Signs	sign malfunction - intersection ahead	solar powered intersection ahead & slow down digital sign not working during the night audit (Photo taken during daytime audit)	2 Unlikely	3 Moderate	Medium
4.5		night	south				Turn left into Old Ballandean Road. 100km/h speed zone			
4.8		night	east		Delineation	guide post(s) no reflector	southern side of the road	2 Unlikely	2 Minor	Low
5.4	5.5	night	east		Delineation	guide post(s) missing	both sides of the road on a curve	2 Unlikely	3 Moderate	Medium
6.9		night	east		Delineation	guide post(s) missing	both sides of road through a crest	2 Unlikely	3 Moderate	Medium
7.2		night	east		Delineation	guide post(s) no reflector	southern side of the road	2 Unlikely	2 Minor	Low
7.2		night	east		Delineation	guide post(s) damaged	southern side of the road at the Rouse Street intersection	2 Unlikely	2 Minor	Low
7.5		night	east		Traffic Signs	sign poor reflectivity - causeway	northern side of the road	2 Unlikely	2 Minor	Low
7.5		night	east		Delineation	guide post(s) no reflectivity	southern side of the road	2 Unlikely	2 Minor	Low
7.7		night	east		Delineation	guide post(s) missing	northern side of the road	2 Unlikely	2 Minor	Low
7.9		night	east		Delineation	guide post(s) missing	northern side of the road	2 Unlikely	2 Minor	Low
7.9		night	east		Delineation	guide post(s) poor reflectivity	southern side of the road	2 Unlikely	2 Minor	Low
7.9	8.0	night	east		Delineation	guide post(s) poor reflectivity	Numerous on both sides of the road	2 Unlikely	2 Minor	Low
8.2		night	east				end 100km/h, start 70km/h speed zone			
8.3		night	east				Turn left into Mount Lindesay Road			
8.3		night	north		Delineation	guide post(s) missing	western side of the road	2 Unlikely	2 Minor	Low
8.5		night	north				end 700km/h, start 100km/h speed zone			
8.6		night	north		Delineation	guide post(s) obscured	eastern side of the road	2 Unlikely	2 Minor	Low
9.0		night	north		Delineation	guide post(s) poor reflectivity	eastern side of the road	2 Unlikely	2 Minor	Low
9.1		night	north		Delineation	guide post(s) missing	eastern side of the road	2 Unlikely	2 Minor	Low
9.2		night	north		Delineation	guide post(s) damaged	eastern side of the road	2 Unlikely	2 Minor	Low
10.8		night	north		Delineation	guide post(s) missing	both sides of road through the cutting	2 Unlikely	3 Moderate	Medium

Sunnyside Crushing and Screening Plant to Dowe's Quarry – Night Audit

Chainage Start	Chainage Finish	Day / Night	Travel Direction	Photo No	Category	Hazard Description	Location / notes	Likelihood	Consequence	Risk Rating
11.5		night	north		Delineation	guide post(s) missing	eastern side of the road	2 Unlikely	2 Minor	Low
11.8		night	north		Delineation	guide post(s) no reflectivity	western side of the road	2 Unlikely	2 Minor	Low
11.9		night	north		Delineation	guide post(s) obscured	eastern side of the road	2 Unlikely	2 Minor	Low
12.5		night	north		Delineation	guide post(s) missing	both sides of the road through the crest	2 Unlikely	3 Moderate	Medium
13.1		night	north				Quarry access road intersection			

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Constructive Solutions Pty Ltd

www.constructivesolutions.com.au

Tamworth Office:

PO Box 1498

Tamworth NSW 2340

Phone: 02 6762 1969

Email: admin@constructivesolutions.com.au

Brisbane Office

PO Box 133

Paddington QLD 4064

Phone: 0427 011 143

Email: admin@constructivesolutions.com.au

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