Submissions Report

Dubbo Quarry Continuation Project

Prepared for Holcim (Australia) Pty Ltd
June 2021

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Submissions Report

Dubbo Quarry Continuation Project

Report Number

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Client

Holcim (Australia) Pty Ltd

Date

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Version

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Prepared by	**Approved by**
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1 Introduction

1.1 Background

Dubbo Quarry (the quarry) is a basalt quarry owned and operated by Holcim (Australia) Pty Limited (Holcim), located approximately 1.9 kilometres (km) west of the city of Dubbo. The quarry falls within the Dubbo Regional Council local government area (Dubbo LGA).

The regional and the local context of the quarry are shown in Figure 1.1 and Figure 1.2, respectively. The quarry is located on Sheraton Road, Dubbo, and it occupies the former Lot 1 DP 623367 which was subject of a boundary adjustment in 2018 that formed Lots 221 and 222 DP 1247780.

The quarry produces high quality basalt aggregates for use in the construction industry in concrete, asphalt, road base and other applications. The quarry produces many types of road base, including premium road base frequently used by local councils and Transport for NSW (TfNSW). Precoated sealing aggregates from crushed basalt are also produced. The quarry sells products to civil construction projects, engineering projects, subdivision developments, industrial projects, commercial and domestic customers.

The quarry operates under Development Consent SPR79/22 (existing consent) granted by the former Talbragar Shire Council on 18 March 1980. The existing consent for the quarry operations does not specify a production rate; however, production is restricted by the capacity of its processing infrastructure which can handle up to 500,000 tonnes per annum (tpa). The quarry currently operates at an average production rate of approximately 350,000 tpa.

Accessible basalt resources within the land to which the existing consent applies (the existing site) are close to being exhausted. Holcim is seeking planning approval to extract material outside of the existing site to allow the quarry to continue operating. This is referred to as the Dubbo Quarry Continuation Project (the project).

1.2 Dubbo Quarry Continuation Project

i Overview

The project involves continued operations in the existing site and the development of two new resource areas, the Western Extension Area (WEA) and Southern Extension Area (SEA). The project area is shown in Figure 1.3 and described in Table 1.1.

The project includes the construction or modification of the following site components:

- a new internal quarry access road which intersects with Sheraton Road just north of the existing intersection with Sheraton Road, which is referred to as the 'proposed access road';
- a new internal haul road to connect the existing site with the SEA, which will include construction of a culvert type crossing across Eulomogo Creek and is referred to as the 'Southern haul road';
- modifications to the existing water management infrastructure within the existing site; and
- additions to the existing water management infrastructure to service the WEA and SEA.

Consistent with current operations, a peak production rate of 500,000 tpa is proposed for the project. The project will extend the quarry life by up to 25 years, dependent on future quarrying and processing rates. There will be no change to the existing fixed infrastructure or method of quarrying and processing. Hours of operation will remain as per current operations.

Source: EMM (2020); DFSI (2017); GA (2011); ASGC (2006)

KEY

▭ Project area

-- Rail line

— Major road

— Named watercourse

▭ Named waterbody

▭ Local government area

🟩 NPWS reserve

🟩 State forest

Regional setting

Dubbo Quarry Continuation Project
Response to Submissions
Figure 1.1

EMM
creating opportunities

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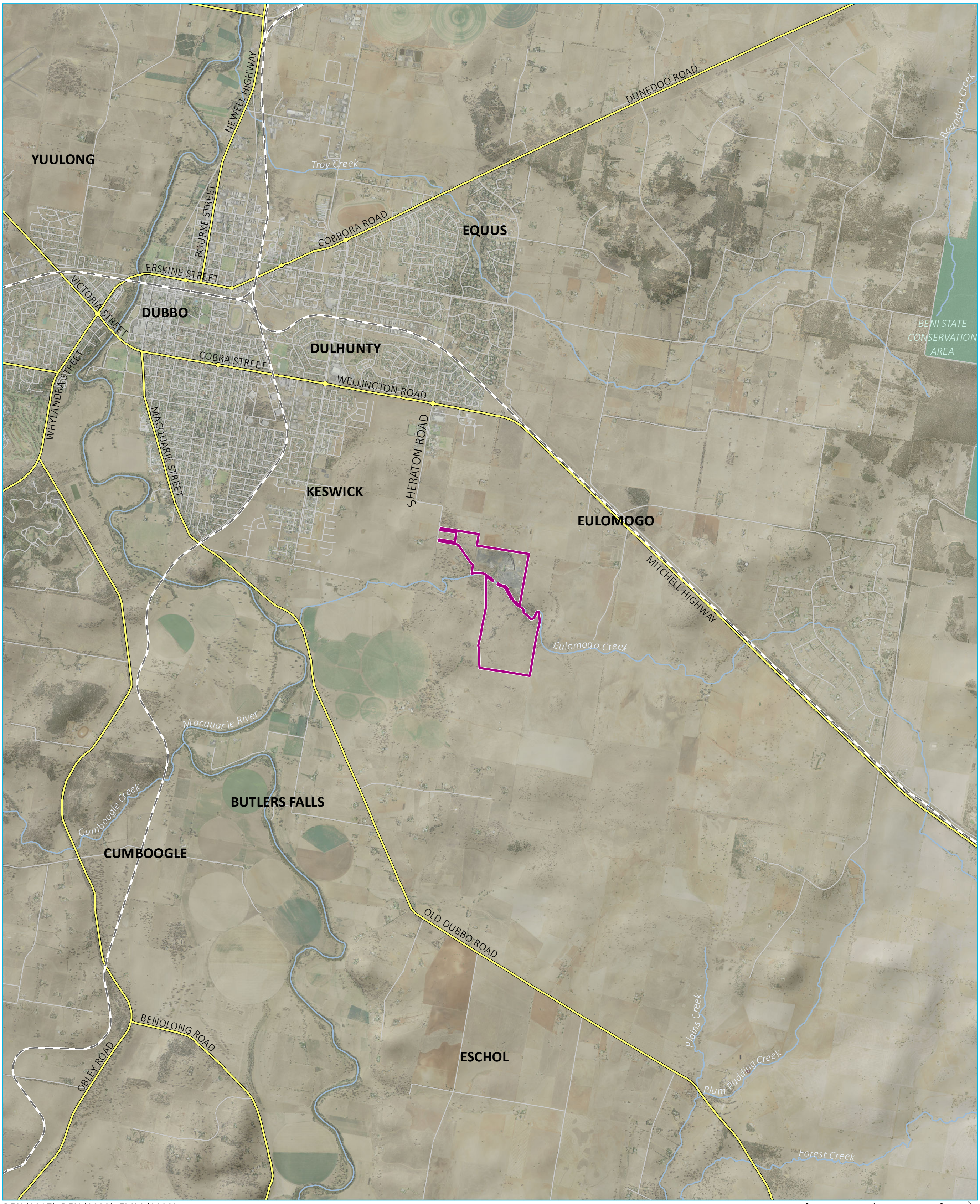

DFSI (2017); DFSI (2020); EMM (2020)

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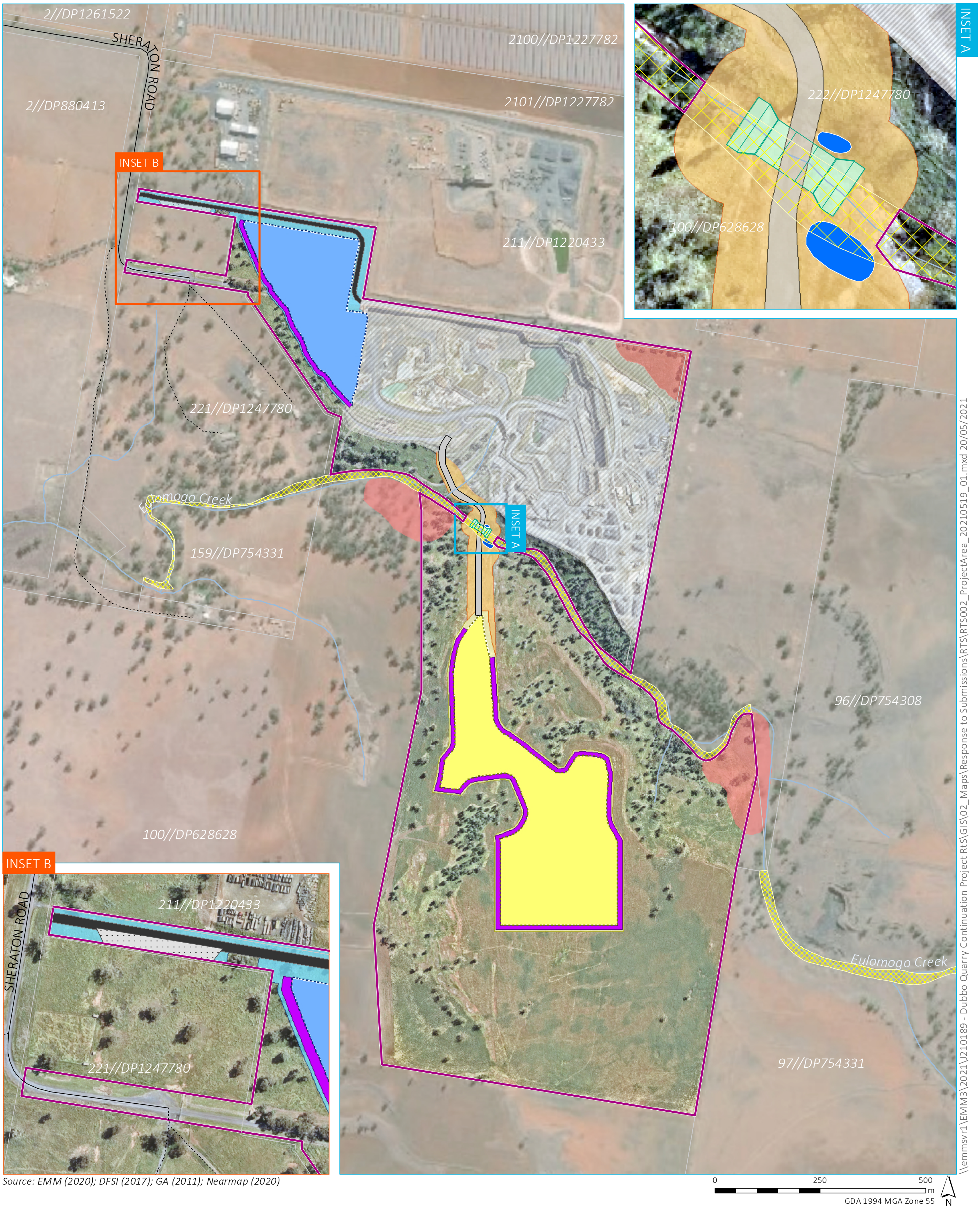
KEY

- ▭ Project area
- – – Rail line
- ━ Major road
- ─ Minor road
- ─ Named watercourse
- 🟩 NPWS reserve

Local context

Dubbo Quarry Continuation Project
Response to Submissions
Figure 1.2

EMM
creating opportunities



Source: EMM (2020); DFSI (2017); GA (2011); Nearmap (2020)

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KEY

- ☐ Project area
- 🟦 Sediment pond
- 🟥 Aboriginal protection zone
- ▨ Indicative existing disturbance area
- ⬜ Proposed haul road
- 🟩 Indicative proposed water crossing
- 🟪 Bund wall
- ⬛ Proposed access road
- ▨ Truck tarping area
- 🟦 Western extension area
- 🟦 Western disturbance area
- 🟧 Haul road disturbance area
- 🟨 Southern extension area
- 🟨 Southern disturbance area
- — Minor road
- ····· Vehicular track
- — Watercourse/drainage line
- ⬜ Waterbody
- ☐ Cadastral boundary (data does not align with surveyed site boundary)
- ▨ Crown land

Project area

Dubbo Quarry Continuation Project
Response to Submissions
Figure 1.3

EMM
creating opportunities

Table 1.1 Project area

Lot/DP	Landowner's consent details	Location description	Approximate size within project area
Lot 222 DP 1247780 (formerly Lot 1 DP 623367 and part Lot 22 DP 793541).	Holcim (Australia) Pty Limited is the owner of this lot and has provided consent for the application.	East of Sheraton Road, contains the existing site, the WEA, proposed access road, and part of the southern haul road.	52.37 ha total 10.18 ha disturbance
Part Lot 100 DP 628628	Owned by an adjacent landowner. Holcim has entered into a Land Use Agreement to be able to quarry on Lot 100 DP 628628, with the owners of this land lot. Land owner's consent is in the process of being obtained.	South of the existing site on the southern side of Eulomogo Creek, contains the SEA and part of the southern haul road.	88.07 ha total 18.12 ha disturbance
Part Lot 221 DP 1247780 (formerly Lot 1 DP 623367)	Owned by an adjacent landowner. Land owner's consent is in the process of being obtained.	West of the existing site, contains part of the existing quarry access road.	0.72 ha total No disturbance
Crown Land	Crown Land. Land owner's consent is in the process of being obtained.	Land perpendicular to Eulomogo Creek between Lot 222 DP 1247780 and Lot 100 DP 628628 contains part of the southern haul road and the proposed crossing of Eulomogo Creek.	0.19 ha 0.19 ha disturbance

ii Approval pathway

The project is classified as State significant development (SSD) under Part 4, Division 4.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). A development application (DA) for SSD must be accompanied by an environmental impact statement (EIS). On 3 April 2020, the Secretary of the Department of Planning, Industry and Environment (DPIE) issued Secretary's Environmental Assessment Requirements (SEARs) for the EIS for the project. The SSD application number is SSD-10417. The project's EIS was submitted to DPIE on 28 January 2021 and publicly exhibited for 28 days.

iii The applicant

Holcim is the applicant for the project with its relevant details provided in Table 1.2. Holcim is a leading international construction material company that has operated in Australia since 1901 and has operated under the well-known Readymix and Humes brands. Holcim is the Australian division of LafargeHolcim Ltd, a Swiss-based leading global construction materials and solutions company that employs around 90,000 employees in more than 80 countries.

Holcim has demonstrated the ability to establish and operate quarrying operations to a high standard, and now owns and operates 65 quarries across Australia.

Holcim also runs a successful concrete supply business from a network of more than 150 concrete plants, 900 mixer trucks and mobile and on-site facilities, as well as 12 precast concrete factories.

Table 1.2 Applicant details

Requirement	Detail
Applicant	Holcim (Australia) Pty Limited
Postal address	Level 7 799 Pacific Highway Chatswood NSW 2067
Contact	Luke Edminson (Planning and Environment Manager NSW)
Contact details	Level 8 799 Pacific Highway Chatswood NSW 2067 luke.edminson@lafargeholcim.com

1.3 Purpose of this report

DPIE wrote to Holcim on 15 March 2021 requesting responses to the matters raised by NSW Government agencies, Dubbo Regional Council and the community that were received during the public exhibition of the EIS. This Submissions Report addresses the issues raised in advice and submissions received on the project (SSD-10417).

This report also documents the additional activities undertaken relating to the application since the conclusion of the exhibition, including further technical studies undertaken and stakeholder and community engagement activities that Holcim has carried out.

The Submissions Report forms part of the EIS documentation and is submitted to DPIE to assist its merit assessment of the SSD-10417.

The purpose of this Submissions Report is to:

- summarise the issues raised in submissions for SSD-10417;
- provide meaningful responses to the submissions;
- summarise any additional assessment and management commitments; and
- update the evaluation of the Project as a whole, having regard to any relevant issues raised in submissions and the responses.

It is noted that certain aspects of the project related to noise, surface water and groundwater are still being considered by Holcim and it is intended that these matters will be subsequently addressed in a separate Addendum Submissions Report to be submitted to DPIE in due course.

This Submissions Report has been prepared by EMM Consulting Pty Limited (EMM) in accordance with the draft DPIE guideline *Preparing a Submissions Report State Significant Development Guide* (DPIE 2020).

2 Submissions analysis

2.1 Exhibition details

The EIS was publicly exhibited electronically from 9 February 2021 to 8 March 2021 on DPIE’s website (https://www.planningportal.nsw.gov.au/major-projects/project/26601).

2.2 Submissions received

During the exhibition period, advice was received from 16 NSW Government agencies and 1 local government authority. Submissions were received from 6 community members.

The advice and submissions received for the project can be viewed on DPIE’s website (https://www.planningportal.nsw.gov.au/major-projects/project/26601).

Table 2.1 Summary of submissions received on SSD-10417.

Source/type	Support	Object	Comment	No comment	Total
State government	0	0	10	5	15
Local government	0	0	1	0	1
Community members	2	4	0	0	6
Total	**2**	**4**	**11**	**5**	**22**

2.3 Summary of submissions

2.3.1 NSW Government agency submissions with comments

i Heritage NSW (Aboriginal Cultural Heritage Regulation)

Heritage NSW (Aboriginal Cultural Heritage Regulation) is satisfied with the Aboriginal Cultural Heritage Assessment (ACHA) completed for the project, including the subsequent consultation with Registered Aboriginal Parties (RAPs). The submission also notes that the project will impact an isolated find (AHIMS 44-4-0383). This impact is identified to be minimal and that the isolated find is to be relocated to reduce harm post project approval in consultation with RAPs.

The Heritage NSW (Aboriginal Cultural Heritage Regulation) submission did not contain any matters for further consideration in this report.

ii NSW Resources Regulator

The NSW Resources Regulator submission did not identify any specific concerns regarding quarry safety or rehabilitation matters in relation to the project.

The NSW Resources Regulator notes the project is required to operate in accordance with the provisions of the Commonwealth *Work Health and Safety Act 2011* and the Commonwealth *Work Health and Safety (Mines and Petroleum Sites) Act 2013*. In addition, the submission notes that the NSW Resources Regulator does not regulate rehabilitation of quarrying projects.

The NSW Resources Regulator may undertake assessments of the mine operators' proposed mining activities under the NSW *Work Health and Safety (Mines and Petroleum Sites) Act 2013* and NSW *Work Health and Safety (Mines and Petroleum Sites) Regulation 2019* as well as other work, health, and safety regulatory obligations.

The NSW Resources Regulator submission did not contain any matters for further consideration in this report.

iii DPI Agriculture

The Department of Primary Industries (DPI) – Agriculture submission notes that sensitive receivers surrounding the project should be sufficiently notified of blasting or fly rock events. This would allow for opportunities for stock to be managed during seasonal activities that may be impacted (eg calving or lambing) can be undertaken.

The submission notes that the existing complaint management system should be responsive to any new issues which arise with the project.

Further, it is noted in the submission that the project's Landscape Management Strategy provides measures to management weed infestations on site. DPI Agriculture notes that a Weed Management Plan would help to coordinate and report on weed occurrence and control onsite and offsite issues that may arise within the site or adjacent land over the project's operational period.

Holcim has no objections to DPI Agriculture's requests made in its submission.

iv DPI Fisheries

The DPI Fisheries submission notes that Eulomogo Creek should be classified as a 3rd order stream and, therefore, Key Fish Habitat. It advised that the design of the water crossing should be undertaken in accordance with *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI – Fisheries 2013) to ensure fish passage is not obstructed. It also noted in the submission that box culverts are preferred to fords and pipe culverts.

DPI Fisheries also advised that a 50 m riparian buffer zone on either side of Eulomogo Creek (measured from the top of the bank) is required, as Eulomogo Creek is classified as a Type 2 Class 3 Minimal Key Fish Habitat under *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI – Fisheries 2013).

The matters raised in DPI Fisheries' submission are addressed in Section 4.1.2.

v Geological Survey of NSW – Mining, Exploration and Geoscience

The Geological Survey of NSW – Mining, Exploration and Geoscience's (MEG) submission notes that the EIS has accurately assessed the resource in consideration of its size and quality.

MEG requests that as a condition of the project's development consent, the proponent is required to provide MEG with annual production data.

MEG asked to be consulted regarding the location of biodiversity offset areas if required to ensure there is no consequent reduction in access to prospective land for mineral exploration, or potential sterilisation of mineral or extractive resources.

Holcim has no objections to MEG's requests made in its submission.

vi Biodiversity and Conservation Division

The Biodiversity and Conservation Division (BCD) notes in its submission that the level of assessment included in the BDAR meets the requirements of the Biodiversity Assessment Method (BAM). BCS notes that the proposed development will result in the removal of 5.82 hectares of plant community type 599, with an offset liability of 132 ecosystem credits.

The BCD submission did not contain any matters for further consideration in this report.

vii TfNSW

Transport for NSW (TfNSW) requested further information and assessment of traffic issues, as summarised below.

- The EIS does not include management measures to mitigate the risk of project-related traffic interacting with school traffic and pedestrians during peak times.
- The existing allowable haulage traffic volumes should be summarised. The baseline plus 10-year scenario of quarry-related traffic presented in the EIS should be zero, as without the project, the resources of the quarry are likely to deplete within a few years.
- Sheraton Road is not approved for trucks larger than 19 m or 50 tonnes (t) as per the TfNSW Restricted Access Vehicle or Performance Based Standards maps. Any road reclassification should be initiated through DRC prior to the commencement of haulage. Holcim should clarify how the National Heavy Vehicle Regulation rules will be met.
- Holcim should clarify management measures for haulage during night-time periods.
- The basic crash analysis does not include an assessment of crash characteristics or likely root causes.
- Existing traffic counts for the intersection of Sheraton Road and Mitchell Highway are lower than TfNSW data in both AM and PM peak school periods for most movements at the roundabout. Multi-day counts should be used so the analysis is based on the worst-case scenario of both data sets.
- The underlying assumptions used to model the increases in traffic from the raw data should be summarised. The current assessment has not considered traffic from Skillset College or South Keswick Quarry.
- Holcim should consider a reduced hourly limit of project-related traffic or further justify currently proposed hourly traffic volumes.
- The Boundary Street Expansion Project will potentially bring increased traffic along the project haulage route. The SIDRA model should be completed with appropriate parameters in consideration of the worst-case scenario for the opening year plus 10 years post commencement of Boundary Street.
- The proposed project-related traffic distribution at the roundabout of Sheraton Road and Mitchell Highway (50% west, 25% east and 25% north) need to also consider 100% of truck movements on any of the roundabout legs. Different trip considerations should be considered to present the worst-case scenario.
- A traffic survey is required to verify actual queue lengths on the Mitchell Highway southwards with further explanation to support the current SIDRA analysis of the roundabout of Mitchell Highway and Sheraton Road. The revised SIDRA model should incorporate the school crossing on Sheraton Road and roundabouts on Mitchell Highway to reflect real world conditions.

Detailed responses to the additional information and commitments requested by TfNSW are provided in Appendix A.

viii Environment Protection Authority

The Environment Protection Authority (EPA) submission noted that the project would operate under the existing Environmental Protection Licence (EPL) 2212 for the quarry, issued under the NSW *Protection of the Environment Operations Act 1997* (POEO Act).

The EPA's submission focuses on the Noise and Vibration Impact Assessment (NVIA) and Air Quality Impact Assessment (AQIA), and the general surface water management proposed for the site. Its key issues are detailed below.

- The NVIA should be revised to account for changing noise impacts caused by stripping and bund construction as completed in one defined period and the potential impacts to sensitive receivers.
- Whether the modifying factor adjustments for low frequency noise have been applied to the assessment, as the predicted noise impact would be higher at some receivers during certain periods if this is the case.
- The AQIA should include discussion and justification to support the land area sizes used to calculate emissions from all areas subject to wind erosion, including rehabilitated and partially rehabilitated areas. The AQIA should also include adequate justification for all emissions controls adopted in the assessment including controls applied for rehabilitation.
- That the AQIA should include adequate justification for the use of 75% control for hauling activities, noting the large area required to be covered and the use of only a single water cart. It should consider all reasonable and feasible options to minimise dust emissions from hauling activities for the life of the project.
- That the AQIA should be revised to include referenced footnotes 1 and 2 for Table 6.4, Table 6.5. and Table 6.6.
- Justification for the use of line-volume sources to model the emission sources from the neighbouring South Keswick Quarry.
- That further assessment and consideration be given to all other available options to avoid discharges to Eulomogo Creek. In addition, that an assessment of appropriate concentration limits in the discharge, or volume limits if applicable, be provided so as to meet the relevant water quality criteria and river flow objectives where discharge to waters cannot be avoided.

Detailed responses to the additional information requested by EPA in relation to air quality are provided in Section 4.4.1. Further noise and surface water assessment is currently being undertaken and outstanding additional information requested by EPA will be provided in a separate Addendum Submissions Report.

ix DPIE Water and NRAR

The DPIE Water and the Natural Resources Access Regulator (NRAR) provided a joint response to the EIS. This submission made a range of recommendations for Holcim to address in both the pre-approval and post-approval stages of the assessment process regarding licencing, controlled activities on waterfront land and surface water and groundwater management.

The submission has been summarised below:

- Existing and proposed water take requires clarification. The proposed surface water take by holding water entitlements is calculated at 136 megalitres per year (ML/year). It is noted that Water Access Licence (WAL) 43440 currently holds zero entitlements. Secondly, the current entitlement at the site is 90 units. The modelled assessment of the groundwater inflows identifies current inflows to be 191 to 127 ML/year.

- Potential impacts of the project towards surface water, including flooding and erosion risks from the proposed water management strategy and creek crossing. Specifically, the proposed location of the sediment basin and design of safety berms on the creek crossing could result in potential erosion and additional flooding impacts. It is also noted that the proposed crossing design may cause changes to downstream discharge rates and hydraulics during flood conditions. The submission recommends that the proposed water management strategy be reviewed to further separate clean and dirty water and prevent the significant loss of water. It is also recommended that the sediments basins are relocated, and additional crossing designs considered.

- Further conceptualisation and a longer period of water table monitoring is required to be presented. The submission recommends that the model consider cross sections to better visual the pit elevation and water table in addition to further considering seasonal rainfall variations. The submission also notes that further consideration should be given to the application of the NSW Aquifer Interference Policy (AIP). Further recommendations are made related to groundwater monitoring and the development of relevant management plans.

Responses to the matters raised by DPIE Water and NRAR will be provided in a separate Addendum Submissions Report.

x School Infrastructure NSW

School Infrastructure NSW (SINSW) is a part of the NSW Department of Education. SINSW made a late submission which for completeness has been considered in this report. SINSW was principally interested in potential noise and vibration, traffic and access and air quality impacts at nearby public schools, including Dubbo College South Campus, Dubbo South Public School and Orana Heights Public School. The submission has been summarised below:

- As noise impacts have the potential to impact for student learning outcomes, SINSW asked for consideration of restricted operations of high impact works during school hours.

- SINSW supports the use of the existing heavy vehicle haulage route, as this will not affect the abovementioned public schools. It asked that traffic movements are managed under a Traffic Management Plan (TMP).

- SINSW requests that Holcim complete air quality monitoring prior to and after commencement of operations and repeated on a regular basis.

Further noise assessment is currently being undertaken and responses to noise matters raised in SINSW's submission will be provided in a separate Addendum Submissions Report. A response to SINSW's air quality matters is provided in Section 4.4.2.

2.3.2 Agency submissions with no comments

The following NSW government agencies made submissions stating that they had no comments:

- Heritage Council of NSW;

- Department of Primary Industries Animal Welfare Unit;

- Crown Lands; and
- Forestry Corporation of NSW.

NRAR also made a no comment submission stating that it would provide a combined response with DPIE Water (see above).

2.3.3 Local government authority submission

The submission made by Dubbo Regional Council (DRC) raised the following matters:

- DRC notes that land within WEA is zoned RE2 Private Recreation under the LEP. As per the State Environmental Planning Policy (Mining, Petroleum and Extractive Industries) 2007 (Mining SEPP), extractive industries are permissible with consent on land for which development for the purposes of agriculture or industry may be carried out. Under the LEP, both extractive industries and agriculture and industry are considered prohibited in RE2 Private Recreation. As the existing RE2 Private Recreation zoning was established with the intention to develop a golf course and for it to act as a buffer between existing extractive industry and residences, DRC considers that the WEA will present a land use conflict.
- The EIS has not demonstrated that the project will result in less than 1,000,000 lumens to avoid light pollution impacts to the Siding Spring Observatory, neighbouring properties or consider the requirements of *The Dark Sky Planning Guideline* (DPE 2018).
- DRC asked Holcim to consider the Draft Dubbo City Transportation Strategy.
- The EIS does not consider the importation of fly ash which is currently occurring on site. A Waste Management Plan should be prepared which details the appropriate management of fly ash.
- DRC recommends that the vegetation inspections should be completed in a more representative season.
- DRC asked Holcim to commence discussions on a planning agreement (PA) regarding the ongoing maintenance of Sheraton Road from the Mitchell Highway intersection.
- Sheraton Road will need to be reconstructed to accommodate increased project-related traffic. This work will need to be carried out to the satisfaction of DRC at an apportioned cost.
- Travel restrictions along Sheraton Road are requested for heavy vehicles during school hours and incorporated into a Code of Conduct for the transportation of materials on public roads.
- DRC made the following comments regarding the project's Traffic Impact Assessment (TIA) (EMM 2020g):
  - the traffic growth noted in the TIA is 1% per year. DRC questioned the appropriateness of this figure considering the extension of Boundary Road and expansion of Southlakes and Keswick Estate;
  - DRC asked if the forecasted network traffic for the year 2045 considers the future expansion of Boundary Road up to Sheraton Road and subsequent traffic increases;
  - the TIA should consider public transport, pedestrian and cycling facilities on Sheraton Road and Boundary Road as part of the Boundary Road Extension Project; and
  - DRC also notes that travel restrictions on Sheraton Road should be provided the same as the South Keswick Quarry.

Responses to matters raised in DRC's submission are provided in Appendix A and Sections 4.1.1, 4.2.3, 4.4.2and 4.9.

2.3.4 Community submissions

Of the six community submissions received on the project, two were in support and four objected. It is noted that two of the objectors, Maas Group Properties (Maas) and Regional Group Australia Pty Ltd (Regional Group) are subsidiaries of Maas Group Holdings. These two submissions have been addressed separately in this report.

i Key comments from community members in support of the project

One submission made the following comments on the benefits of the project:

- The project will allow the sustained delivery of high quality basalt products to local and regional markets.
- The continued operation of the quarry will provide significant immediate and long-term benefits to the local community, region and State; as the development of the region relies on locally sourced and readily available quarry product that can be used to achieve strategic objectives and plans for the region.
- Continued quarry operation maintains employment in the region of approx. 12 site personnel, ~25 Truck driver subcontractors and ~28 regular sub-contractors of specialised and skilled work for the quarry (eg electricians, mechanical fitters, and boilermakers).
- The project area is in a strategic and central location, which will continue to benefit both Holcim and its customers into the future.
- It is sufficiently distanced from dense residential areas, minimising environmental impacts to the closest urban environment.
- A staged approach to extraction sequencing will be implemented to reduce potential land use conflicts.
- The project will utilise existing infrastructure as much as possible and improve infrastructure for an efficient supply of the resource.
- The existing environmental management measures will ensure that the health, diversity, and productivity of the environment is maintained or enhanced, where possible, for future generations.
- Environmental management will be undertaken in accordance with the issued SSD consent, updated EPL, revised site management plans, and mitigation measures.
- There will be no change to the existing fixed infrastructure or method of quarrying and processing. Hours of operation will remain as per current operations, except for processing and extractive hours which will commence at 7 am instead of 6 am. The project will utilise the existing quarry workforce during operations. Some additional contractors will be required during construction of the Eulomogo Creek crossing (up to 6 persons) and the proposed access road (up to 9 persons).

One community member commented that while they live near the existing quarry, the quarry has never caused a major conflict with the use of their land. The community member also noted that minor issues have been addressed and rectified immediately by Holcim.

A community member remarked that Holcim has shown exemplary stewardship with regards to the environment and in all aspects of the operation of the existing quarry. The community member strongly supports the project as it will provide social and economic benefits to the community and broader region.

Holcim is appreciative of the support it receives from the community, including from people living near its operations. It notes the comments made in supporting submissions. No responses to the issues raised in supporting submissions are considered necessary in this document.

ii Key comments from community members objecting to the project

a Maas Group Properties

The submission made by Maas Group Properties (Maas) has been summarised below:

- The EIS should address potential cumulative impacts that the project may have upon future residences at the Southlake Estate.
- The compatibility of the project on existing land uses of Lot 2 DP880413 should be considered in accordance with State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industry) 2007 (Mining SEPP).
- The EIS does not adequately assess the noise, air quality, traffic and visual impacts on future residences close to the WEA.
- The discharge points to the surrounding environment and subsequent mitigation measures should be clarified.
- The level of flood affection at the SEA and the proposed flood evacuation strategy should be clarified.

Maas included peer reviews of the project's NVIA and Traffic Impact Assessment (TIA) by Muller Acoustics Consulting and Cardno in its submission.

Responses to matters raised in Maas submission are provided in Sections 4.2, 4.9 and Appendix A. Further noise and surface water assessment is currently being undertaken and responses to the outstanding matters raised in Maas' submission will be provided in a separate Addendum Submissions Report.

b Regional Group Australia Pty Ltd

Regional Group Australia Pty Ltd (Regional Group) is a subsidiary of Maas which owns and operates the South Keswick Quarry. The submission made by Regional Group has been summarised below:

- The EIS should further consider the project against future adjoining land uses.
- The EIS should further consider the permissibility of the project under the Mining SEPP in considering adjoining land uses.
- The extraction sequence should prioritise the WEA to avoid impacts to future adjoining residential development.

Regional Group also provided a summary of the peer reviews completed by Muller Acoustics Consulting and Cardno for the NVIA and TIA.

Responses to matters raised in Regional Group's submission are provided in Section 4.2 and Appendix A. Further noise assessment is currently being undertaken and responses to outstanding matters raised in Regional Group's submission will be provided in a separate Addendum Submissions Report.

c Other community objections

There were two other community submissions that objected to the project. Both submissions noted concerns with the increased heavy vehicle usage on Sheraton Road, Wheelers Lane and Boundary Road and potential road traffic and safety impacts on nearby schools, sports precinct, and aged care facilities.

One submission also commented on traffic noise impacts at residential areas and aged care facilities and air quality impacts. This submission also commented that the hours of operation should be reduced, and the proposed number of heavy vehicles decreased.

This community member also noted concerns surrounding the impact of increased heavy vehicle usage on property values in Southlakes Estate.

Assessments of road safety, road noise and air quality were undertaken as part of the EIS, and it was concluded that the project would not have significant impacts. Further consideration of road safety and heavy vehicles on Sheraton Road is given in Section 4.5 and Appendix A. It is also noted that Boundary Road and Wheelers Lane are not proposed to be used as heavy vehicle routes under the project.

3 Actions undertaken since exhibition

3.1 Stakeholder engagement

3.1.1 Introduction

Holcim has actively engaged with the community throughout the design phase of the project and during the preparation of the EIS. The purpose of this engagement has been to obtain feedback on the project and inform and update stakeholders about the project. This engagement continued throughout the public exhibition period and remains ongoing. Holcim's stakeholder engagement has been comprehensive to date and reflects the importance Holcim places on this aspect of its business and the project.

3.1.2 Community engagement

Holcim has actively sought to inform the local communities about the application in several ways. The Dubbo Quarry Community Consultative Committee (CCC) was established for the project, and it has facilitated opportunities for community participation in the project. It has allowed Holcim to develop productive working relationships with the local community and key stakeholders. The CCC generally meets every three months. Information has been provided to the CCC about the project since the public exhibition of the EIS.

Holcim has also been in regular contact with the neighbouring landowners to keep them informed of the process, to discuss issues of concern and to seek the necessary landowner consents to lodge the SDD applications.

3.1.3 Government agency and local government authority consultation

A summary of the State and local government consultation that has been undertaken since exhibition of the EIS is provided in Table 3.1. Note that this is in addition to consultation undertake during preparation of the EIS as detailed in Chapter 5 of the EIS.

Table 3.1 Summary of Government agency and local government authority consultation

Stakeholder	Consultation method	Key matters discussed
Dubbo Regional Council	Ongoing consultation through face-to-face meetings and via Community Consultative Committee	• Discussions concerning the traffic issues. • Update on the project.
NSW Department of Planning, Industry & Environment – Resource Assessments	Ongoing consultation through face-to-face meetings and email correspondence.	• The scope of the Submissions Report. • Discussion on process post submission of the Submissions Report.
Transport for NSW	Ongoing consultation through face-to-face meetings and email correspondence.	• Traffic analysis on Sheraton Road. • Discussion on the scope of analysis required.

Future consultation with DRC is proposed regarding entering into a Planning Agreement with Holcim.

3.2 Further technical assessments

3.2.1 Traffic

In response to issues raised by TfNSW and DRC, EMM undertook further analysis of the road network near the quarry. The following analysis was undertaken:

- traffic counts in the AM and PM peak hours near the schools on Sheraton Road; and
- queue length analysis for at the Mitchell Highway roundabout and at the school crossing on Sheraton Road.

3.2.2 Water

In order to address issues raised by DPIE Water, EMM has undertaken a review of the potential for groundwater interception and the potential water licensing issues associated with this impact.

Surface water matters were raised in EPA's submission and the combined DPIE Water/NRAR submission. The key issues raised include further assessment of water quality of existing surface water that is in site water management dams and assessment of flooding and water management impacts of the project.

EMM is currently undertaking a hydrogeological conceptualisation, supplemented by additional monitoring data, to inform updated surface and groundwater assessments. The outcomes of this and a potential surface and groundwater monitoring program for incorporation into a Pollution Reduction Program will be reported on a separate Addendum Submissions Report.

3.2.3 Noise

Holcim has reviewed its proposed operations to determine whether further reductions in noise levels can be achieved at surrounding sensitive receivers. As a result, additional noise assessment is currently being undertaken and will be reported on a separate Addendum Submissions Report.

4 Response to submissions

4.1 Biodiversity

4.1.1 Vegetation inspections

Assessment of vegetation integrity was undertaken during Summer and Autumn, where native vegetation coverage and species diversity is likely highest. In addition, the assessments were timed to follow rainfall wherever possible. The Biodiversity, Conservation and Science Directorate (BCS) within DPIE has reviewed the BDAR and are satisfied that the assessment meets the requirements of the Biodiversity Assessment Method (BAM).

4.1.2 Key fish habitat

DPI Fisheries submission stated that Eulomogo Creek is mapped as Key Fish Habitat, given it is a third order stream (Strahler method of stream ordering). Therefore, further assessment of impacts to fish habitat in accordance with the Policy and Guidelines for Fish Habitat Conservation and Management (DPI – Fisheries 2013) has been undertaken.

A culvert-based crossing of Eulomogo Creek is proposed. Preliminary engineering designs are included in Appendix H of the EIS and include either:

- five 2.1-m diameter precast pipe; or
- five 3.0 x 2.1-m rectangular box culverts.

Given that Eulomogo Creek is considered Type 2, Class 3 Minimal Key Fish, then either of these designed are suitable in accordance with the Policy and Guidelines for Fish Habitat Conservation and Management (DPI 2013). Noting that box culverts are preferred but not mandatory in the guideline.

DPI Fisheries' submission states:

> DPI Fisheries policy advocates the use of terrestrial buffer zones as per the Policy and Guidelines for Fish Habitat Conservation and Management (Update 2013) which states that "NSW DPI will generally require riparian buffer zones to be established and maintained for developments or activities in or adjacent to TYPE 1 or 2 habitats or CLASS 1-3 waterways." Eulomogo Creek is a TYPE 2 CLASS 3 Minimal Key Fish Habitat and therefore DPI Fisheries anticipates the use of a 50 metre riparian buffer zone either side of the creek, measured from the top of the bank.

The disturbance areas have been designed to avoid Eulomogo Creek with the bund and pit extensions at least 150 m from the top of the creek bank. Therefore, the riparian vegetation buffer exceeds the required buffer distance by 100 m. The exception to this is the haul road and associated creek crossing, which is necessary to link the WEA and SEA.

4.2 Land use conflicts

DPI Agriculture, DRC and some community submissions raised matters relating to potential conflicts with neighbouring land uses. Matters raised included:

- the need for notification of neighbouring properties prior to blasting;
- the need for a mechanism for community members to notify the quarry of issues;

- incompatibility with RE2 zoning with regard to permissibility and zone objectives;
- potential for conflicts between extractive operations and approved/proposed residential subdivisions; and
- extraction regime to avoid potential conflicts between encroaching residential development.

These matters are addressed in the following subsections.

4.2.1 Blast notification

Holcim's current procedures for blast notification include contacting by phone the quarry's immediate residential neighbours, and the operators of the South Keswick Quarry and South Keswick Solar Farm. This is done on the morning of each blast, approximately undertaken at 1pm. If there is an issue on site with blasting, the same people are contacted to inform that the blast has been postponed.

This notification procedure would be formalised in the proposed Blast Management Plan to be prepared for the project (see proposed mitigation and management measures in Appendix B).

4.2.2 Community complaints

Holcim agrees to a commitment to formalise a procedure for the community to contact the quarry with complaints. Historically this has been the responsibility of the quarry manager on an informal basis. The protocol will include providing the relevant contact details on its website and a log of community correspondence and actions kept at the quarry. This protocol has been included in the revised list of mitigation measures (see Appendix B). It is also noted that community issues can be raised at CCC meetings by community representatives.

4.2.3 Permissibility

The permissibility of an extractive industry within the RE2 zone is governed by Clause 7(3) of the Mining SEPP. It states that extractive industry is permissible with consent on land on which development for the purposes of agriculture or industry may be carried out. The definition of 'agriculture' in the Dubbo Local Environmental Plan 2011 includes 'aquaculture'. Aquaculture is a permissible use within the RE2 zone and, therefore, extractive industries are permissible with consent. Notwithstanding, as noted in the EIS, Section 4.38(3) of the EP&A Act allows development consent for SSD to be granted despite being partly prohibited by an environmental planning instrument.

With regard to the project's compatibility with the RE2 zone objectives, it is clear that the subject land has limited potential for recreational purposes and that the RE2 zoning has been retained to act as a buffer between encroaching residential land and the quarry. Therefore, it is considered that the zone objectives are not particularly relevant to the subject land.

DRC also argues in its submission that extension of the quarry into the RE2 zone will undermine the effectiveness of this land as a 'protective buffer' for residential land to the west and, therefore, is an incompatible use in this zone. However, the technical assessments undertaken for the EIS (ie the noise, vibration, air quality and visual assessments) demonstrate that, except for residential receivers R2 and R3, impacts will be within relevant criteria. Further, it is noted that, generally, noise levels at nearby receivers would be improved under the project when compared to noise levels from the existing operations.

4.2.4 Residential subdivision impacts and compatibility

The Minister for Planning is required, as the consent authority for the project, to consider the relevant matters stipulated in Part 3 of the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007. This includes Clause 12 which refers to the compatibility of a proposed extractive industry with other land uses. The EIS has considered all existing land uses in the vicinity of the project area as well as all approved and proposed subdivisions publicly exhibited at the time of writing.

Both DRC and Maas submissions refer to the rezoned residential land of Lot 2 DP 880413 which is the property boundary of receiver R3. No subdivision application is currently in place for this property and, therefore, noise and air quality impacts are required to be assessed at the dwelling house within the lot (ie R3). Air quality impacts at this receiver were determined in the AQIA to meet relevant criteria. The NVIA predicted exceedance of criteria during certain operation scenarios at R3 and further noise assessment is currently being undertaken in this regard.

Further, it is noted that, should a subdivision application be prepared for Lot 2 DP 880413, it will also be required to consider its compatibility with nearby extractive industries as required by Clause 13 of the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007.

For the visual impact assessment (VIA) (refer section 6.16 of the EIS), impacts were considered for this land and the wider South Lakes Estate. The VIA concluded that R3 would have moderate visual impacts to the WEA primarily due to the construction of the bund being visible. Once the bund is landscaped, visual impacts would be effectively mitigated. Additional plantings proposed west of the WEA would further reduce potential visual impacts. Visual impacts to other residential subdivisions would be low or non-existent, due to both viewing distance and the presence of intervening structures and vegetation.

4.2.5 Extraction sequencing

The Regional Group submission stated that the proposed development does not propose an extraction sequence as was required for its South Keswick Quarry. This statement is not correct. The project proposes an extraction sequence where quarry material is predominantly extracted from the WEA initially before extraction moves to the SEA. There are two exceptions to this where:

- the extraction of floor rock occurs within the existing quarry pit whilst extraction of fresh basalt occurs within the WEA. This is because the extraction of floor rock would be unable to occur within the WEA until the base of the basalt is reached and a suitable working area is established; and
- the extraction of fresh basalt within the SEA commences in Year 3 at a rate of 100,000 tpa. This is required to meet the land use agreements between Holcim and the landowner.

Further, it is noted that for general operations, road trucks traveling within the site are the main contributor to noise emissions at R3 (the closest receiver to the WEA) and not extraction activities. Therefore, an alternative extraction sequence, that requires all extraction within the WEA to be undertaken before extraction commences in the SEA would have no material reduction in the duration of noise impacts at the receivers close to the WEA.

4.3 Rehabilitation

DPI Agriculture requested that a weed management plan be included in the Rehabilitation and Land Management Plan. There are several weed management commitments made in relation to rehabilitation in the EIS. Holcim has no objection to weed management being a requirement of a Rehabilitation and Land Management Plan and this has been included in the revised list of mitigation measures for the project (refer Appendix B).

4.4 Air quality

4.4.1 Responses to EPA comments

EMM has provided further clarification and assessment in relation to the EPA's submission as detailed below.

i Land areas used to calculate wind erosion

The exposed areas calculated for the project were provided by Holcim and have been confirmed as appropriate. As correctly stated in the EPA's comment, the size of the exposed area in the existing quarry reduces from 8.6 ha in the existing scenario to 1 ha in Scenario 3. This is due to rehabilitation planned in the existing quarry area. There are at least 15 years between the existing scenario and Scenario 3 (dependant on project approval). Holcim has confirmed that this amount of time is adequate to achieve rehabilitation of an area of this size. It is noted that rehabilitation strategies would be further developed within a Rehabilitation Management Plan for the project.

Fully rehabilitated areas have not been modelled as exposed areas (for wind erosion) in the AQIA. As rehabilitation works typically include planting of grasses, shrubs, and other plants, it is commonly acknowledged that the likelihood of wind erosion of the soil will be limited. It is a common approach in AQIAs to exclude these areas in the modelling for this reason. Partially rehabilitated areas have been included in the AQIA (eg in Scenario 2) with a control of 70% applied per 'vegetative ground cover'. The 70% control applied was adopted using the guidance provided in Table 71 of *NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining* (Katestone 2011). A control for 'bunds' was applied in some areas behind the bund (see response below for additional information on use and sensitivity testing). It is noted that these partially rehabilitated areas are small in size compared to the other exposed areas included in the modelling.

Given the information provided by Holcim, and the wind erosion sensitivity tests completed (see responses below), it is considered that the modelling applied in the AQIA adequately represents anticipated exposed areas and rehabilitation goals for the project. It is noted that a level of conservatism has been applied in the AQIA typical with that expected for these types of assessments. For example, Table 5.5 of the AQIA provides an overview of the best practice measures applied or to be applied in future at the project. The Table states that watering would be applied to exposed areas when necessary and it also states that all roads are gravel roads. However, in the AQIA watering has not been applied on exposed areas and no control has been applied for gravelled surfaces for conservatism.

ii Model assumptions for wind erosion and emission controls

In developing the emissions inventory for the Dubbo Quarry AQIA, all existing and proposed dust mitigation measures at the quarry were confirmed by the proponent and then compared with accepted best practice dust mitigation measures (eg Katestone 2011). This included the use of water carts on the southern stockpiles/southern exposed areas to control wind erosion emissions. Figure 5.1 of the AQIA shows the adopted area, totalling 5.6 ha, shaded in green in the southern region of the existing works area. While the selected southern area features various material stockpiles throughout, not all of the 5.6 ha area is used for stockpiling and not all of it would be continuously disturbed by haul trucks or front-end-loaders/excavators, etc. It is therefore considered that the use of the entire land area for wind erosion calculations throughout the modelling period is conservative. The application of watering to wind erosion emissions is considered appropriate.

Wind erosion emission from the southern stockpiles/southern exposed areas accounts for approximately 10% of the total estimated quarry emissions in the existing operations scenario. The following responses provide some sensitivity testing in relation to controls applied to bunds (per EPA comments above). The results of those tests show that when removing controls from multiple wind erosion sources, there is a negligible effect on predicted concentrations and there is no change to the cumulative outcomes as provided in the AQIA. This is due to the release of emissions from wind erosion sources in the model being proportional to the hourly wind speed, with the highest emissions coinciding with the highest wind speeds (typically the periods with greatest pollution dispersion potential).

The bunds proposed in both the WEA and SEA as detailed in the EIS (Figure 2.1 and Section 2.3.4) will be constructed to a height of 4 m and then covered with topsoil, cover crops, and grass to minimise wind erosion. Table 5.5 of the AQIA (within section 'Wind erosion from exposed areas') states 'no' against the category 'wind speed reduction – fencing, bunding, shelterbelts or in-pit dumps' however, the adjacent column includes the point 'bunds established in the SEA and WEA'. It is acknowledged that this could have been presented in a clearer manner.

The 30% control applied for bunds was adopted using the guidance provided in Table 71 of NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining (Katestone 2011). Bunds were assumed to be in place at the WEA and SEA per Figure 2.1 of the EIS. Using the AQIA Scenario 3 as an example, a 30% control for bunds was applied to four areas; the largest being the 'Southern Extension area (not used for extraction)' with an area of 9 ha.

Almost all of the SEA has been assumed as an exposed wind erosion source in Scenario 3. Only a 1.3 ha portion of the SEA relates to extraction and the majority of the remaining part of the SEA has been allocated as exposed wind erosion areas. This assumption is considered conservative as it assumes that the entire 9 ha is actively erodible whereas in reality, much of this exposed area will not be continuously disturbed and have a low potential for wind erosion (ie compacted, crusted surface).

Notwithstanding the above, a modelling sensitivity test has been completed to determine the level of effect of the controls used for bunds on predicted concentrations. The 30% control applied for bunds on the following activities was removed from the Scenario 3 emissions inventory:

- wind erosion of SEA (not used for extraction);
- wind erosion of SEA active extraction area;
- wind erosion of WEA (not used for extraction); and
- wind erosion of WEA active extraction area.

Table 4.1 shows a comparison of the predicted maximum 24-hour average and annual average PM_{10} concentrations at each assessment location for the original assessment ('with bund controls') and the revised modelling ('without bund controls') respectively. The concentrations show that there is a negligible difference between the two sets of modelling results. Further, this has had no discernible effect on the cumulative results, and therefore conclusions, of the original AQIA.

Table 4.1 Incremental (Scenario 3) comparison of PM_{10} concentrations with and without bund controls

Assessment location ID	Incremental PM_{10} concentrations			
	24-hour maximum		Annual	
	With bund controls	Without bund controls	With bund controls	Without bund controls
R1	2.8	2.8	0.4	0.4
R2	2.5	2.5	0.3	0.3
R3	1.4	1.4	0.1	0.2
R4	1.7	1.7	0.1	0.1
R5	1.0	1.0	0.1	0.1
R6a	0.5	0.5	<0.1	<0.1
R6b	0.5	0.5	<0.1	<0.1
R7	0.7	0.7	<0.1	<0.1
R8	0.6	0.7	<0.1	<0.1
R9	1.1	1.1	<0.1	<0.1
R10	1.1	1.1	<0.1	<0.1
R11	1.2	1.2	<0.1	<0.1
R12	1.1	1.1	<0.1	<0.1
R13	0.9	0.9	<0.1	<0.1
R14	0.9	1.0	0.1	0.1
R15	0.9	0.9	<0.1	0.1
R16	0.8	0.8	<0.1	0.1
R17	2.1	2.1	0.1	0.1
R18	0.6	0.6	0.1	0.1
R19	0.8	0.8	0.1	0.1
R20	0.8	0.8	<0.1	<0.1
R21	0.7	0.7	<0.1	<0.1
R22	0.8	0.8	0.1	0.1
R23	1.7	1.7	0.1	0.1

A control efficiency of 30% was applied to the existing area of Scenario 2 to account for the rehabilitated areas surrounding this area, shown by the dark green shaded areas in Figure 4.1. It is noted that the light green areas marked in Figure 4.1 correspond to partially rehabilitated areas and bunds (bund located to the north-west).

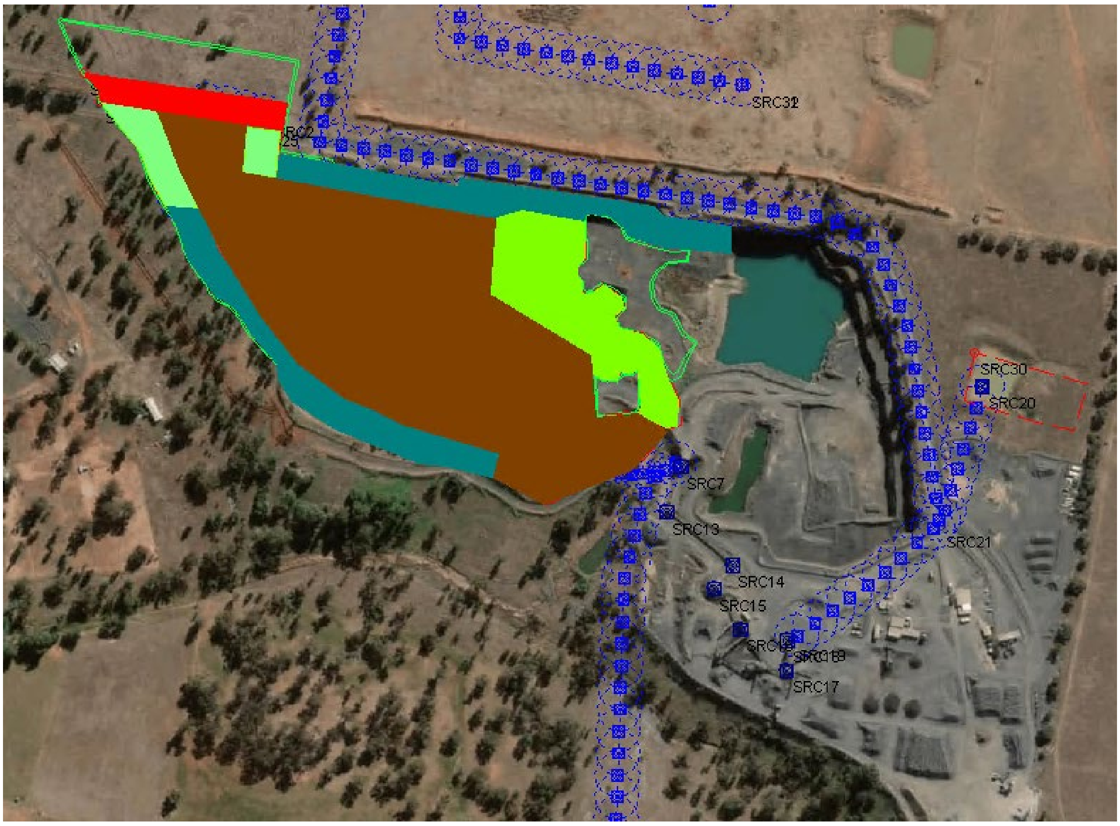

Figure 4.1 Model source locations – wind erosion areas – Scenario 2

A modelling sensitivity test has been completed to determine the level of effect of the control used for 'rehab bund' on predicted concentrations. The 30% control applied for the rehab bund on the activity 'wind erosion of existing pit exposed area' was removed from the Scenario 2 emissions inventory.

Table 4.2 shows a comparison of the predicted incremental maximum 24-hour average and annual average PM_{10} concentrations at each assessment location for the original assessment ('with rehab bund controls') and the revised modelling ('without rehab bund controls') respectively. The concentrations in Table 4.2 show that there is a negligible difference between the two sets of modelling results. Further, this has had no discernible effect on the cumulative results, and therefore conclusions, of the original AQIA.

Table 4.2 Incremental (Scenario 2) comparison of PM_{10} concentrations with and without rehab bund controls

Assessment location ID	Incremental PM_{10} concentrations			
	24-hour maximum		Annual	
	With rehab bund controls	Without rehab bund controls	With rehab bund controls	Without rehab bund controls
R1	3.6	3.6	0.6	0.6
R2	2.1	2.1	0.2	0.2
R3	2.2	2.5	0.2	0.2
R4	1.1	1.2	0.1	0.1

Table 4.2 Incremental (Scenario 2) comparison of PM_{10} concentrations with and without rehab bund controls

Assessment location ID	Incremental PM_{10} concentrations			
	24-hour maximum		Annual	
	With rehab bund controls	Without rehab bund controls	With rehab bund controls	Without rehab bund controls
R5	0.9	0.9	<0.1	<0.1
R6a	0.3	0.3	<0.1	<0.1
R6b	0.3	0.3	<0.1	<0.1
R7	0.4	0.4	<0.1	<0.1
R8	0.3	0.3	<0.1	<0.1
R9	1.0	1.0	<0.1	<0.1
R10	0.9	0.9	<0.1	<0.1
R11	1.0	1.0	<0.1	<0.1
R12	0.8	0.8	<0.1	<0.1
R13	0.7	0.7	<0.1	<0.1
R14	0.9	0.9	0.1	0.1
R15	0.9	0.9	<0.1	<0.1
R16	0.7	0.7	<0.1	<0.1
R17	1.1	1.1	0.1	0.1
R18	0.6	0.6	0.1	0.1
R19	0.8	0.9	0.1	0.1
R20	0.3	0.4	<0.1	<0.1
R21	0.3	0.3	<0.1	<0.1
R22	0.8	0.8	<0.1	<0.1
R23	2.5	2.5	0.1	0.1

iii Hauling activities

EPA requested further justification on the use of a 75% control factor in the AQIA applied to hauling activities due to application of water from a watering cart.

If required during operation of the project, Holcim will consider the use of larger water cart or an increased number of water carts, to achieve their commitment of Level 2 watering (corresponding to a 75% control) on unpaved roads. As noted in a previous response, all haul roads at the project will be gravelled. This will help to reduce wheel-generated dust from unpaved haul roads. However, the AQIA assumed that the haul roads are regular haul roads (without gravel) for conservatism.

It is noted that the level of watering required to achieve 75% control is based on a relatively high evaporation rate of 2mm/hr. Therefore, watering at a level of >2L/m2/hour (Level 2 watering) may only be required during certain conditions (hot summer days). The ability of the site to achieve an effective level of control, on any given day, can be evaluated through daily visual assessment of haulage to ensure that wheel-generated dust does not extend higher than the truck wheel rim. If dust is seen to extend higher than the truck wheel rim, the rate or frequency of water application may be increased, particularly on haulage routes being used that day, and routes that are close to the site boundary. If increasing the rate or frequency of water application does not fully address the issue, additional surface treatments could be applied.

If required, Holcim will consider further mitigation measures to reduce wheel-generated dust on unpaved roads. This may include installation of ground sprinkler systems or the use of chemical dust suppressants.

iv South Keswick quarry

Line-volume sources were chosen to represent all emission sources at the South Keswick Quarry for consistency with the source maps provided in the South Keswick Quarry AQIA (Pacific Environment 2016). Whilst it is noted that the South Keswick Quarry AQIA used individual volume sources, in the interest of simplicity in the modelling process, line-volume sources were used in the cumulative dispersion modelling conducted by EMM in favour of volume sources (ie line-volume sources reduce the number of emission sources that need to be configured in the model relative to the use of individual emission sources).

It is noted that the modelling of the South Keswick Quarry was completed using additional detail to what might be normally undertaken for a cumulative source. This included splitting the emissions into source categories, applying specified hours of operations, and allocating sources per the source maps provided. It is often common practice to apply the total emissions evenly to randomly spaced (often volume) sources when modelling cumulative sources. It is considered that the diurnal and spatial variation in emissions in the cumulative modelling would have a greater influence over the concentrations predicted from the South Keswick Quarry than the type of emission source selected.

For the modelling of the Dubbo Quarry, area sources were used to represent activities occurring across large areas (such as quarry pit operations) and wind erosion. Volume and line-volume sources were used to represent activities occurring in discrete locations (such as conveyor transfers, unloading to stockpiles and material hauling). This is not an uncommon approach when modelling these types of emission sources. Activities from the Dubbo Quarry were modelled in this way given the detailed information available on source locations and the potential spatial distribution of quarry pit operations.

Regarding the implications of using area sources to air quality predictions, it is noted that AERMOD does not apply plume meander to predictions from an area source. As identified by US EPA[1] in 2019, plume meander "*decreases the likelihood of observing a coherent plume after long travel times and results in a greater plume spread and increased dispersion downwind*". With the exclusion of plume meander from area source dispersion calculations, resultant predicted downwind concentrations under low wind speed conditions can be overpredicted. This is supported by Victoria EPA[2] which identifies that "*it is recognised that AERMOD concentration predictions for area sources in the current approved version of AERMOD are likely to be overestimated under very light wind conditions (i.e. for wind speeds less than 1 m/sec)*".

Therefore, the area source modelling approach for quarry pit operational emissions at the Dubbo Quarry is considered to be conservative.

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[1] https://www.epa.gov/sites/production/files/2021-01/documents/lowwind_plume_meander_white_paper.pdf

[2] https://www.epa.vic.gov.au/-/media/epa/files/publications/1551.pdf

In conclusion, the method used for modelling sources at Dubbo Quarry and at South Keswick Quarry is considered to be in line with standard modelling practices.

v Other

EPA requested that the AQIA be revised to include referenced footnotes 1 and 2 for Tables 6.4, 6.5 and 6.6. Tables 6.4, 6.5 and 6.6 include footnotes 1 and 2 for columns 3 and 5 respectively (‘PM_{10} - 6th Highest 24-hour’ and ‘$PM_{2.5}$ - 3rd highest 24-hour’). The corresponding footnotes have not been included.

The columns titled ‘6th highest’ and ‘3rd highest’ in Tables 6.4, 6.5 and 6.6 have been identified as typographical errors. These columns should simply be labelled as ‘24-hour’ or ‘Maximum 24-hour’. The results shown in these columns are the highest (or maximum) results. As noted in Section 4.3.1 of the AQIA, there are no existing exceedances of the daily PM_{10} criterion in the regional average background dataset.

4.4.2 Responses to other submissions

DRC’s submission raised the issue of importation of fly ash that is currently occurring at the site and potential issues with its storage.

Fly ash was, until recently, received and stored at the site for use in the blending of different quarry products. Until recently it was considered that this activity was approved under the current development consent for the quarry. However, upon receipt of advice from the EPA in May 2021, this was determined to not be the case and the receipt and storage of fly ash has been halted.

It is proposed, as part of the project, that fly ash will be received at the quarry and blended with basalt products. The proposed maximum amounts of fly ash received at the site would be around 3,000 tonnes per year. This amount has been accounted for in the amount of material stockpiled in the AQIA scenarios. Potential measures for the management of fly ash stored at the site include:

- locating stockpile(s) away from water courses and within impervious areas;
- administration of chemical suppressors on stockpiles where required; and
- fly ash to be ordered on an as needs basis and minimising the amounts of fly ash stored where possible.

It is also proposed to continue to receive concrete washout at the quarry to blend into product. This is not a daily routine activity, and the material is still damp at the time that it is removed from the trucks. This is, therefore, not deemed to be an activity that will cause significant emissions of particulate matter. If dust is observed, Holcim will apply water sprays to reduce particulate matter emissions.

Both the fly ash and concrete washout materials to be received at the quarry have resource recovery exemptions granted by the EPA under the Protection of the Environment Operations (Waste) Regulation 2014.

SINSW requested in its submission that a condition be placed on the development consent to undertake air quality monitoring at the identified receivers. Holcim anticipates that the development consent will include the requirement to comply with strict air quality criteria. Controls and management of air quality impacts will be detailed in an Air Quality Management Plan.

4.5 Traffic

EMM undertook additional traffic modelling and assessment in response to matters raised in TfNSW and DRC’s submission. This is presented in Appendix A. The main outcomes of the additional assessment are:

- project related traffic would have minimal impacts on the operation of the Mitchell Highway/Sheraton Road intersection as well as the children's school crossing on Sheraton Road;
- when allowing for all existing and potential future development in the local area, the volume of traffic would exceed the capacity of the intersection (Level of Service (LoS) F) at the Mitchell Highway/Sheraton Road during the am and pm peak hour periods and at the Sheraton Road children's crossing during the am peak hour period;
- a significant northbound queue was observed between 3:20 – 3:35 pm on Sheraton Road due to traffic associated with school pickup. Therefore, it is proposed to restrict outgoing quarry traffic movements for a period of half hour (eg between 3.15 to 3.45 pm) on school days;
- the main contributor to the road network performance will be future Boundary Road residential development and background traffic growth beyond 2021, with the project related traffic being only a minor contributor; and
- future road network improvements, including the Boundary Road extension and the potential Freightway Ring Road, will be required to alleviate road network constraints.

4.6 Aboriginal heritage

The Aboriginal Cultural Heritage Assessment (ACHA) (EMM, Appendix G to the EIS) noted that additional assessment would be required during exhibition of the EIS to determine if scar trees were present within the southern disturbance boundary of the project. This was due to the presence of large amounts of rock around the base of trees within this area that required removal for inspection by an archaeologist.

This additional assessment was undertaken by EMM's archaeologist, and no scar trees were identified within the southern disturbance boundary. An addendum to the ACHA was prepared and provided to RAPs for comment on 16 April 2021. No comments were received from the RAPs within the two-week review period (16–30 April 2021) and the addendum has been finalised and is presented as Appendix C to this report.

4.7 Visual

DRC's submission stated that the EIS has not demonstrated that the project will result in less than 1,000,000 lumens to avoid light pollution impacts to the Siding Spring Observatory, neighbouring properties or consider the requirements of *The Dark Sky Planning Guideline* (DPE 2018).

As stated in Section 6.16.4 of the EIS, night-time quarrying operations are not proposed but there may be an occasional need for maintenance of plant or equipment at night. Such lights would be flood lights of no more than 1,000 W each which generate 18,000 lumens. Therefore, exceedance of the 1,000,000 lumens threshold would not occur. Further, it is not expected that night lighting will generate any substantive light spill as lighting will be localised and directional to the task area, and the proposed 4 m high perimeter earth bunds will also mitigate the spill of light or night glow.

In terms of the visual elements of the quarry and landscape treatments, Section 6.16 of the EIS provides a comprehensive visual assessment of the project. Visual elements of the project are described in section 6.16.4.i. The visual assessment concluded that there are three existing rural residences which have a ranking of high or moderate sensitivity, to the moderate visual effects associated with the proposed voids and bunding, and to a lesser extent with the new and existing surface infrastructure. Visual mitigation measures within the project area have been proposed for these residences.

For all other rural residences, the impact is assessed to be low or non-existent, due to both viewing distance and the presence of intervening structures and vegetation.

Maas suggested that existing stands of trees be retained and that bund walls are landscaped. These suggestions are already incorporated into the project design with a substantial area of ecological communities being retained west of the WEA. Holcim has committed to maintaining and enhancing this community with additional plantings consistent with the community composition to be detailed in the BMP. Potential landscape treatments of bund walls are limited to grass species. This is because the bund walls are intended to be temporary, as the soil and rocks within the bund walls will be used in rehabilitation of the final landform.

4.8 Fly rock

The EIS included a commitment that further consideration of potential fly rock impacts would be given in the Submissions Report.

Holcim's blasting contractor for the quarry currently implements a Drill and Blast Management Plan to ensure safe practices and procedures for blasting operations, the safety and minimisation of impact on personnel, plant and the environment, and compliance with current legislation. Risks associated with drill and blast activities are assessed and documented in accordance with the contractor's risk management procedure.

Stemming material can be added to the top of blast holes to contain the explosion gases and to prevent fly rock and excessive air blast overpressure. The use of stemming material is considered in the blast planning and site preparation for a blast. An exclusion zone is established for each blast from which all personnel and equipment are to be cleared. If road closures are required, this is also determined in the blast planning.

It is considered that the existing drill and blast management plan is sufficient to minimise the risk of fly rock to personnel, equipment, and the general public. Reference to the contractor's drill and blast management plan would be included in the proposed Blast Management Plan for the project.

5 Closing

This Submissions Report has addressed the matters raised in submissions received on the EIS from Government agencies and the community.

The exceptions being matters related to noise, surface water and groundwater which will be addressed in an Addendum Submissions Report. The Addendum Submissions Report will also provide an updated evaluation of the project and conclusion as to whether the project is in the public's interest and any additional mitigation or management measures proposed.

References

Katestone 2011, *NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining*.

NSW Department of Primary Industries 2013, *Policy and guidelines for fish habitat conservation and management*.

Appendix A

Traffic response to submissions

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18 June 2021

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Re: Dubbo Quarry Continuation Project (SSD-10417: 22L Sheraton Rd, Dubbo)- Response to Submissions (Traffic)

Dear Luke,

This letter addresses the traffic issues raised by Transport for NSW (TfNSW), Dubbo Regional Council (Council), School Infrastructure NSW (SINSW) and the community in submissions on the Traffic Impact Assessment (TIA) prepared for the Dubbo Quarry Continuation Project by EMM Consulting Pty Ltd.

1 Authority comments

1.1 Transport for NSW (TfNSW)

TfNSW comments and references to where comments are addressed in this report are provided in the following table.

Table 1.1 TfNSW comments

TfNSW comments	Response notes and section references
The Road Safety Audit (RSA) provided by the applicant raises safety concerns with mixing of quarry and school traffic or pedestrians at peak times. If different road users are separated the potential for incidents will be substantially reduced. The applicant has not proposed management measures and/or works to address these risks or justified why such commitments are unnecessary to keep the risks as low as reasonably practicable. Any measures may be included as consent conditions or incorporated into a Traffic Management Plan in consultation with schools, bus operators, businesses, Council and TfNSW.	This letter undertakes a traffic assessment during the school hours and a range of management measures have been identified (Section 11). Holcim will prepare a Traffic Management Plan in accordance with conditions of consent, and will consult with TfNSW, Council and the three schools during its preparation.
Please note Skillset Senior College (171 Sheraton Road) has non-standard start and finish times for classes, and these are to be considered by the applicant. The school zone operating hours have recently been amended to 8:00-9:30am and 2:00-4:00pm.	The comment is noted. A traffic survey has been conducted during the school peak hours. The timing of the survey was agreed with TfNSW and Council (Section 5).

Table 1.1 TfNSW comments

TfNSW comments	Response notes and section references
The TIA asserts there will be no significant increase in quarry traffic as the existing consent conditions (SPR 79/22) do not limit haulage. The TIA cites historic production up to 500ktpa with average 350ktpa (s3.1, pg17) but later refers to historic production up to 350ktpa (s3.3.2, pg19) and notes the Environmental Protection Licence (EPL) is approved for up to 500ktpa. These quantities cannot be accepted as the baseline traffic scenario, as: *-For the present-day baseline, neither the production capacity of plant onsite, nor the production levels the site has operated at in recent years, can be taken as evidence of compliance with historic DA consent SPR79/22. The applicant should present a summary of comprehensive review of the planning reports accompanying SPR79/22 to determine haulage traffic volumes that were consented to.* *-Without approval of this application, existing hard rock resources at the site are likely to be depleted within a few years as the existing consent is limited in terms of the quarry envelope. The baseline + 10 years scenario (which Austroads AGTM12 specifies is to be assessed for development proposals) is to therefore reflect zero quarry traffic.*	The quarry traffic is assumed to be additional from the survey, as discussed in Section 7.
The proposal includes use of trucks up to 20 metres long. The Sheraton Rd route is not approved for trucks greater than 19 metres or 50 tonnes on either the TfNSW Restricted Access Vehicle (RAV) or Performance Based Standards (PBS) maps, available online. If the route is to be reclassified to allow PBS Level 1 trucks (up to 20m), it is requested this be initiated through Council, and gazetted prior to commencement of haulage. The applicant is to clarify how the National Heavy Vehicle Regulation (NHVR) rules will be met.	The transport contractor has obtained PBS authorisation permits from the National Heavy Vehicle Regulator (NHVR) which allows Higher Mass Limit (HML) 56.5 tonnes and 25/26 m B-double trucks within Dubbo Regional Council LGA. The permits are included in Attachment B.

Table 1.1 TfNSW comments

TfNSW comments	Response notes and section references
Proposed hours of loading and transport are 4am to 6pm Monday to Saturday (Sundays or public holidays for emergencies). The applicant is to clarify controls and commitments to safely manage haulage during darkness and twilight.	There will be a range of controls implemented during darkness and twilight, including speed restrictions on site and good driving practices. These controls will be included in the Driver's Code of Conduct which will form part of the TMP. Examples of such controls are detailed below. Drivers are to observe the posted speed limits on all public roads with speed adjusted appropriately to suit the road environment and prevailing weather conditions, to comply with the Australian Road Rules. The vehicle speed must be appropriate to ensure the safe movements of the vehicle based on the vehicle configuration. All drivers and truck operators working for or on behalf of Holcim are to be made aware of the Three Strikes Scheme (https://www.aic.gov.au/sites/default/files/2020-05/tandi446.pdf) introduced by Australian government which applies to all vehicles over 4.5 tonnes. When a heavy vehicle is detected travelling at 15 km/h or more over the posted or relevant heavy vehicle speed limit by a mobile police unit or fixed speed camera, TfNSW will record a strike against that vehicle. If three strikes are recorded within a three-year period, TfNSW will act to suspend the registration of that vehicle (up to three months). Fatigue is one of the biggest causes of crashes for heavy vehicle drivers. The National Heavy Vehicle Accreditation Scheme (https://www.nhvr.gov.au/safety-accreditation-compliance/national-heavy-vehicle-accreditation-scheme) allows heavy vehicle operators the choice of operating under three fatigue management schemes: Standard Hours of Operation; Basic Fatigue Management (BFM); and Advanced Fatigue Management (AFM). All heavy vehicle drivers operating at the site must be aware of their adopted fatigue management scheme and operate within its requirements. Drivers are to use vehicle headlights when driving during the period between sunset and sunrise and also during weather conditions that may affect visibility (i.e. heavy rain or fog).
The basic crash analysis in the RSA (s2.9) is not acceptable as it lacks an assessment of crash characteristics and likely root causes. Detailed crash data can be obtained from TfNSW. A more comprehensive analysis is to be presented on behalf of the applicant.	Detailed crash data has been obtained from TfNSW. This has been discussed in Section 2.
Traffic counts provided at TIA Figure 2.2 (R.O.A.R., 4th and 6th June 2019) are substantially lower than TfNSW data (4th December 2019) in both the AM and PM (school) peak periods, for most or all movements at the roundabout. Austroads AGTM12 recommends multi-day counts be used, so the analysis is to be based on the likely worst-case using both datasets as they are statistically relevant, or further counts are needed.	Updated traffic data, provided by TfNSW has been used in the SIDRA model (see Sections 5.1 and 5.2 and Attachment A).

Table 1.1 TfNSW comments

TfNSW comments	Response notes and section references
The underlying assumptions used to model increases in traffic from the raw data are to be summarised. It appears the current analysis has not allowed for Skillset College or the approved increase in haulage from South Keswick Quarry, which TfNSW understands is capped at 495ktpa, 110 truckloads outbound per day and 10 loads outbound per hour.	A cumulative traffic impact assessment has been undertaken (Section 8). The traffic generation from Boundary Road development, Dubbo RSL and South Keswick Quarry have been discussed and agreed with both TfNSW and Dubbo Regional Council before any modelling work. The Skillset College has start and end times outside of our assessed peak hours therefore its associated movements would not need to be captured. Hence, the cumulative traffic impact assessment has been done as per agency agreements.
The neighbouring quarry (DA2016/482) committed to limit maximum hourly traffic to 20 hourly movements (in and out combined), equating to a peak factor of around twice \the average number of loads required to achieve approximately 500ktpa. This approach is commonly taken on similar developments. Higher peak traffic volumes are associated with poor safety and efficiency outcomes, especially where they coincide with elevated background traffic. The applicant should consider an appropriate reduced hourly limit or is to justify why the current proposed limit is necessary.	Dubbo Quarry operates differently to the neighbouring South Keswick Quarry as they serve different customers with different truck sizes. Holcim sells/delivers, on average, 33 tonne of product per truck with smaller trucks often visiting the site to purchase product ad hoc. It is understood that South Keswick Quarry typically delivers 39 tonne of product in its trucks and does not have ad hoc sales. The Dubbo Quarry also has shorter proposed haulage hours over the day where product can be sold or delivered compared to South Keswick Quarry. These factors allow for South Keswick Quarry to reduce their hourly truck numbers whilst still achieving the same annual production volume as Dubbo Quarry. The two quarries have comparable maximum daily truck movements, 242 for Dubbo Quarry and 220 for South Keswick Quarry, with the difference attributed to smaller truck sizes frequenting the former. Further, it should be noted that these maximum volumes are expected to occur infrequently and would not be a regular occurrence. They have been presented to assess a potential worst case impact scenario as is standard practice for undertaking comprehensive traffic impact assessments.
Discussion in the TIA (s4.5) on extension of Boundary Rd in 2021 is inadequate. Boundary Road will cater for new desire r[sic] between the southwest residential area and the highway / east Dubbo, with potential to significantly increase traffic along the haul route. Discussion of appropriate parameters for input into the SIDRA modelling is required, and likely worst-case scenarios are to be modelled for both the opening year and +10 years post-commencement.	Boundary Road residential traffic has been incorporated in the SIDRA model and sensitivity testing has been undertaken in a 10-year horizon (see Section 8.1).
TfNSW does not accept the assumed quarry trip distributions at the roundabout (50% to west, 25% to east and 25% to north). During any hourly period of a haulage campaign, 100% of trips are likely to use any one of the legs of the roundabout. Different trip distributions must be considered to demonstrate likely worst-case performance.	The trip distribution has been updated and additional SIDRA analysis has been undertaken based on the worst case scenario of 100% traffic turning left at the roundabout (see Section 7).
95th percentile queue values modelled with SIDRA disagree with site observations, which both the submitted RSA and TfNSW staff have observed routinely approach lengths of 300 metres or more from the Mitchell Highway southwards to the supervised school crossing. *Traffic survey is required to verify queue lengths that develop south of the roundabout, in both directions towards and away from the roundabout (noting traffic is also known to queue back toward the roundabout). The report is to explain how the SIDRA model was recalibrated to match surveyed queue lengths before updated modelling is provided.*	A site visit has been undertaken by EMM traffic engineers to observe queuing at the children's crossing on Sheraton Road and at the Mitchell Highway roundabout. The SIDRA model has been recalibrated to represent the observed queue lengths (see Section 5.1.)

Table 1.1 TfNSW comments

TfNSW comments	Response notes and section references
It is suggested that a linked SIDRA model, incorporating the school crossing in addition to the highway roundabout, may give results that reflect real-world conditions.	The model has been updated by linking the roundabout and the children's crossing (see Section 5.1).

1.2 Dubbo Regional Council

Dubbo Regional Council (Council) comments and references to where comments are addressed in this report are provided in the following table.

Table 1.2 Council comments

Comment	Response notes and section references
Council advises that the draft Dubbo City Transportation Strategy has been completed and placed on public exhibition. The subject site is situated adjacent to the Hennessy Road Reserve. The draft Strategy includes a proposal for Hennessy Road to become part of the Southern Distributor, to allow for the effective movement of traffic through the Precinct to the schools on Sheraton Road and to provide a greater level of access for the existing quarries out to the Mitchell Highway. *It is strongly suggested that the Proponent undertakes a review of the draft Dubbo City Transportation Strategy to ensure familiarisation with the document. It is also suggested that the Proponent seek to meet with Council's Manager Infrastructure Strategy and Design -Chris Godfrey to further discuss Council's strategy for the area.*	Following discussion with Council's Manager for Infrastructure Strategy and Design, the Dubbo Transportation Strategy has been reviewed and the future Boundary Road residential precinct has been considered in the updated SIDRA model (see Section 8.1).
As stated in Council's correspondence dated 6 February 2020, upgrades to Sheraton Road and access into the site are required to be undertaken. Council is open to entering into a Planning Agreement (PA) with the Applicant for the ongoing maintenance of Sheraton Road. This is an acknowledgement that the quarry will increase the amount of heavy traffic on Sheraton Road which will in turn require an increased maintenance regime. The EIS only mentions a Planning Agreement (p.49) and that it was mentioned by Council at a meeting held 17 July 2019, with no further response from the proponent. *It is recommended that the proponent commence negotiations regarding the Planning Agreement with Council as soon as possible. The Planning Agreement will need to address the following issue:* *(i) Maintenance of Sheraton Road from the intersection with Wellington Road (Mitchell Highway) to the vehicular access point for 22L Sheraton Road.* *The contribution is likely to be a monetary figure based on the tonnage rate of product won from the subject development as determined by Dubbo Regional Council and the Applicant.* *It should be noted that there exists a Planning Agreement between Council and the adjoining Regional Hardrock Pty., Ltd., as required by a condition of consent to their 2016-482 approval dated 5 July 2017.*	Holcim is open to discussions with Council in relation to the nexus for a Planning Agreement and will contact Council directly to discuss the matter further.

Table 1.2 Council comments

Comment	Response notes and section references
Notwithstanding the comments above, Sheraton Road from the proposed access servicing the Quarry up to the southern side of intersection of Wellington Road (Mitchell Highway) will be required to be reconstructed to accommodate the increased traffic generated by the expansion of Holcim Quarry. The reconstruction work will need to be carried out to the satisfaction and approval of Dubbo Regional Council and that Council staff will provide input with regard to the reconstruction works and their associated design. This reconstruction is to be carried out at an apportioned cost (noting Regional Hardrock Pty., Ltd.,) as determined by the Director Infrastructure in consultation with Holcim (Australia) Pty., Ltd.	There is a requirement within South Keswick Quarry's consent to upgrade the section of Sheraton Road from the Mitchell Highway intersection to the quarry's site access. Holcim's requirements for further upgrade works will be discussed with Council in due course.
Travel restrictions along Sheraton Road shall be provided for heavy vehicles during 'school hours' in consultation with the schools located along Sheraton Road, TfNSW and Council. These restrictions shall be incorporated into a Code of Conduct for the transportation of materials on public roads.	As a result of the site observations undertaken by EMM, Holcim will restrict outgoing truck traffic during the half hour period between 3.15 pm and 3.45 pm on school days. It is noted that South Keswick Quarry has a truck traffic restriction between 3 pm and 3.30 pm. The restriction at different times will result in a staggered truck arrival to the roundabout and the children's crossing which would be beneficial to all road users (see Section 14). Travel restrictions during the am school period were not considered warranted as demonstrated in Section 14.
With regard to the Traffic Impact Assessment, prepared by EMM dated December 2020, the following comments are provided:	
-Traffic growth in Dubbo is about 1.8% per year. Therefore, the growth considered in the study is not accurate. *Due to the extension of Boundary Road up to Sheraton Road and due to the expansion of Southlakes and Keswick Estate, it is likely that the volume of traffic on Sheraton Road south of Mitchell Highway will increase. In addition Sheraton Road south of the schools will eventually operate as an urban environment unlike a rural environment that exists now.*	Traffic growth of 1.8% has been used for Sheraton Road (see Sections 5 and 6).
-Does the Sheraton Road traffic consider the increase in traffic on this road that is expected to happen due to the expansion of Boundary Road up to Sheraton Road?	Boundary Road residential traffic has been considered in the analysis (see Section 8.1).
-Traffic growth in Dubbo is about 1.8% per year. Therefore, the growth considered in the analysis is not accurate.	As stated above, the traffic growth of 1.8% has been used for Sheraton Road (see Sections 5 and 6).
-Currently, public transport services, pedestrian footpath and cycling infrastructure do not extend beyond the schools on Sheraton Road but the Boundary Road extension project, which is up to Sheraton Road includes bicycle lanes on both sides and a footpath on the south side of Boundary Road. Therefore, it is likely that footpath and bicycle lane will also be constructed on Sheraton Road between the schools and the Boundary Road and Sheraton Road intersection to improve active transport connectivity to the schools and also address the active transport missing link between the schools and the roundabout. *Furthermore, due to the extension of Boundary Road up to Sheraton Road, it is expected that some school buses will travel on this route.* *As a result, the impacts of public transport, pedestrian and cycling facilities should be considered as part of the TIA.*	Active transport and public transport have been assessed (see Sections 3 and 4).

Table 1.2 Council comments

Comment	Response notes and section references
-Travel restriction on Sheraton Road should be provided the same as MAAS quarry.	As a result of the site observations, it is proposed to restrict outgoing truck traffic during a half hour window between 3.15 pm and 3.45 pm on school days. As stated above, the South Keswick Quarry also has a truck movement restriction between 3 pm and 3.30 pm. In applying a restriction on Holcim's truck movements at different times, this will result in a staggered truck arrival to the roundabout and the children crossing (see Section 14),

1.3 Maas Group (Cardno report)

Cardno, on behalf of Maas Group Properties, undertook a peer review of the TIA. Responses to the comments made by Cardno are provided below (see Table 1.3). It is noted that the Cardno peer review is also referenced in Regional Group Australia's submission.

Table 1.3 Maas comments

Comment	Response notes and section references
The report does not make any detailed reference to previously approved traffic generating developments in the surrounding area, namely South Keswick Quarry (to the north of the Dubbo Quarry site) and Southlakes Estate (to the west of the Dubbo Quarry site). It is important to consider the combined traffic impact of all traffic generating developments in the area, as a small increase in traffic generation from the Dubbo Quarry may have a larger overall impact on traffic efficiency, amenity, safety and/or road pavement life. *The forecast growth assumptions of 1% for 25 years, to 2045 should be reviewed against the cumulative background traffic generation from the residential subdivisions and quarry approvals in the area. It may be that the growth rate. The cumulative assessment should consider the Boundary Road / Sheraton Road intersection and not just the Mitchell Highway / Sheraton Road roundabout.*	Additional modelling has been undertaken that links the roundabout intersection and the children's crossing on Sheraton Road. Additional modelling has assessed cumulative traffic (see Section 8) and conservatively assumed a traffic growth rate of 1.8% per annum on Sheraton Road (see Sections 5 and 6).
It is unclear how a "daily traffic capacity of 30,000 vehicle movements" has been derived for a four-lane divided carriageway other than an expansion on the 900 vehicles per hour per lane. However, this is unlikely to change the findings of the assessment if the daily capacity was lower given the key consideration for daily flows is pavement life and residential amenity for the likes of Sheraton Road and Boundary Road	Comment noted.

Table 1.3 Maas comments

Comment	Response notes and section references
The report is unclear on details of the largest heavy vehicle, including its type, specific gross vehicle mass and length. Section 3.6 is ambiguous as both a 20m Truck and Dog and 20m Quad Dog Trailers are referred to. *Section 3.6 also refers to trucks larger than 20m potentially requiring access to the subject site. It is good practice to specifically identify the largest vehicle which will require access to the site and design the access road widths and model the intersection turning paths accordingly. This would prevent any maintenance issues and costs arising in the future.* *Additionally, it is unclear if the geometry of Sheraton Road at both the future Boundary Road intersection, as well as the horizontal curves to the west of Boundary Road near the South Keswick Quarry is sufficient for 20m long vehicles. Further information on the proposed site access and DA 2017/640 should be provided to ensure the SSD can be supported by the proposed intersection arrangement, which appears to be reliant on a separate application.*	The transport contractor has obtained PBS authorisation permits for vehicles up to 25/26m long. the National Heavy Vehicle Regulator (NHVR) permits are included in Attachment B. It is understood that Sheraton Road/ Boundary Road intersection will be controlled by a roundabout. This roundabout will be constructed by Council in due course.
Cardno supports the recommendation that Holcim should contribute to the maintenance of Sheraton Road as indicated in the SSD, south of Mitchell Highway. As per the calculations in Table 3.1, average daily heavy vehicle usage from the Dubbo Quarry will increase by a rate of 1.43 (from 70 heavy vehicle movements per day, up to 100 heavy vehicle movements per day), contributing to a potential increased deterioration rate of the road pavement on Sheraton Road.	Comment noted.
The Road Safety Audit correctly highlights an existing issue with the children's crossing located on Sheraton Road. The proposed mitigation of this concern is reliant on the Driver Code of Conduct which is an administrative control rather than a physical measure, however it is considered that further consideration be given to the following: *- Upgrade of the crossing to be in line with current standards and de-risking the outcome; and / or* *- Prohibit heavy vehicle movements generated by the Dubbo Quarry to travel along Sheraton Road during school zone hours. This would be consistent with approvals of other quarry's as well as the TfNSW Heavy Vehicle Access restrictions already in place for Sheraton Road.*	A comprehensive site observation has been undertaken by EMM engineers. As a result of the site observation, it is proposed to restrict outgoing truck movements during a half hour period between 3.15 pm and 3.45 pm (see Section 5).
Considering the future traffic generation from Southlakes Estate, the South Keswick Quarry and the Dubbo Quarry, the intersection of Boundary Road and Sheraton Road is a key intersection linking these developments which should be modelled and considered. *While a future roundabout at this intersection has been noted, Dubbo Regional Council will be constructing an interim T-intersection with Give Way priority as part of the Boundary Road Extension Project. The intersection will not be a standard T-intersection, with Boundary Road to the west and Sheraton Road to the north forming the priority road. Vehicles from South Keswick Quarry and Dubbo Quarry approaching the intersection from the eastern leg of Sheraton Road will be required to give way to oncoming traffic, and without any intersection modelling, it is unknown whether this will cause any delays, queueing or impact on Level of Service.*	As stated above, a roundabout will be constructed by Council at Sheraton Road/ Boundary Road intersection. This roundabout will facilitate the longest size of quarry trucks.

1.4 School Infrastructure NSW

SINSW comments and report reference are provided in the following table.

Table 1.4 SINSW comments

SINSW comments	Relevant section
The Traffic Impact Assessment prepared by EMM Consulting notes that any proportional increase in traffic volume will be contained to Sheraton Road, south of the Mitchell Highway. Further, all vehicles (heavy and light) will enter and exit the site via Sheraton Road (as per the existing operations) up to the Mitchell Highway intersection. SINSW is supportive of this existing arrangement and acknowledges that these roads are sufficiently removed from the above school sites. *SINSW requests that an optimal traffic outcome would include scheduling of heavy vehicle and haulage movements outside school periods (including pick up and drop off). SINSW recommends that this measure be placed on the SSD-10417 development consent (if approved) in addition to the preparation of a Traffic Management Plan for both the construction and operational stages of the development. This will ensure that the proposal will not compromise student safety during drop-off and pick-up periods*	The comment from SINSW is noted. A TMP will be prepared in consultation with the relevant authorities where truck movements during the school hours will be outlined.

2 Crash analysis

TfNSW provided EMM with detailed crash data for a five-year period between October 2015 and April 2021 which identified only one crash between the Mitchell Highway/Sheraton Road intersection and the site. Details of that crash is presented in Table 2.1. This crash history does not indicate any road safety deficiencies at this location.

Table 2.1 Crash data

Crash year	Severity	Truck involvement	Type of location	Crash detail	Natural lighting
2016	Non casualty (towaway)	No	Roundabout	Cross traffic	Daylight

3 Active transport

This Section addresses Council comments (Table 1.2).

Pedestrian footpaths and cycling infrastructure do not extend beyond the schools on Sheraton Road. The Boundary Road extension project includes bicycle lanes on both sides of the road and a footpath on the southern side of Boundary Road. It is likely that footpath and bicycle lanes will also be constructed on Sheraton Road between the schools and the Boundary Road/Sheraton Road intersection to improve active transport connectivity to the schools. This will also address the active transport missing link between the schools and the Boundary Road/Sheraton Road intersection. Therefore, provision of active transport infrastructure by Council would improve pedestrian and cyclist safety along Sheraton Road. In addition, restricting truck movements during the afternoon school pick up time will assist in reducing the safety risk with pedestrians and cyclists.

4 Public transport

This Section addresses Council comments (Table 1.2).

There is no public transport operating on Sheraton Road south of the schools. However, some school buses may operate via Boundary Road following the extension of Boundary Road up to Sheraton Road. Until the extension of Boundary Road is completed, no further details can be provided. However, restricting truck movements during the afternoon school pick up time will assist in reducing the safety risk and traffic conflict with the school bus movements.

5 Existing traffic

A site visit was conducted by EMM traffic engineers from 8 to 9 am and from 3 to 4 pm on two consecutive days between 11 May 2021 and 13 May 2021 to:

- undertake a traffic count, observe queue length and identify any safety issues at the Sheraton Road children crossing, located 300 m south of the Mitchell Highway/Sheraton Road intersection; and
- observe queue lengths at all approaches of the Mitchell Highway/Sheraton Road intersection.

5.1 Model calibration and validation

The SIDRA model has been calibrated and validated by adjusting the model based on the site observations. Photographs and videos were taken every five minutes capturing the queue lengths on both approaches of the children crossing and all four legs of the roundabout. These videos and photographs are available upon request.

During the AM peak, model adjustment was not necessary as there was no distinct peak period, pattern or queuing in the area. School drop-off occurred more staggered during the period which contributed to a more balanced traffic distribution in the AM peak.

During the PM school peak, the traffic and queue lengths were consistent where a queue of approximately 530 m was observed along the south approach of the Mitchell Highway/Sheraton Road intersection, for a period of 15 minutes. The rest of the hour traffic was relatively quiet. Table 5.1 compares the 15-minute traffic spike to the average 15-minute traffic volumes across the whole peak hour. It is noted there was more traffic at the Mitchell Highway/Sheraton Road intersection during the AM peak than the PM peak, as during the PM peak for a 15 minute period there was less arrival of traffic on the south approach of the roundabout.

Table 5.1 Two-way traffic spike at the Sheraton Road children crossing

Date	Period	Two-way traffic
11/05/2021	3.00 pm – 3.15 pm	205
	3.15 pm – 3.30 pm	293
	3.30 pm – 3.45 pm	135
	3.45 pm – 4.00 pm	72
12/05/2021	3.00 pm – 3.15 pm	278
	3.15 pm – 3.30 pm	**332**
	3.30 pm – 3.45 pm	152
	3.45 pm – 4.00 pm	83
Average two-way traffic for a 15-minute period in PM peak hour		**193.75**

It was noted that school parents arrive at the school early and occupy the kerbside parking spaces. When the school concludes, parents were noted as leaving the campus immediately after collecting their children. The situation exacerbates when many school buses try to leave at the same time.

During the site visit a noticeable number of trucks were noted exiting Sheraton Road and passing the school. A significant proportion of these were Council B-double trucks.

5.1.1 Sheraton Road children's crossing

The surveyed 15-minute peak traffic passing the Sheraton Road children's crossing are presented in Figure 5.1.

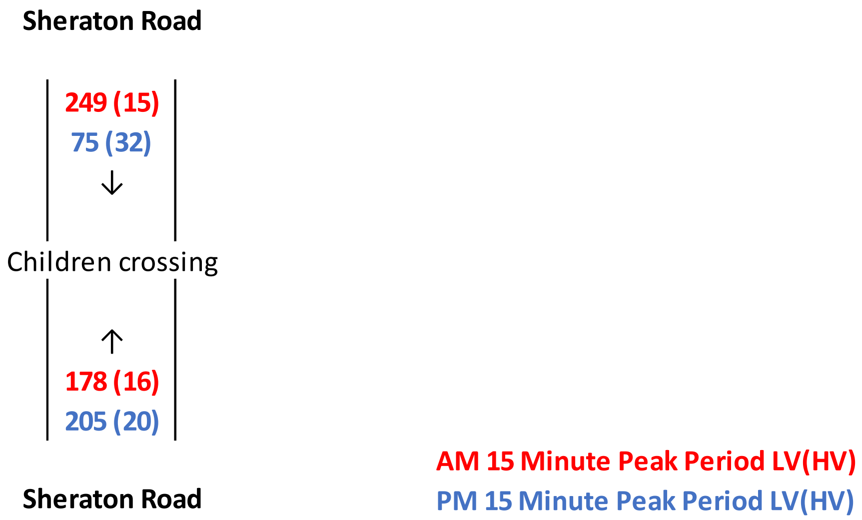

Figure 5.1 2021 surveyed 15-minute peak traffic passing the Sheraton Road children's crossing

During the 15-minute PM peak period, a queue started to build on the south approach of the children's crossing. At the start of the peak period traffic was relatively quiet and the queue was gradually started to build up where the maximum recorded queue was approximately to 220 m. This means the recorded traffic presented in Figure 5.1 (traffic accessing the crossing) does not represent the actual traffic arrival, which includes the queued traffic on the south approach.

To represent the real traffic demand at the children's crossing, an additional 37 cars (220 m / 6 m per car) has been added at this crossing (Figure 5.2). Traffic data shows that during the PM peak, in the 15-minute window, there are an estimated 20 northbound heavy vehicles in Sheraton Road.

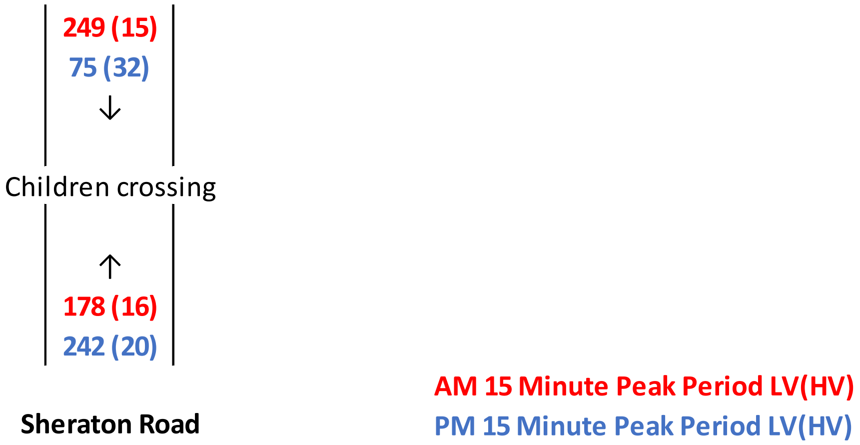

Figure 5.2 2021 surveyed 15-minute peak traffic for the Sheraton Road children crossing (adjusted for actual traffic demand)

5.1.2 Mitchell Highway/Sheraton Road intersection

TfNSW provided EMM with 2019 traffic data at the Mitchell Highway/Sheraton Road intersection which has been used to update the assessment of surveyed intersection traffic presented in the original TIA. A linear annual background traffic growth factor of 1.0% has been adopted for the Mitchell Highway and 1.8% elsewhere, as agreed with TfNSW and Council at a meeting held between Holcim, EMM and the agencies on 19 April 2021.

As discussed, the 15-minute peak periods have been analysed to validate the model during the PM school peak period. Figure 5.3 presents the 2021 traffic volumes with a 2% traffic increase in Mitchell Highway and a 3.6% traffic increase in Sheraton Road. The data shows that the westbound through traffic is dominant at the roundabout, along with right turning traffic into Sheraton Road (south) during the AM peak. For the PM peak, there are high volumes of westbound traffic, similar to the AM peak.

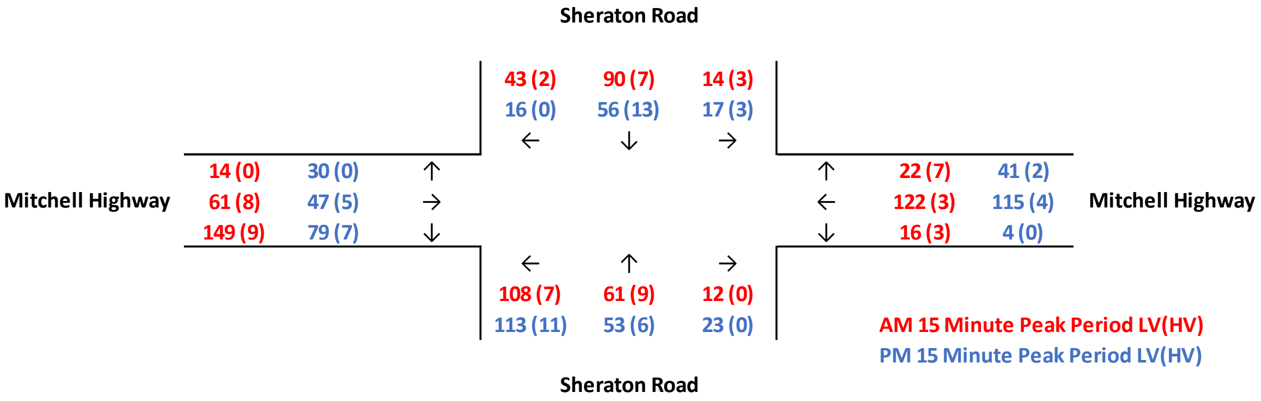

Figure 5.3 2021 15-minute peak traffic passing the Mitchell Highway/Sheraton Road intersection

During the PM peak, a queue started to build on the south approach during the 15-minute peak period and the recorded maximum queue from the roundabout was approximately 530 m (ie 220 m passed the children's crossing). This means that the passing traffic presented in Figure 5.3 does not represent the actual traffic demand, which includes the queued traffic on the south approach of the roundabout.

Therefore, for model calibration, an additional 88 cars (530 m / 6 m per car) has been added to the traffic analysis to address the correct demand on the south approach. The directional split of this additional traffic demand is assumed as per existing proportions, presented in Table 5.2.

Table 5.2 Additional traffic demand in south approach queue

South approach movement	Additional traffic demand in queues during PM school peak period
Left	53
Through	25
Right	10
Total	88

The adjusted 2021 peak traffic for the Mitchell Highway/Sheraton Road intersection is presented in Figure 5.4.

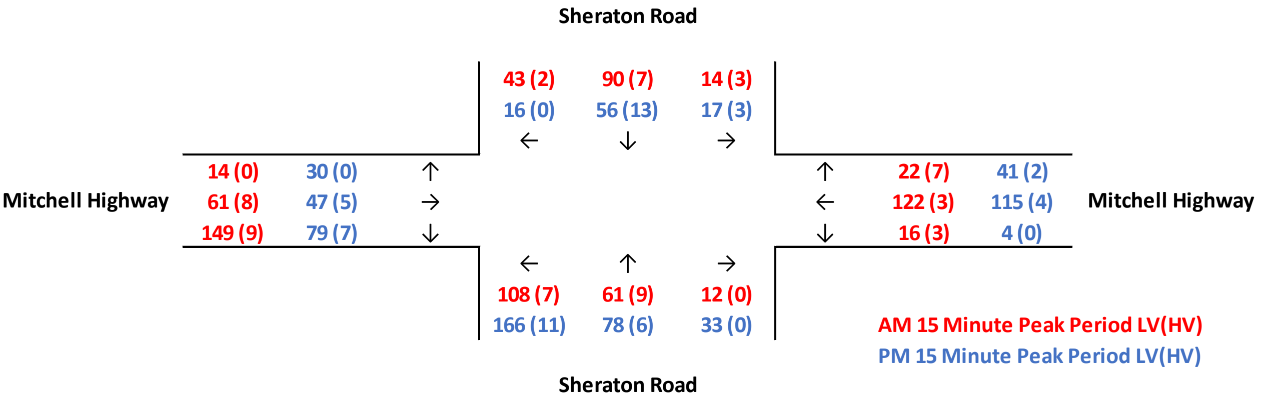

Figure 5.4 2021: 15-minute peak traffic for the Mitchell Highway/Sheraton Road intersection (adjusted for actual traffic demand)

In addition, from the site observations, critical gap and follow up headway has been increased from the default SIDRA model to 4.8 s and 2.5 s respectively to intentionally match the site observations. The SIDRA modelling results for a 15-minute PM peak period has matched the observed queue lengths on all approaches which confirms the validation of the model (see Attachment C).

5.2 Peak hourly traffic

As mentioned in Section 5.1, traffic data for the Mitchell Highway/ Sheraton Road intersection was extracted from 2019 TfNSW data and factored into 2021, while the traffic at the Sheraton Road children's crossing was surveyed in May 2021. Figure 5.5 presents the total traffic across the entire AM and PM peak hours.

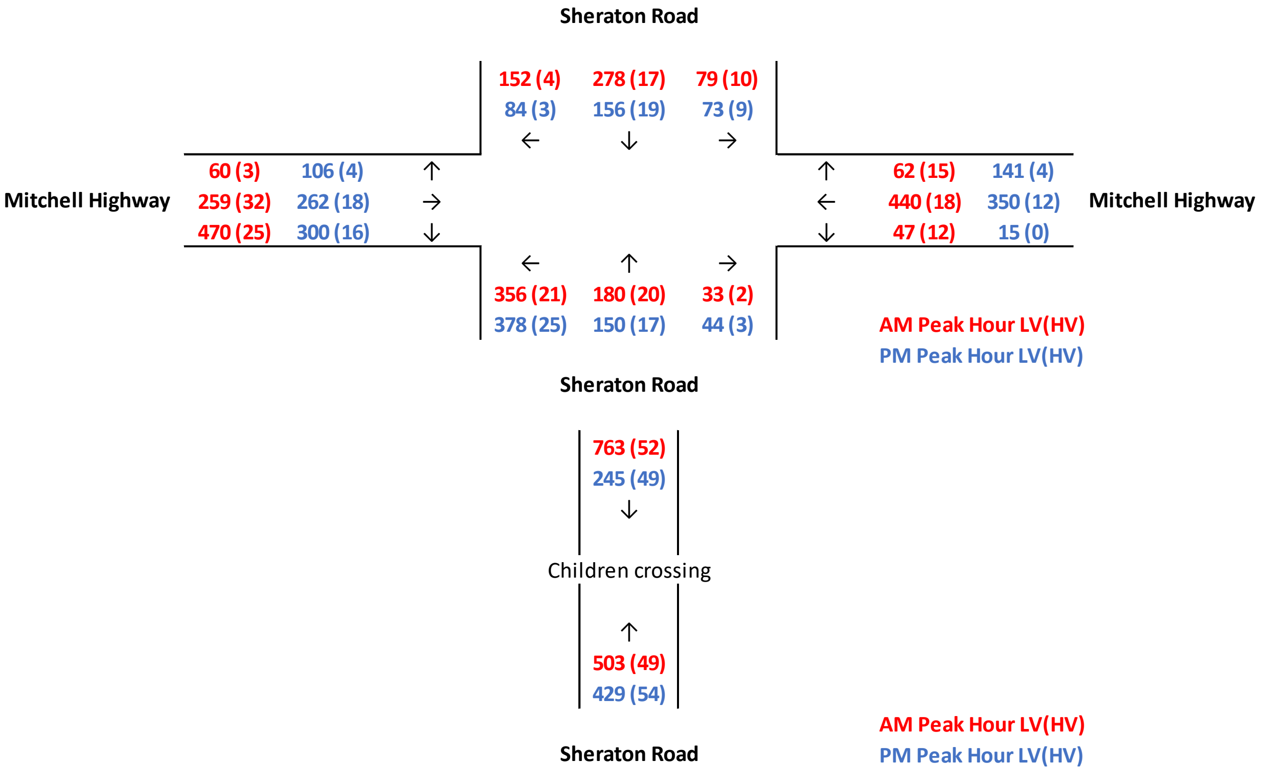

Figure 5.5 2021 peak hourly traffic

6 Baseline traffic

Based on Figure 5.5, Figure 6.1 presents the 2031 traffic volumes with a 1.8% and 1% linear annual traffic increase in Sheraton Road and Mitchell Highway, respectively.

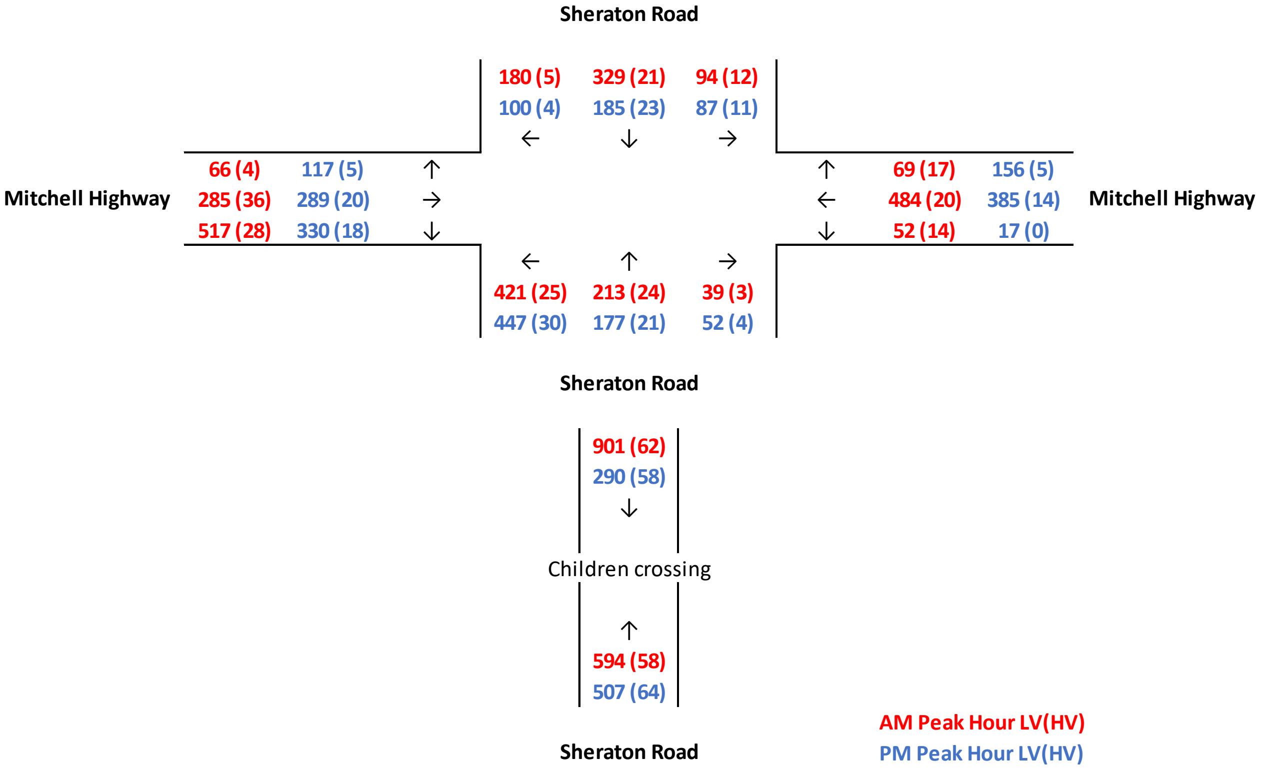

Figure 6.1 Projected 2031 peak hourly traffic

Figure 6.2 presents the 2046 traffic volumes with a 1.8% and 1% linear annual traffic increase in Sheraton Road and Mitchell Highway, respectively.

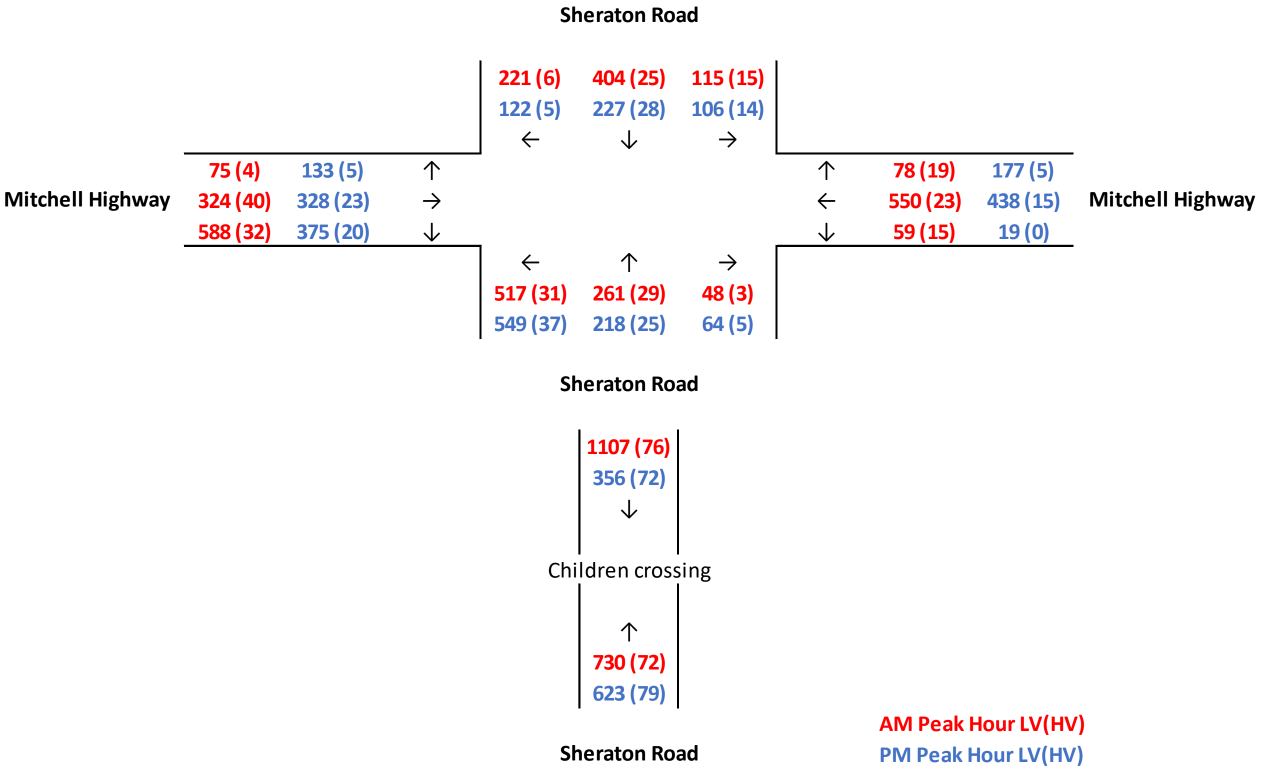

Figure 6.2 2046 peak hourly traffic

7 Development traffic

7.1 Traffic generation

7.1.1 Existing site traffic

Holcim have recorded the existing truck loads leaving the weighbridge of the quarry on the following key dates, which shows the surveyed traffic have already captured some of the quarry traffic.

Table 7.1 Holcim recorded truck numbers in key dates

	Date	Heavy vehicles leaving the weighbridge
Initial traffic survey by Roar Data (EMM TIA)	Tuesday 4 June 2019	20
	Wednesday 5 June 2019	32
Traffic survey by TTM (provided by TfNSW) – **Mitchell Highway/Sheraton Road intersection**	Wednesday 4 December 2019	38
EMM initial site inspection	Tuesday 28 April 2020	69
Road Safety Audit site inspection	Thursday 11 June 2020	63
	Friday 12 June 2020	55
Updated traffic survey by EMM (this RtS) – **Sheraton Road children's crossing**	Tuesday 11 May 2021	104
	Wednesday 12 May 2021	114
	Thursday 13 May 2021	94

Assuming peak hourly traffic represents 10% of the daily traffic, the peak hourly site traffic which has been captured in the baseline traffic (Section 6) is 22 movements (11 inbound and 11 outbound movements on Wednesday, 12 May 2021) for the Sheraton Road children's crossing and 8 movements for the Mitchell Highway/Sheraton Road intersection on Wednesday 4 December 2019.

7.1.2 Additional traffic generation

The proposed quarry's development traffic generation as presented in the original TIA is a maximum 40 truck movements in the peak hours. As discussed in Section 7.1.1, some of the quarry traffic has already been captured in the baseline traffic (Section 6), hence the proposed additional peak hourly traffic from the quarry is less than 40 truck movements.

For this assessment, 40 additional truck movements are conservatively assumed during the peak hours.

7.2 Traffic distribution

As can be seen in Figure 5.4, the western approach has the highest traffic volumes in both directions. Assuming all project related heavy vehicles are travelling to/from the west would yield the longest queue and, therefore, is the most conservative scenario. Figure 7.1 presents the traffic distribution for that scenario. Figure 7.2 presents background traffic plus development traffic (all travelling to and from the west).

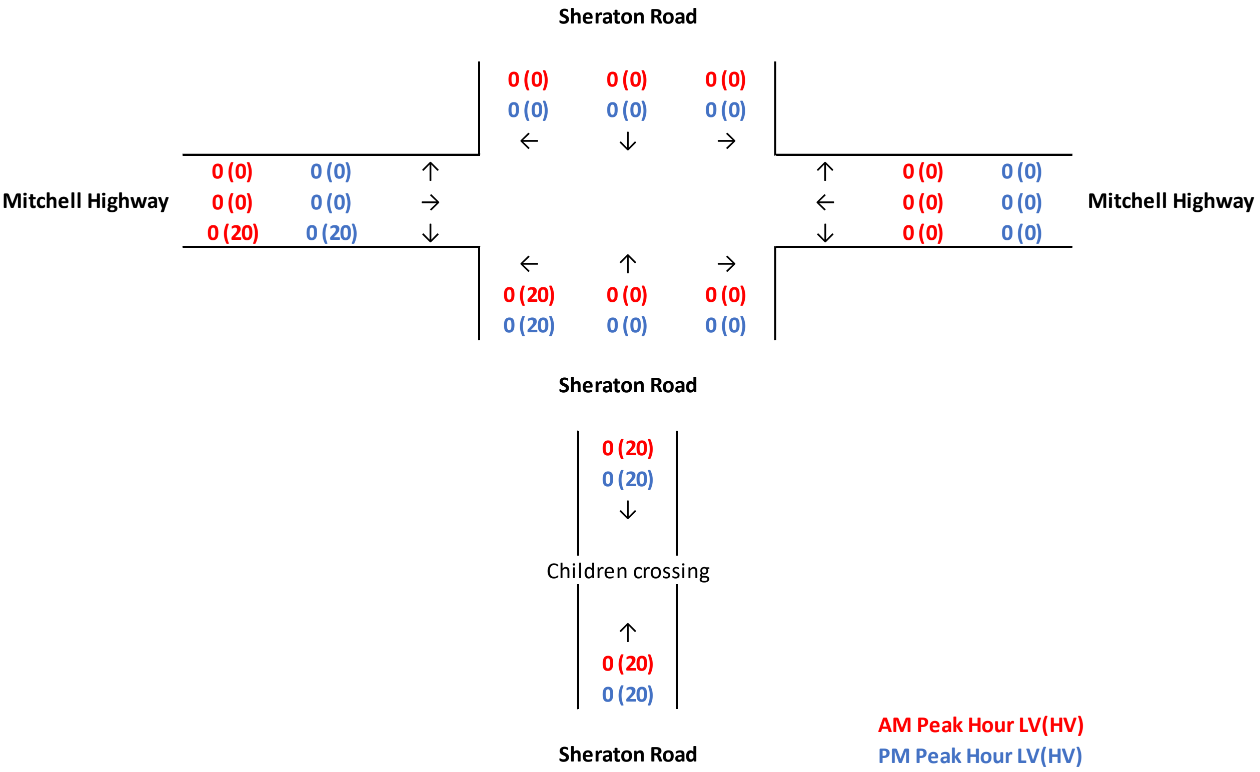

Figure 7.1 Project-related peak hourly traffic (all travelling to/from the west)

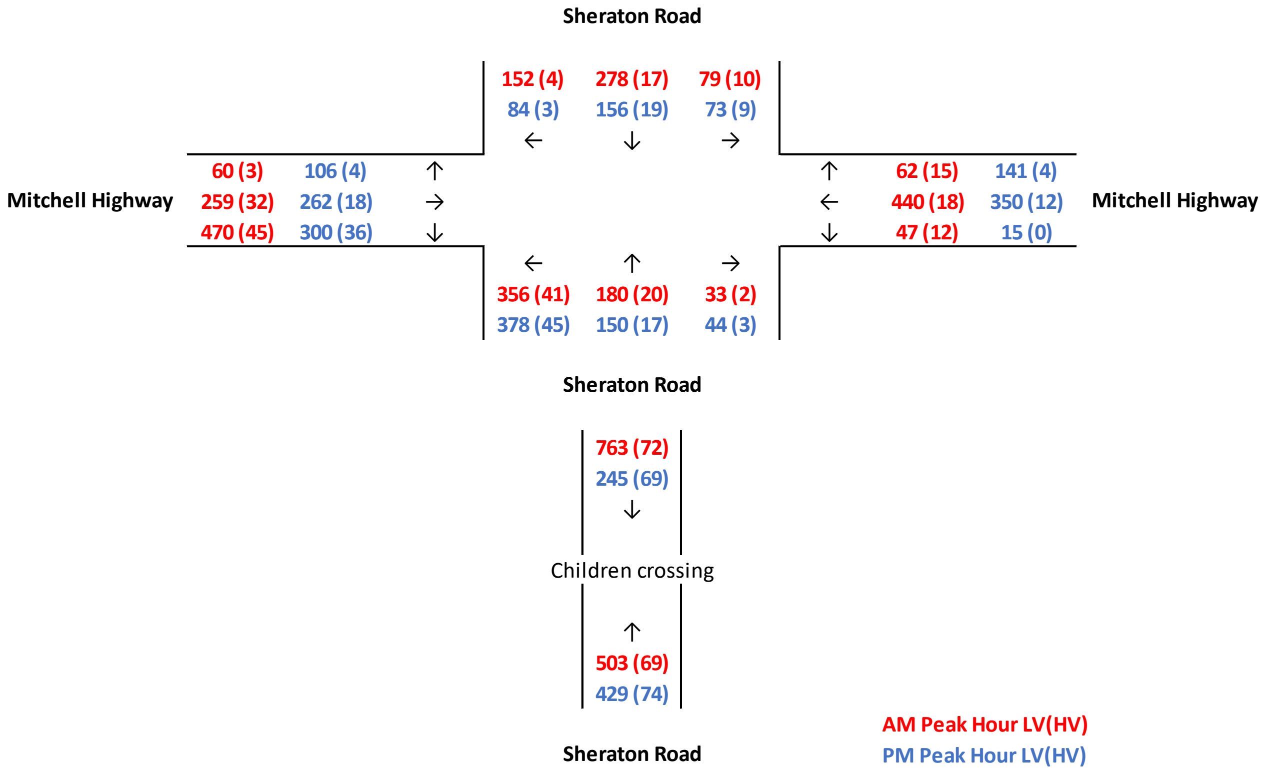

Figure 7.2 2021 development traffic (background + development)

8 Cumulative traffic

Potential future development within the locality that will have a traffic impact on Sheraton Road include Boundary Road residential developments and Dubbo RSL Club. The estimated traffic generation from these developments have been assessed in the following sections and are collectively called cumulative traffic.

The Skillset College operates between 9.15 am and 2.15 pm which falls outside our analysed peak periods. Therefore, its associated traffic movements would not need to be captured and have been omitted from this assessment.

In addition, 20 truck movements per hour have been allowed for in cumulative traffic to account for maximum approved hourly movements for South Keswick Quarry. This is considered conservative as it is likely that some South Keswick Quarry truck movements have been captured in the baseline traffic data. Although a modification to South Keswick Quarry's development consent to increase production from 250,000 tpa to 495,000 tpa was granted in June 2020 (after the TfNSW survey date which was in 2019) this modification did not propose an increase to existing maximum hourly truck movements (20 hourly truck movements) only total daily movements.

8.1 Boundary Road residential developments

The Dubbo Transportation Strategy 2020 outlines the anticipated residential development staging for the Dubbo area. By 2030, an addition of 1,200 dwellings is expected to be developed in the southeast sector of Dubbo along the Boundary Road extension. Furthermore, an extra of 800 dwellings are expected to be completed between 2030 and 2040, totalling 2,000 additional dwellings over the next 20 years.

As suggested by Council, the traffic generation rate for each dwelling is 1.1 in the weekday peak hours. This equates to 1,320 and 2,200 peak hourly light vehicle movements for 1,200 dwellings and 2,000 dwellings respectively.

It is reasonable to assume that half of the traffic movements will travel via Sheraton Road, ie 660 peak hourly light vehicle movements by 2031, and 1,100 movements thereafter. The remaining half would travel via Wheelers Lane, Boundary Road towards the west etc. At the Mitchel Highway/Sheraton Road intersection, the traffic distribution has been assumed as per existing proportional splits (see Figure 8.1).

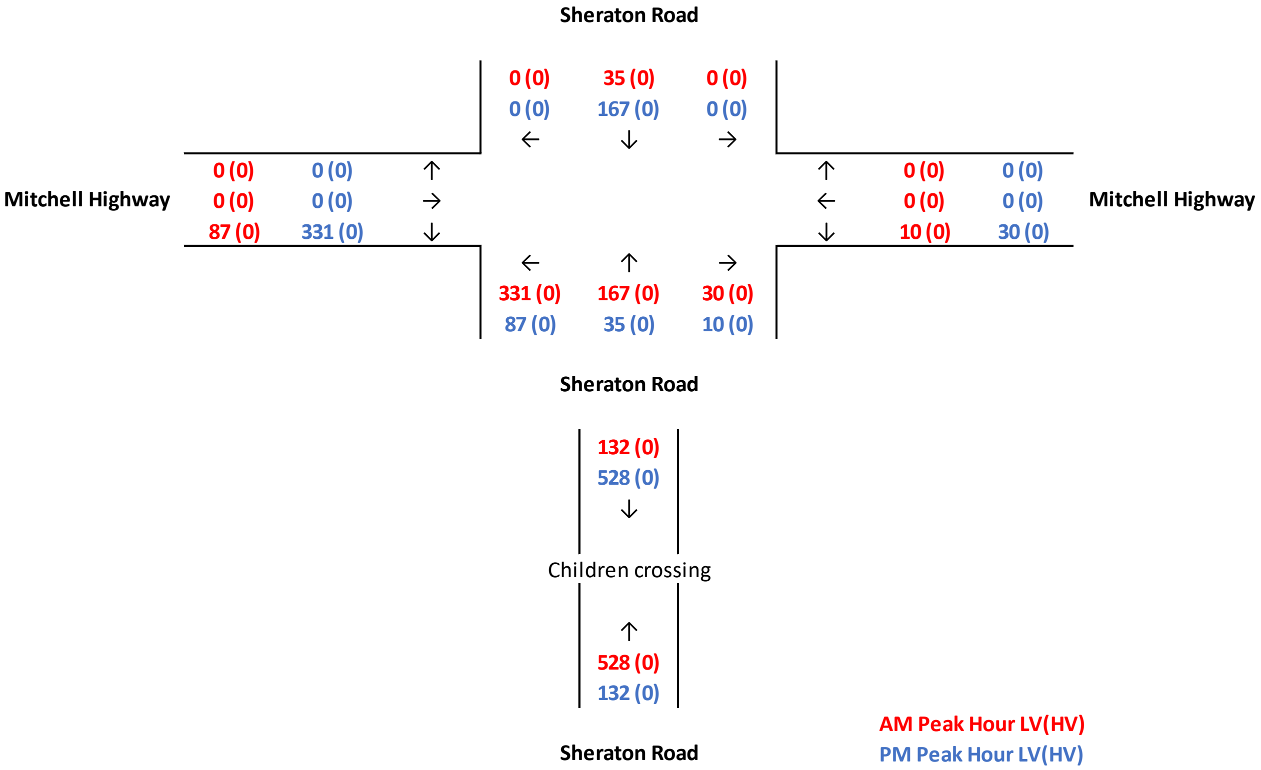

Figure 8.1 Boundary Road cumulative traffic (2031 with 1,200 dwellings)

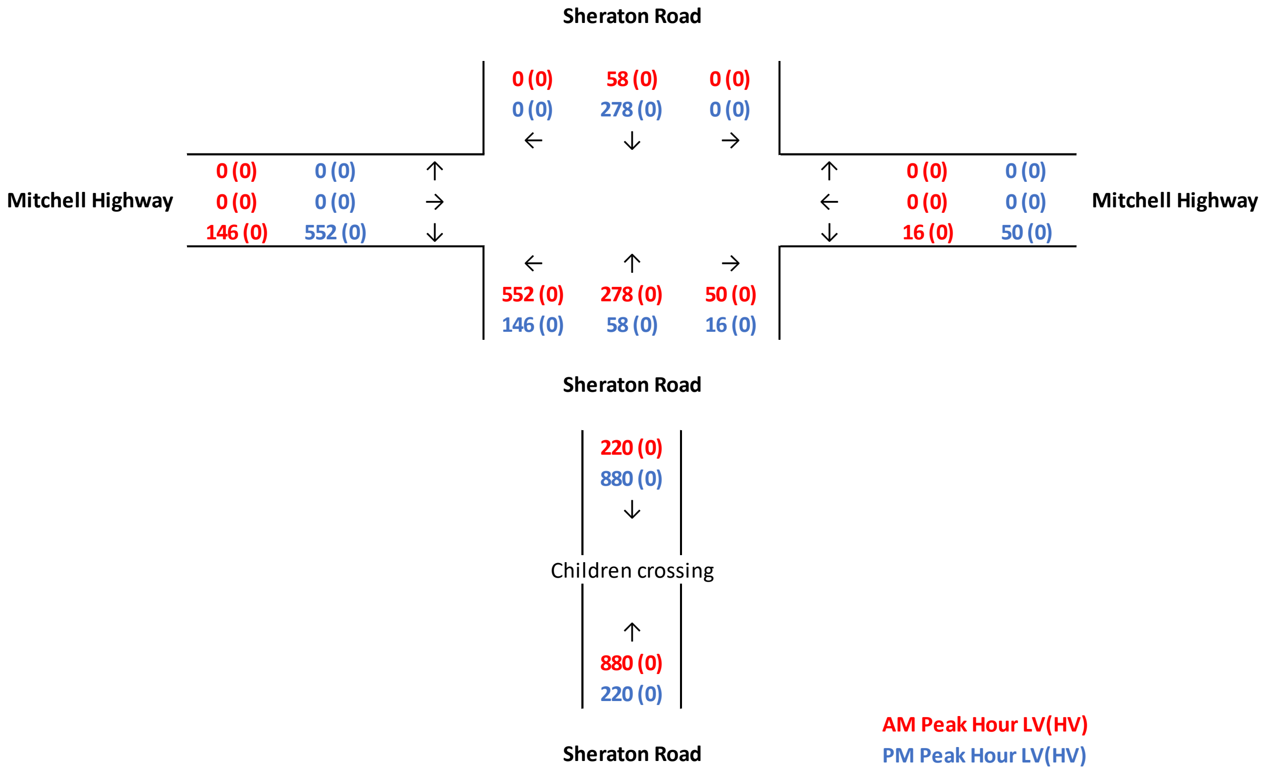

Figure 8.2 Boundary Road residential development traffic generation (2046 with 2,000 dwellings)

8.2 Dubbo RSL Club

Dubbo RSL Club is proposed to be developed at the corner of the future extension of Boundary Road and the future Henty Drive, taking up part of the land at Lot 339 DP 1241303. The land parcel is bound by Sheraton Road to the east and Boundary Road to the south. However, the exact location of the RSL Club is unknown as Henty Drive does not exist currently. The main components of the club will be indoor and outdoor gaming lounges, dining facilities and coffee shop, kids play areas, extensive back-of-house storage and service area, change room facilities for sporting activities and a sports field for local cricket and rugby league and tennis courts. The traffic generation during the weekday PM peak hour is expected to be in the order of 100 vehicles[1]. The traffic generation during the AM peak is unlikely to be significant as the club will not be operational during the AM peak hour.

It is assumed that all traffic movements will be via Sheraton Road and that there will be all incoming vehicle movements during the PM peak hour (see Figure 8.3).

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[1] As per Council email dated 29 April 2021

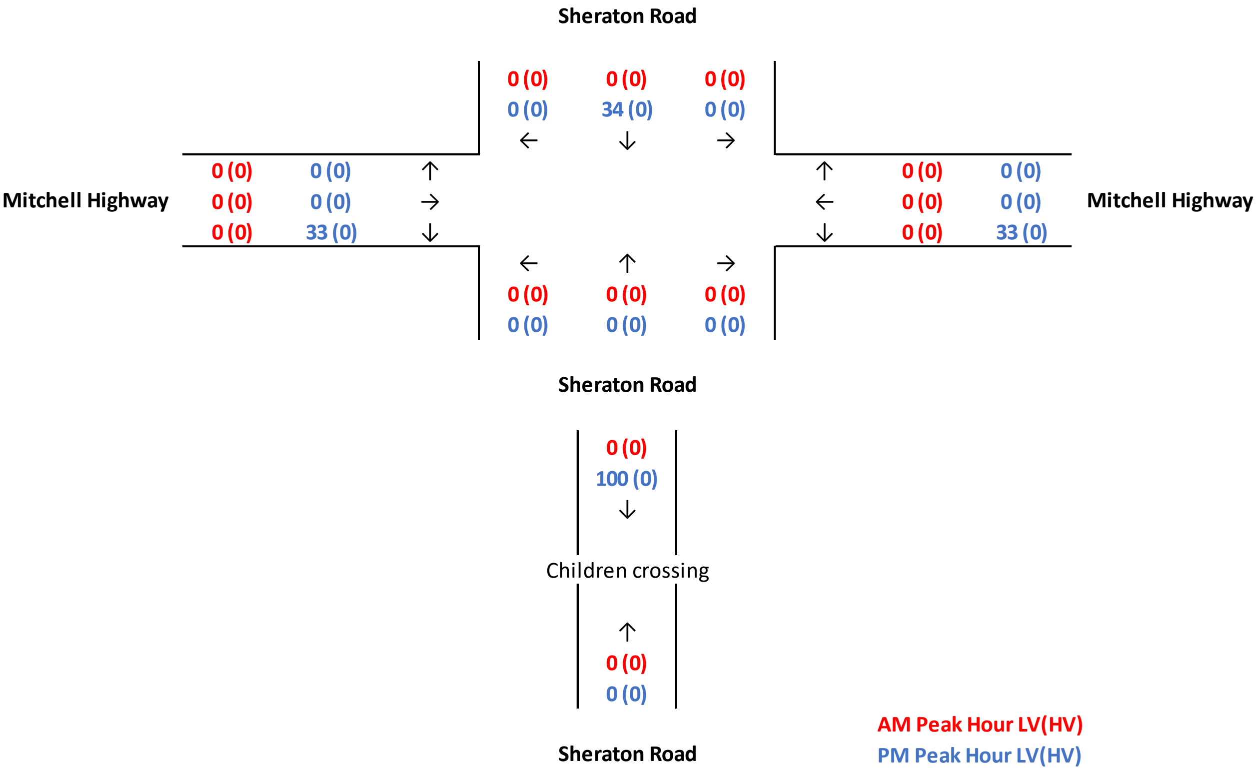

Figure 8.3 **Dubbo RSL Club traffic generation**

8.3 South Keswick Quarry

A modification was approved for the neighbouring South Keswick Quarry in 2020 (DA2016-482 Part 6) to increase maximum production rate from 250,000 to 495,000 tpa, which would increase the maximum number of daily truck movements from 120 to 220 movements. Haulage operations during student drop off and pick times (from 8.30 am to 9 am and from 3 pm to 3.30 pm) are prohibited under the consent for that quarry. It is assumed the peak hourly traffic represents 10% of the 100 daily traffic movements (See Figure 8.4).

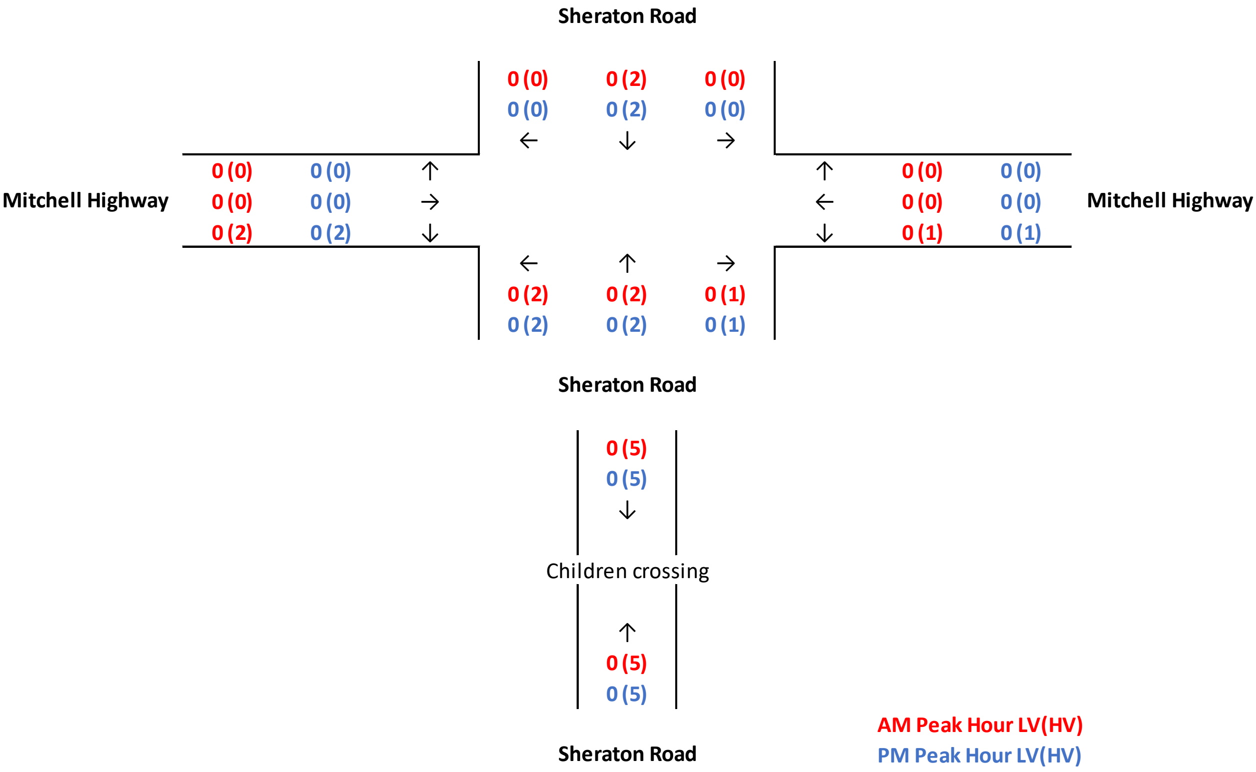

Figure 8.4 MAAS Quarry traffic generation

9 Cumulative traffic assessment

The baseline traffic with development and cumulative traffic for 2021, 2031 and 2046 are presented in Figure 9.1, Figure 9.2 and Figure 9.3, respectively. It should be noted that 1,200 additional dwellings along Boundary Road are assumed for the 2021 and 2031 scenarios, while 2,000 additional dwellings are assumed for the 2046 scenario.

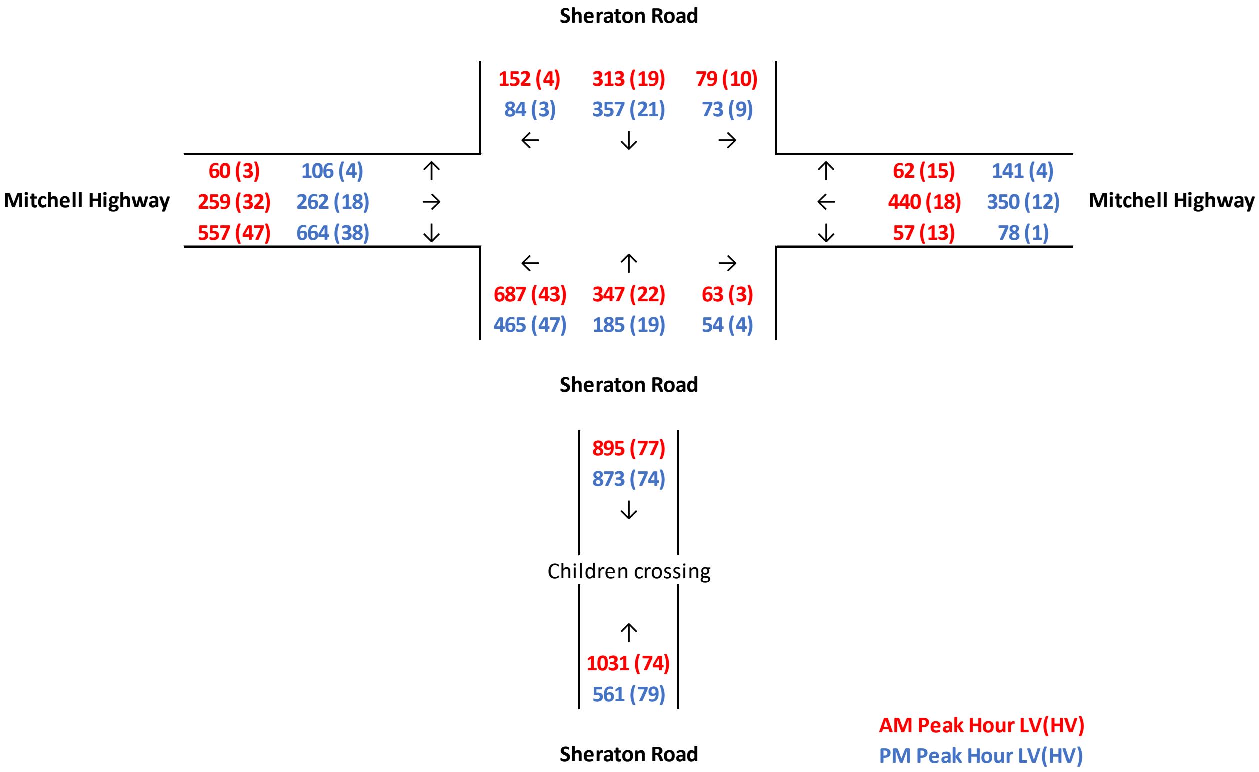

Figure 9.1 2021 development with cumulative traffic

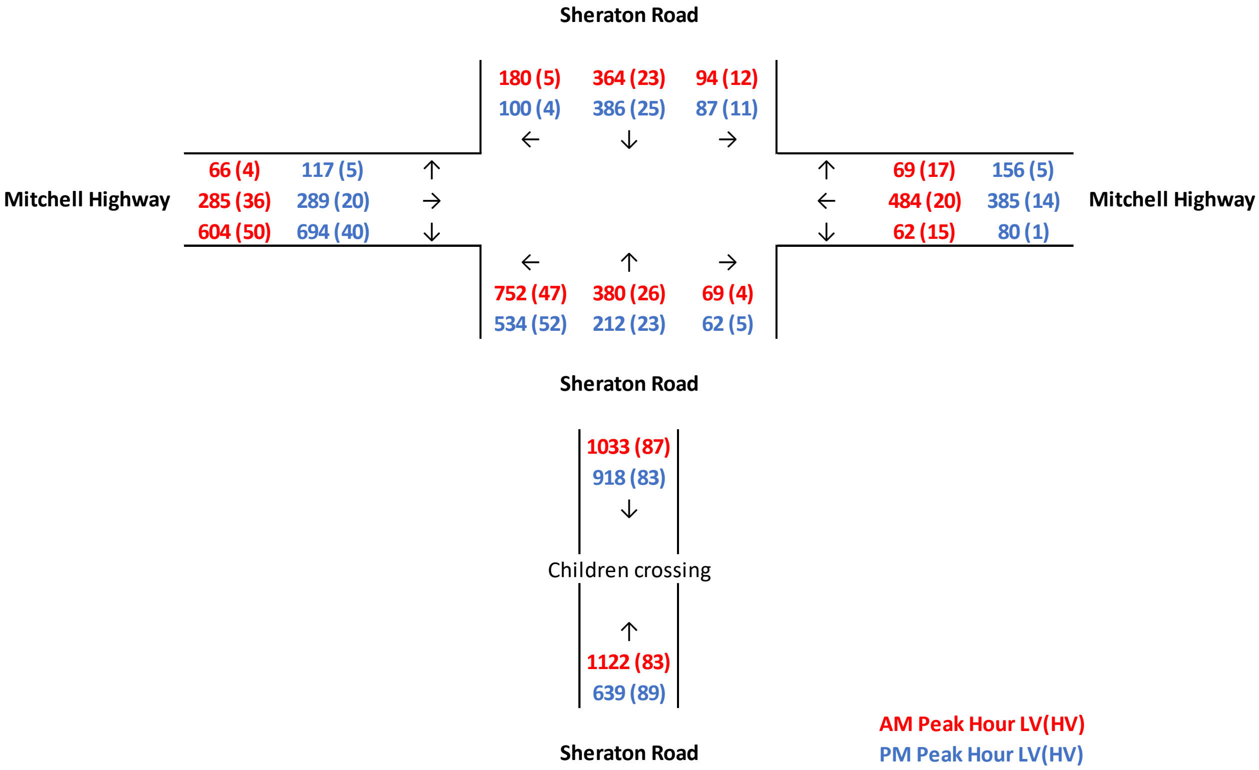

Figure 9.2 2031 development with cumulative traffic

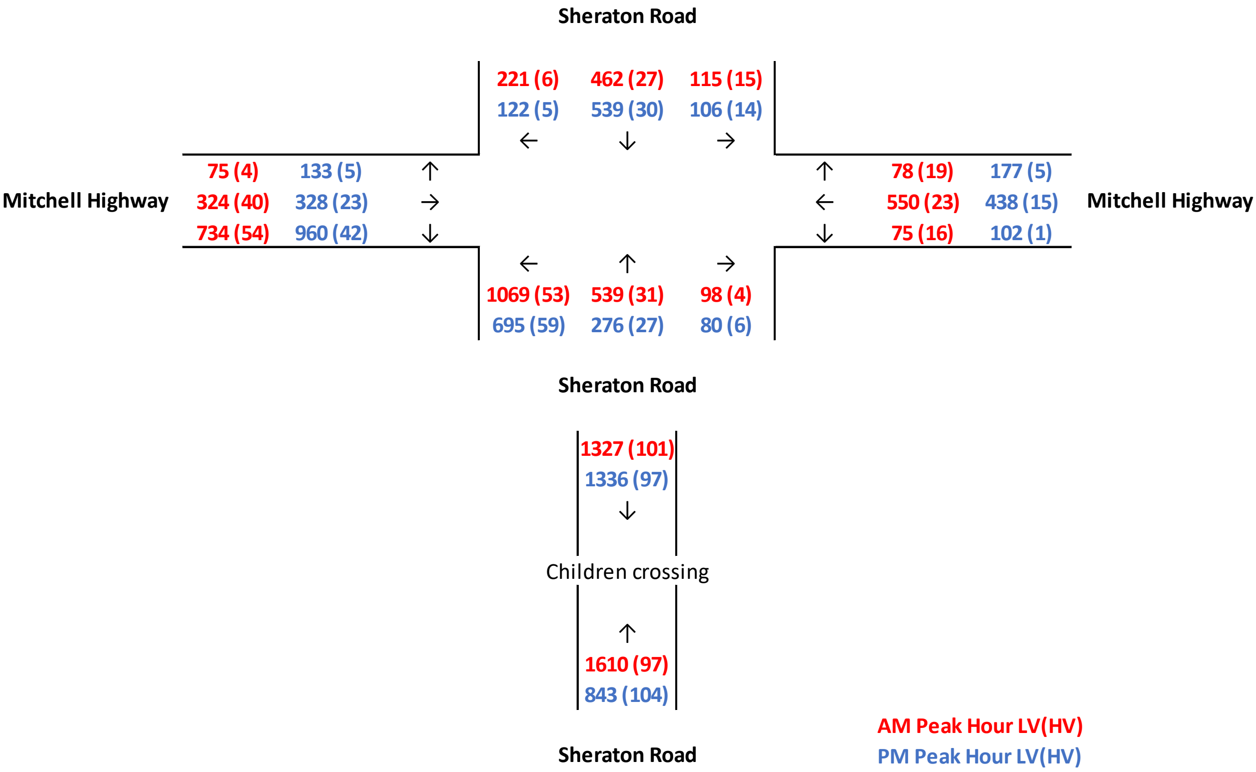

Figure 9.3 2046 development with cumulative traffic

10 Sensitivity testing

As requested by TfNSW, an additional sensitivity testing has been undertaken with 1.8% linear annual growth factor on both Mitchell Highway and Sheraton Road in 2031. Figure 10.1 presents the 2031 baseline traffic with 1.8% linear annual growth factor on all roads.

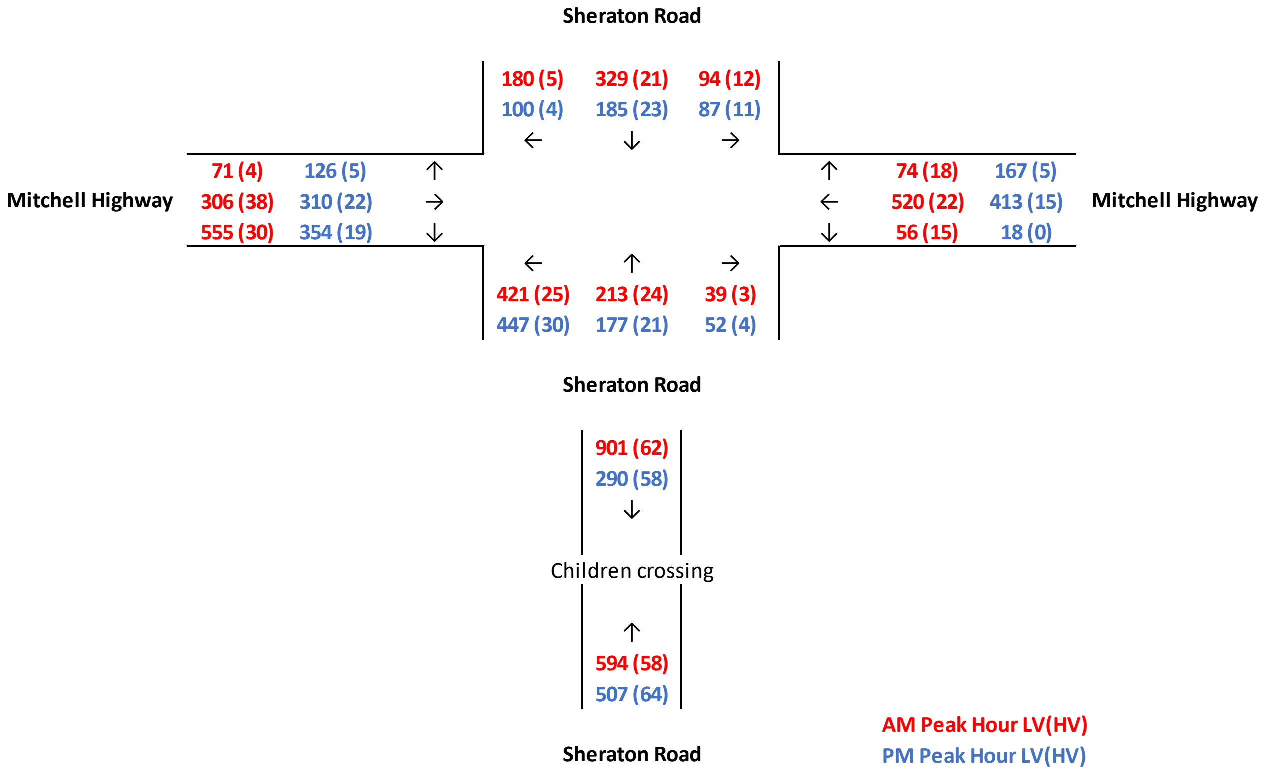

Figure 10.1 2031 baseline traffic (sensitivity testing)

Figure 10.2 presents the 2031 background with development and cumulative traffic and incorporating 1.8% linear annual growth factor on all roads.

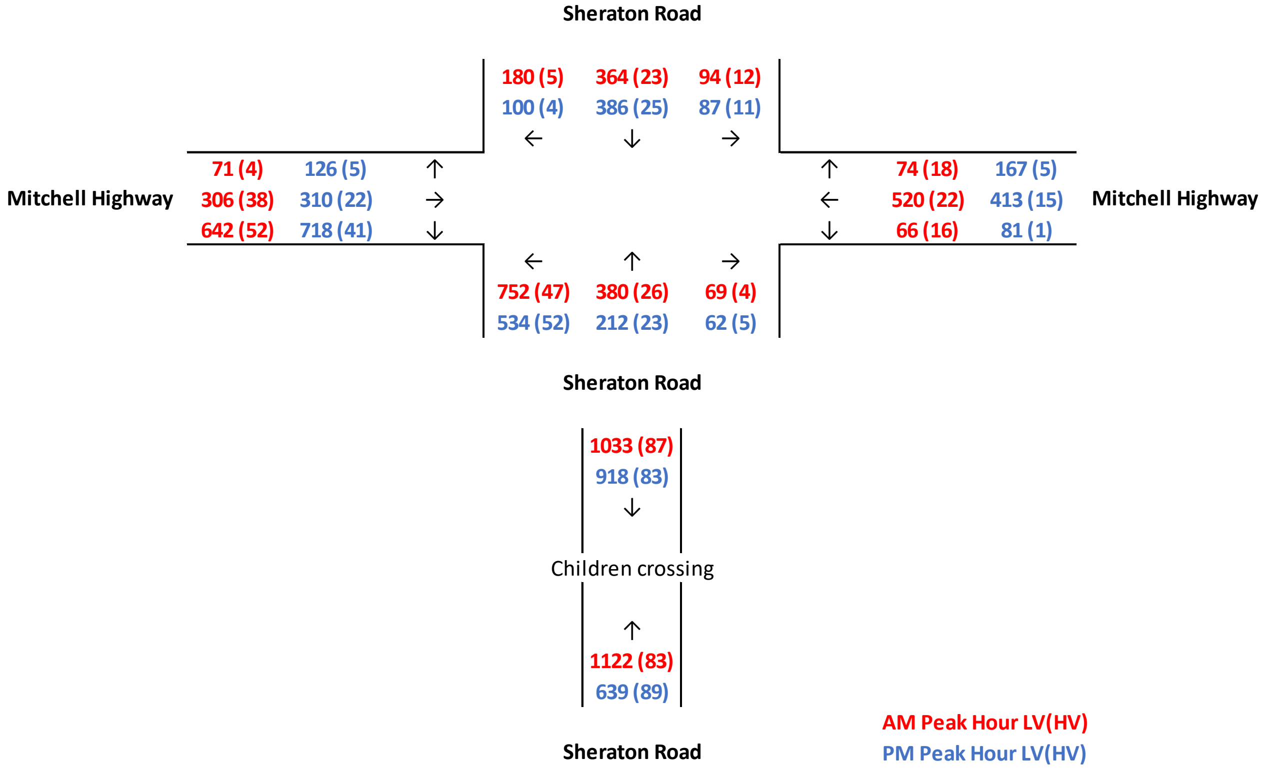

Figure 10.2 2031 development with cumulative traffic (sensitivity testing)

11 Intersection performance

11.1 Mitchell Highway/ Sheraton Road intersection

The SIDRA results for the Mitchell Highway/Sheraton Road intersection are summarised in Table 11.1. The full SIDRA results are presented in Attachment D.

Table 11.1 SIDRA results for the Mitchell Highway/Sheraton Road intersection

Scenario	Peak hour	Intersection Demand volumes	DOS	LOS	DEL	Q95
2021 baseline traffic	AM	2,732	0.693	C	30.5 (RT on east approach)	46.8 (RT on east approach)
	PM	2,304	0.607	B	15.1 (RT on east approach)	37.4 (LT on south approach)
2021 baseline + development traffic	AM	2,774	0.723	C	33.1 (RT on east approach)	53.9 (LT on south approach)
	PM	2,346	0.660	B	15.6 (RT on east approach)	45.7 (LT on south approach)
2021 baseline + development and cumulative traffic	AM	3,479	1.220	F	220.0 (LT on south approach)	717.9 (LT on south approach)
	PM	3,157	0.984	F	96.1 (RT on east approach)	134.1 (LT on east approach)
2031 baseline traffic	AM	3,114	0.931	E	68.5 (RT on east approach)	111.6 (RT on east approach)
	PM	2,628	0.792	B	17.2 (RT on east approach)	67.0 (LT on south approach)
2031 baseline + development traffic	AM	3,156	0.973	F	86.1 (RT on east approach)	139.0 (LT on south approach)
	PM	2,671	0.853	B	19.5 (LT on south approach)	87.6 (LT on south approach)
2031 baseline + development and cumulative traffic	AM	3,861	1.208	F	248.6 (RT on east approach)	679.3 (LT on south approach)
	PM	3,481	1.201	F	243.4 (RT on east approach)	347.3 (all movements on east approach)
2046 baseline traffic	AM	3,665	1.282	F	305.7 (RT on east approach)	496.0 (LT and TH on east approach)
	PM	3,093	1.115	F	132.5 (LT on south approach)	421.7 (LT on south approach)
2046 baseline + development traffic	AM	3,707	1.307	F	327.0 (RT on east approach)	522.6 (LT and TH on east approach)
	PM	3,135	1.187	F	191.5 (LT on south approach)	592.1 (LT on south approach)
2046 baseline + development and cumulative traffic	AM	4,876	1.419	F	409.8 (RT on north approach)	724.9 (RT on west approach)
	PM	4,408	1.520	F	490.9 (RT on west approach)	1787.1 (RT on west approach)

Table 11.1 SIDRA results for the Mitchell Highway/Sheraton Road intersection

Scenario	Peak hour	Intersection Demand volumes	DOS	LOS	DEL	Q95
[2]Sensitivity testing: 2031 baseline traffic	AM	3,237	1.067	F	136.5 (RT on east approach)	236.5 (RT on east approach)
	PM	2,732	0.837	B	18.6 (LT on south approach)	77.9 (LT on south approach)
Sensitivity testing: 2031 baseline + development traffic	AM	3,279	1.130	F	183.2 (RT on east approach)	309.6 (RT on east approach)
	PM	2,774	0.902	B	26.4 (LT on south approach)	108.2 (LT on south approach)
Sensitivity testing: 2031 baseline + development and cumulative traffic	AM	3,984	1.303	F	325.4 (RT on east approach)	643.7 (LT on south approach)
	PM	3,584	1.293	F	318.3 (RT on east approach)	456.5 (all movements on east approach)

Key findings for the Mitchell Highway/Sheraton Road intersection:

- the intersection currently operates at Level of Service (LOS) C and B in the AM and PM peak hours respectively, with or without the development traffic, with a reasonable spare capacity. This represents minimal impact due to the development traffic;
- in 2021, with development and cumulative traffic, the intersection will operate at LOS F in both peak hours;
- in 2031, with the background traffic growth alone, the intersection will operate at LOS E and B in the peak hours. This will continue to worsen in 2046 when LOS F will be experienced by background traffic growth alone;
- traffic is constantly higher (about 20%) in the AM peak. Consequently during the AM peak the intersection will continue to perform worse, compared to PM peak. However, with cumulative traffic, the intersection will experience LOS F on both the peak hours;
- the development traffic will only slightly affect the queue lengths and average delays; and
- the sensitivity testing of 1.8% annual growth on the Mitchell Highway shows slightly worse delay and queuing.

In summary, the currently dual lane roundabout will not be able to accommodate traffic generated by planned development in the area (eg Boundary Road residential project, Dubbo RSL and South Keswick additional traffic). A wider road network upgrade would be required in due course. The 'Dubbo City Planning and Transport Strategy 2036' prepared by STAPLETON TRANSPORTATION AND PLANNING Pty Ltd dated November 2009 outline the following key points:

- based on the population forecast over a 30 year period, an additional 250 dwellings will be constructed per annum in the south-east, south-west and north-west sectors. Boundary Road residential development falls under south-east sector;

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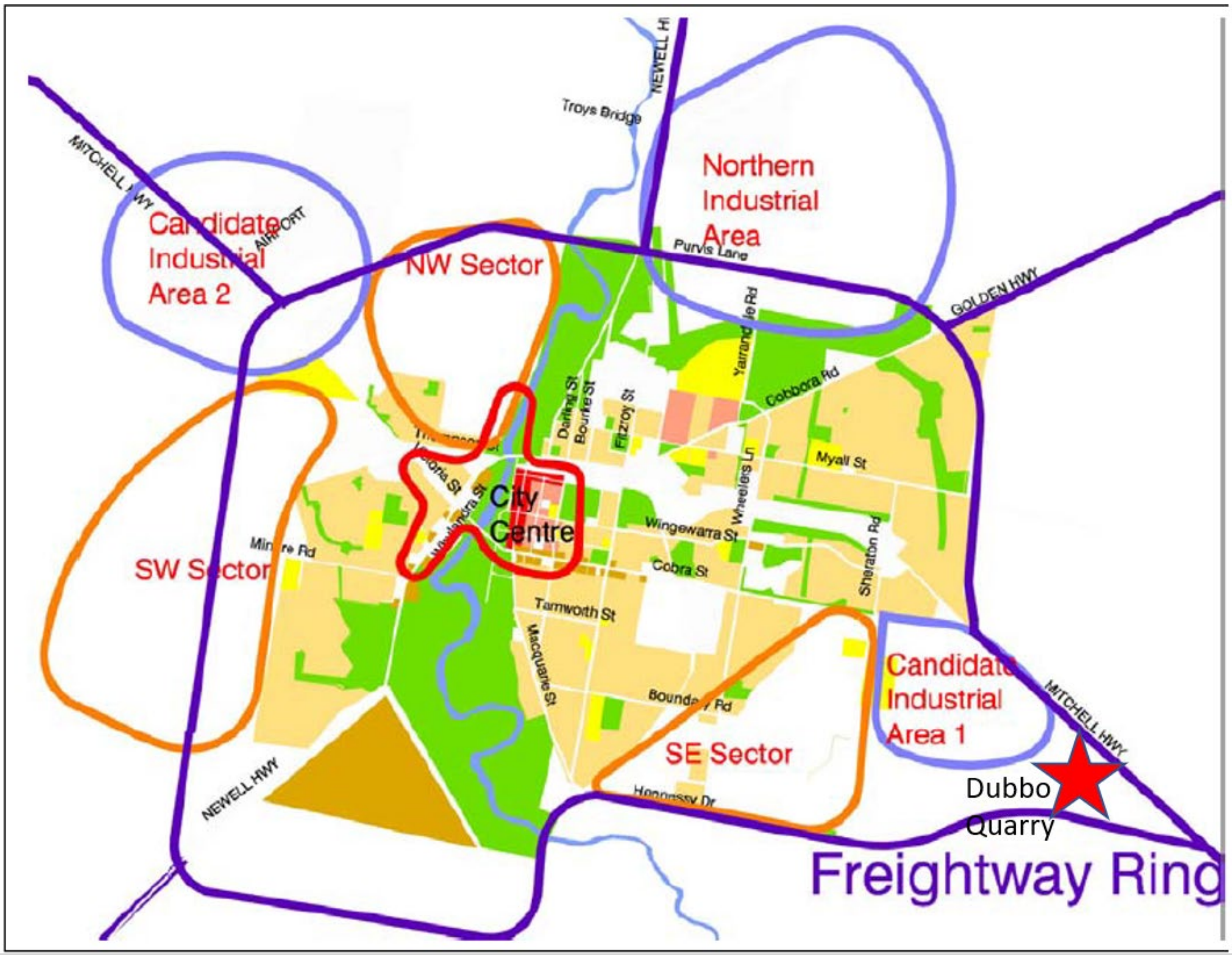
[2] Sensitivity testing: with 1.8 growth of background traffic for both Mitchell Highway and Sheraton Road

- completion of ring road (The Freightway) is a fundamental part of the social and economic plan for Dubbo as it will avoid the need to widen the roads within the city and allowing them to operate without complex turn restrictions. It will declare Dubbo takes freight seriously and provides the best access for B-double and road trains. The figure below shows a candidate for industrial area has been identified which will be connected to Mitchell Highway (Freightway Ring). Once constructed by the authorities, the subject development trucks would have direct connection to Mitchell Highway by avoiding the schools along Sheraton Road; and

- the 2036 projected traffic flow for Sheraton Road is 11,000 to 15,000 vehicles per day and road classification would be Neighbourhood Sub-arterial which indicates that the key functionality would be to allow more residential traffic. The current daily traffic volume in Sheraton Road (south) falls within this range, however, as currently Sheraton Road is a ‘no through’ road, the only entry/ exit to the school precinct is via the Mitchell Highway roundabout. This means, entry and exit vehicles in this precinct are being double counted in the peak hour, at some extent. Once the Boundary Road/ Sheraton Road roundabout is constructed, the traffic at this precinct would likely be more balanced and dispersed.

Based on the above considerations, Council future strategic plan for Sheraton Road is to carry more residential traffic and redistribute heavy vehicles via the other ring road which would be a better outcome for both residents and industries for the future.



Source: STAPLETON TRANSPORTATION AND PLANNING Pty Ltd

Figure 11.1 The Freightway Ring

The additional peak hour traffic generated by the development (at maximum 500,000 tpa production) would have relatively minor traffic generation during the peak hour (40 vehicular movements in both directions), compared to other developments in the area. In addition, the background traffic growth in 10 years' time will deteriorate the intersection performance.

11.2 Sheraton Road children's crossing

The SIDRA results for the Sheraton Road children's crossing is summarised in Table 11.2. The full SIDRA results are presented in Attachment D.

Table 11.2 SIDRA results for the Sheraton Road children's crossing

Scenario	Peak hour	Intersection demand volumes	DOS	LOS	DEL	Q95
2021 baseline traffic	AM	1,439	0.617	A	2.4 (north approach)	40.4 (north approach)
	PM	818	0.383	A	2.6 (both approaches)	16.2 (south approach)
2021 baseline + development traffic	AM	1,481	0.639	A	2.4 (both approaches)	45.0 (north approach)
	PM	860	0.406	A	2.7 (south approach)	18.3 (south approach)
2021 baseline + development and cumulative traffic	AM	2,186	1.080	F	91.3 (south approach)	1,730.9 (south approach)
	PM	1,671	0.739	A	3.2 (north approach)	66.3 (north approach)
2031 baseline traffic	AM	1,700	0.729	A	2.5 (north approach)	66.4 (north approach)
	PM	967	0.453	A	2.7 (south approach)	21.4 (south approach)
2031 baseline + development traffic	AM	1,742	0.751	A	2.6 (north approach)	75.2 (north approach)
	PM	1,009	0.476	A	2.7 (south approach)	24.0 (south approach)
2031 baseline + development and cumulative traffic	AM	2,447	1.141	F	147.0 (south approach)	1,946.3 (south approach)
	PM	1,820	0.770	A	3.3 (north approach)	77.5 (north approach)
2046 baseline traffic	AM	2,089	0.840	A	2.8 (north approach)	124.3 (north approach)
	PM	1,189	0.605	A	2.8 (south approach)	38.6 (south approach)
2046 baseline + development traffic	AM	2,132	0.848	A	0.848 (north approach)	133.3 (north approach)
	PM	1,232	0.686	A	2.9 (south approach)	54.8 (south approach)
2046 baseline + development and cumulative traffic	AM	3,300	1.559	F	516.2 (south approach)	3,291.7 (south approach)
	PM	2,505	1.000	C	31.7 (south approach)	876.7 (south approach)

Table 11.2 SIDRA results for the Sheraton Road children's crossing

Scenario	Peak hour	Intersection demand volumes	DOS	LOS	DEL	Q95
[3]Sensitivity testing: 2031 baseline traffic	AM	1,700	0.726	A	2.5 (north approach)	65.3 (north approach)
	PM	967	0.453	A	2.7 (south approach)	21.4 (south approach)
Sensitivity testing: 2031 baseline + development traffic	AM	1,742	0.745	A	2.6 (north approach)	72.8 (north approach)
	PM	1,009	0.476	A	2.7 (south approach)	24.0 (south approach)
Sensitivity testing: 2031 baseline + development and cumulative traffic	AM	2,447	1.116	F	122.7 (south approach)	1,854.6 (south approach)
	PM	1,820	0.750	A	3.2 (north approach)	70.3 (north approach)

Key findings for the children's crossing:

- the intersection currently operates at LOS A in both the AM and PM peak hours, with or without the development traffic;
- in 2021, with development and cumulative traffic, the intersection will operate at LOS F in the AM peak hour;
- beyond 2021, the intersection will continue to have LOS F in the AM peak hour and experience longer queues into the future; and
- the sensitivity testing of 1.8% annual growth on the Mitchell Highway shows slightly better delay and queuing, as the roundabout is more congested and, therefore, slower traffic on Sheraton Road.

In summary, with the development traffic, there will be a minor impact at the children's crossing; however, the LOS will remain at A. As more and more traffic is added due to all planned/approved development in the area, there will be excessive delays during the AM peak and the northbound queue will be nearly 3.3 km which is unsustainable. Despite the fact that the southbound queue will not impact the Mitchell Highway/Sheraton Road roundabout, other alternative traffic management measures may be required for this children's crossing in the future (eg a pedestrian signalised crossing).

12 Traffic composition

This chapter undertakes a relative comparison of the traffic growth due to the subject development against other planned/approved traffic generation which has resulted in the poor performance of these intersections. The intersection traffic volumes are a combination of surveyed background traffic, background traffic growth, project related traffic (development traffic) and cumulative traffic. Table 12.1 presents the percentage increase of traffic by each component.

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[3] Sensitivity testing: with 1.8 growth of background traffic for both Mitchell Highway and Sheraton Road

Table 12.1 Intersection traffic volumes (increased traffic in percentages)

Traffic	**2021**		**2031**		**2031 sensitivity testing (1.8% annual growth on the Mitchell Highway)**		**2046**	
	AM	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Baseline (Mitchell Highway/Sheraton Road intersection)	2,595	2,189	2,595	2,189	2,595	2,189	2,595	2,189
Baseline (Sheraton Road children's crossing)	1,367	777	1,367	777	1,367	777	1,367	777
Background traffic growth	-	-	363 (33.8%)	308 (27.5%)	480 (40.3%)	406 (33.4%)	887 (**43.5%**)	749 (37.5%)
Holcim Development traffic	40 (5.6%)	40 (4.9%)	40 (3.7%)	40 (3.6%)	40 (3.4%)	40 (3.3%)	40 (2.0%)	40 (**2.0%**)
Boundary Road residential developments	660 (**93.0%**)	660 (81.5%)	660 (61.5%)	660 (59.0%)	660 (55.5%)	660 (54.3%)	1,100 (54.0%)	1,100 (55.0%)
Dubbo RSL Club	-	100 (12.3%)	-	100 (8.9%)	-	100 (8.2%)	-	100 (5.0%)
South Keswick Quarry	10 (1.4%)	10 (1.2%)	10 (0.9%)	10 (0.9%)	10 (0.8%)	10 (0.8%)	10 (0.5%)	10 (0.5%)
Total increase	**710**	**810**	**1,073**	**1,118**	**1,190**	**1,216**	**2,037**	**1,999**

The key observations from the above table are:

- the Boundary Road residential development would be the main traffic generator in the areas, as much as 93% during the AM peak in 2021;
- the growth of background traffic would the second most contributor for the poor performance of the road network, as much as 43.5% traffic in 2046; and
- the subject development traffic would be a minor contributor on the road network performance which is only 2% in 2046.

This traffic data comparison shows that the development generated traffic would have very minor impact on the external road network in the longer term future.

13 Signal warrant assessment at the Sheraton Road children's crossing

As requested by TfNSW, a signalised pedestrian crossing warrant has been undertaken. TfNSW has a traffic signal design guideline for the general warrants for traffic signals in public road which indicates *a signalised mid-block marked foot crossing may be considered if one of the following warrants is met*. The signal warrant which is predominantly used by children is as follows:

- for each of two one-hour periods of an average day:

- the pedestrian flow exceeds 50 persons/hour; and
- the vehicular flow exceeds 600 vehicles/hour in each direction.

The recorded pedestrian and traffic volumes at this children's crossing is presented in Table 13.1.

Table 13.1 Signal warrant at the Sheraton Road children crossing

	Pedestrian flow	Northbound traffic	Southbound traffic
12/05/2021: 8 am – 9 am	25	563	760
13/05/2021: 8 am – 9 am	45	539	868
Average AM peak hour	**35**	**551**	**814**
11/05/2021 3: pm – 4 pm	67	446	259
12/05/2021 3: pm – 4 pm	48	518	327
Average PM peak hour	**57.5**	**482**	**293**

Although the signal warrant is not met in the existing context, the pedestrian flow is close to the warrant threshold. If all planned developments in the vicinity of the crossing were to eventuate in future, pedestrian volumes would be likely to increase and potentially meet the warrant. With the cumulative traffic in the locality, traffic signals could be considered at this children's crossing which will be beneficial for not only traffic operation but also pedestrian safety.

14 Conclusion and recommendations

This letter responds to comments made about the potential traffic impacts of the Dubbo Quarry Continuation Project during exhibition.

EMM engineers observed traffic movements over two consecutive days (between 11 and 13 May 2021).

During the AM peak hour, no network issues have been observed, hence no restriction of the truck movements along Sheraton Road is warranted and should not be conserved. Any restriction during the AM peak is considered to be excessive, as parents drop off their children to the schools in a more staggered period, rather than one congregated period which occurs during the PM peak.

During the PM peak a northbound queue has been observed in Sheraton Road between the period 3.20 to 3.35 pm on both days. Therefore, there is merit in restricting outgoing quarry traffic movements for a period of half hour (eg between 3.15 to 3.45 pm) on school days. While the assessment noted peak queueing between 3.20 pm to 3.35 pm, the extended 15 additional minute restriction is recommended to cover the commencement and decline of queueing during the period of the peak. During the same time, no significant queuing has been observed for the southbound traffic in Sheraton Road. Therefore, no restriction is recommended for incoming traffic to the quarry during the PM school peak hour.

The local road network will likely be constrained in the future as a result of the traffic generated by all planned and approved development in the locality and excessive growth of background traffic. Therefore, there may be a need to upgrade the road network to cater for future traffic volumes. Upgrading the road network should not be the sole responsibility of Holcim as its traffic generation is relatively minor (maximum of 20 movements hourly in each direction or 2% traffic generation contributor in 2046), compared to other developments in the area.

Should you require any further clarification on this letter, please do not hesitate to contact the undersigned.

Yours sincerely

Abdullah Uddin
Associate Traffic Engineer
auddin@emmconsulting.com.au

0425 478 650

Attachment A

Intersection traffic data provided by TfNSW

TTM Reference: 19SYD0213
Location: Wellington Rd & Sheraton Rd
Suburb: Dubbo
Date: Wednesday 4th Dec 2019
AM Peak: 0800-0900
Weather: Fine

www.ttmgroup.com.au

TTM Reference:	19SYD0213
Location:	Wellington Rd & Sheraton Rd
Suburb:	Dubbo
Date:	Wednesday 4th Dec 2019
PM Peak:	1500-1600
Weather:	Fine

www.ttmgroup.com.au

Attachment B

PBS Permit

Permit Number

136197 v5

Class 2 – Heavy Vehicle PBS Authorisation Permit

Note:
This Permit is issued under the provisions of ***Section 143 of the Heavy Vehicle National Law Act 2012*** for the operation of a complying Class 2 vehicle subject to the conditions of the *National Class 2 PBS Level 1 & 2A Truck and Dog Trailer Authorisation Notice* and/or any additional conditions or attachments set out in this Permit.

Permit details

This Permit is issued to

Gramardi Transport Pty Ltd

Address

34L North Burrabadine Road
Dubbo, NSW Postcode 2830

Description of vehicle combination

3 Axle Truck and 4 Axle Dog Trailer

Issue period

From 01/10/2020

To 24/06/2021

Authorised Routes/Area

Route/s ☐ Area ☑

Level 1 - General Mass Limits (GML)
The vehicle is permitted to operate at (GML) 50.5 tonnes on the following numbered routes/area (1-36)

Level 2 - General Mass Limits (GML) or Concessional Mass Limits (CML)
The vehicle is permitted to operate at General Mass Limits (GML) 56.0 tonnes or Concessional Mass Limits (CML) 57.5 tonnes on the following numbered routes/area (1-30, 32-46)

1) Start: PBS Level 2A GML and CML Network, Mitchell Hwy, Dubbo NSW 2830
Sheraton Rd, Dubbo
End: Holcim Quarry, Sheraton Rd, Dubbo NSW 2830

2) Start: PBS Level 2A GML and CML Network, Newell Hwy, Brocklehurst NSW 2830
Burraway Rd, Brocklehurst
End: Dubbo Sand Quarry, Burraway Rd, Brocklehurst NSW 2830

3) Start: PBS Level 2A GML and CML Network, Newell Hwy, Brocklehurst NSW 2830
Burraway St, Brocklehurst
Dubbo St, Brocklehurst
End: Boral Quarry, Old Gilgandra Rd, Dubbo NSW 2830

4) Start: PBS Level 2A GML and CML Network, Mitchell Hwy, Narromine NSW 2821
Warren Rd, Narromine
Eumungerie Rd, [Narromine - Burroway]
Dubbo-Burroway Rd, [Burroway - Rawsonville]
Burraway Rd, Rawsonville
Rawsonville Rd, Rawsonville
Whylandra Crossing Rd, Rawsonville
End: Dubbo Sand Quarry, Whylandra Crossing Rd, Rawsonville NSW 2830

5) Start: PBS Level 2A GML and CML Network, Intersection of Culling St and Mitchell Hwy, Narromine NSW 2821
Mitchell Hwy, Narromine
End: PBS Level 2A GML and CML Network, Intersection of Burraway St and Mitchell Hwy, Narromine NSW 2821

6) Start: PBS Level 2A GML and CML Network, Mitchell Hwy, Narromine NSW 2821
Macquarie Dr, Narromine
Industry Ave, Narromine
End: KB Concrete Plant, Industry Ave, Narromine NSW 2821

7) Start: PBS Level 2A GML and CML Network, Castlereagh Hwy, Mudgee NSW 2850
Putta Bucca Rd, Putta Bucca
End: Putta Bucca Landscape Supplies, 69 Putta Bucca Rd, Putta Bucca NSW 2850

8) Start: PBS Level 2A GML and CML Network, Ulan Rd, Ulan NSW 2850
Toole Rd, Ulan
End: Holcim, 10 Toole Rd, Ulan NSW 2850

9) Start: PBS Level 2A GML and CML Network, Peabody Rd, Molong NSW 2866
Packham Dr, Molong
End: Packham Concrete, 231 Packham Dr, Molong NSW 2866

NHVR
National Heavy Vehicle Regulator

Permit Number

103377 v8

Class 2 – Heavy Vehicle PBS Authorisation Permit

Note:
This Permit is issued under the provisions of ***Section 143 of the Heavy Vehicle National Law Act 2012*** for the operation of a complying Class 2 vehicle subject to the conditions of the *National Class 2 PBS Level 1 & 2A Truck and Dog Trailer Authorisation Notice* and/or any additional conditions or attachments set out in this Permit.

Permit details

This Permit is issued to

Advance Truck Driving School

Address

14 Sheraton Road
Dubbo NSW
Postcode

Description of vehicle combination

3 Axle Truck and 4 Axle Dog Trailer

Issue period

From: 11/09/2020

To: 10/09/2021

Authorised Routes/Area

Route/s ☐ Area ☑

Level 2 - Higher Mass Limits (HML)
The vehicle is permitted to operate at Higher Mass Limits (HML) 56.5 tonnes in the following areas:

Dubbo Regional Council
The vehicle is permitted to operate on all HML 25/26m B-Double routes approved in Dubbo Regional Council.

Narromine Shire Council
The vehicle is permitted to operate on all 25/26m B-Double routes approved in Narromine Shire Council

Route/s ☑ Area ☐

Level 2 - General Mass Limits (GML) or Concessional Mass Limits (CML)
The vehicle is permitted to operate at General Mass Limits (GML) 55.0 tonnes or Concessional Mass Limits (CML) 56.0 tonnes on the following numbered routes/area (1-39)

Level 2 - Higher Mass Limits (HML)
The vehicle is permitted to operate at Higher Mass Limits (HML) 56.5 tonnes on the following numbered routes/area (1-20, 22-43)

1) Start: PBS Level 2A HML Network, Castlereagh Hwy, Mudgee NSW 2850
Putta Bucca Rd, Mudgee
End: Boral Quarry, 69 Putta Bucca Rd, Putta Bucca NSW 2850

2) Start: PBS Level 2A HML Network, Mitchell Hwy, Dubbo NSW 2830
Bunglegumbie Rd, Dubbo
End: Access to Sand Plant, Bunglegumbie Rd, Dubbo NSW 2830

3) Start: PBS Level 2A HML Network, Mitchell Hwy, Orange NSW 2800
Dairy Creek Rd, Orange
Blowes Rd, Orange
Elsham Ave, Orange
Ash St, Orange
Scott Pl, Orange
End: Boral Concrete, Scott Pl, Orange NSW 2800

4) Start: PBS Level 2A HML Network, Newell Hwy, Brocklehurst NSW 2830
Burraway St, Brocklehurst
Dubbo St, Brocklehurst
End: Boral Concrete, Dubbo St, Brocklehurst NSW 2830

5) Start: PBS Level 2A HML Network, Mitchell Hwy, Dubbo NSW 2830
Sheraton Rd, Dubbo
End: Yuruga, 26R Sheraton Rd, Dubbo NSW 2830

6) Start: PBS Level 2A HML Network, Newell Hwy, Dubbo NSW 2830
Mitchell Hwy, Dubbo
End: PBS Level 2A HML Network, Mitchell Hwy, Dubbo NSW 2830

7) Start: PBS Level 2A HML Network, Castlereagh Hwy, Coonamble NSW 2829
Railway St, Coonamble

Authorised Routes/Area

Route/s ☑ Area ☑

Level 2 - General Mass Limits (GML) or Concessional Mass Limits (CML)
The vehicle is permitted to operate at General Mass Limits (GML) 56.0 tonnes or Concessional Mass Limits (CML) 57.5 tonnes on the following numbered routes/area (1-27, 29-30)

Level 2 - Higher Mass Limits (HML)
The vehicle is permitted to operate at Higher Mass Limits (HML) 57.5 tonnes on the following numbered routes/area (28)

1) Start: Start: PBS Level 2A GML and CML Network, Mitchell Highway, Dubbo NSW 2830
Sheraton Rd, Dubbo
End: Holcim Quarry, Sheraton Rd, Dubbo NSW 2830

2) Start: PBS Level 2A GML and CML Network, Redfern St, Cowra NSW 2794
Mulyan St, Cowra
North Logan Rd, Cowra
Glenlogan Rd, Cowra
End: PBS Level 2A GML and CML Network, Glenlogan Rd, Cowra NSW 2794

3) Start: PBS Level 2A GML and CML Network, Warraderry Way, Gooloogong NSW 2805
Warraderry Way, Gooloogong
Casuarina Dr, [Gooloogong - Eugowra]
End: PBS Level 2A GML and CML Network, Casuarina Dr, Eugowra NSW 2806

4) Start: PBS Level 2A GML and CML Network, Ulan Rd, Ulan NSW 2850
Toole Rd, Ulan
End: Holcim, 10 Toole Rd, Ulan NSW 2850

5) Start: PBS Level 2A GML and CML Network, Great Western Hwy, Marrangaroo NSW 2790
Great Western Hwy, [Marrangaroo - Lithgow]
Main St, Lithgow
Lithgow St, Lithgow
Mort St, Lithgow
Chifley Rd, [Lithgow - Clarence]
Clarence Colliery Rd, Clarence
End: Hanson Quarry, Clarence Colliery Rd, Clarence NSW 2790

6) Start: PBS Level 2A GML and CML Network, Great Western Hwy, Marrangaroo NSW 2790
Great Western Hwy, [Marrangaroo - Lithgow]
Main St, Lithgow
Lithgow St, Lithgow
Mort St, Lithgow
Bridge St, Lithgow
Inch St,[Lithgow - Oaky Park]
Bells Rd, Oaky Park
End: Holcim Australia, Bells Rd, Oaky Park NSW 2790

7) Start: PBS Level 2A GML and CML Network, Ulan Rd, Turill NSW 2850
Ulan Rd, [Turill - Cassilis]
End: PBS Level 2A GML and CML Network, Golden Hwy, Cassilis NSW 2329

8) Start: PBS Level 2A GML and CML Network, Newell Hwy, Brocklehurst NSW 2830
Burraway Rd, [Brocklehurst - Rawsonville]

Attachment C

SIDRA results for PM 15-minute period (calibration)

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2021 baseline PM 15 min (Site Folder: Maximum daily production)]

Network: N101 [2021 Baseline PM 15 min (Network Folder: Validation)]

Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	708	6.2	708	6.2	1.145	153.1	LOS F	73.3	540.7	1.00	4.91	8.62	14.1
2	T1	336	7.1	336	7.1	0.751	12.1	LOS A	7.7	56.3	0.95	1.22	1.46	41.9
3	R2	132	0.0	132	0.0	0.751	16.8	LOS B	7.7	56.3	0.95	1.22	1.46	44.0
Approach		1176	5.8	1176	5.8	1.145	97.5	LOS F	73.3	540.7	0.98	3.45	5.77	19.4
East: Mitchell Highway														
4	L2	16	0.0	16	0.0	0.511	11.6	LOS A	3.8	27.4	0.84	0.96	1.01	49.2
5	T1	476	3.4	476	3.4	0.511	11.9	LOS A	3.8	27.4	0.84	0.97	1.01	57.4
6	R2	172	4.7	172	4.7	0.511	18.0	LOS B	3.8	27.6	0.84	0.99	1.01	53.6
Approach		664	3.6	664	3.6	0.511	13.5	LOS A	3.8	27.6	0.84	0.98	1.01	56.2
North: Sheraton Road														
7	L2	80	15.0	80	15.0	0.360	8.9	LOS A	2.1	17.1	0.79	0.88	0.81	54.3
8	T1	276	18.8	276	18.8	0.360	9.0	LOS A	2.1	16.7	0.79	0.88	0.81	46.2
9	R2	64	0.0	64	0.0	0.360	13.8	LOS A	2.1	16.7	0.79	0.88	0.81	55.6
Approach		420	15.2	420	15.2	0.360	9.7	LOS A	2.1	17.1	0.79	0.88	0.81	50.2
West: Mitchell Highway														
10	L2	120	0.0	120	0.0	0.534	12.8	LOS A	4.8	35.0	0.92	0.99	1.10	52.6
11	T1	208	9.6	208	9.6	0.534	13.6	LOS A	4.8	35.0	0.92	0.99	1.10	56.7
12	R2	344	8.1	344	8.1	0.568	20.3	LOS B	5.3	39.7	0.93	1.04	1.17	41.7
Approach		672	7.1	672	7.1	0.568	16.9	LOS B	5.3	39.7	0.93	1.02	1.14	49.3
All Vehicles		2932	7.0	2932	7.0	1.145	47.4	LOS D	73.3	540.7	0.91	1.96	2.92	31.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2021 baseline PM 15 min (Site Folder: Maximum daily production)]

Network: N101 [2021 Baseline PM 15 min (Network Folder: Validation)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	1048	7.6	1048	7.6	0.906	10.8	LOS A	35.7	266.1	0.71	0.51	0.82	32.4
Approach		1048	7.6	1048	7.6	0.906	10.8	LOS A	35.7	266.1	0.71	0.51	0.82	32.4
North: Sheraton Road														
8	T1	428	29.9	428	29.9	0.358	3.0	LOS A	1.9	16.5	0.22	0.38	0.22	38.6
Approach		428	29.9	428	29.9	0.358	3.0	LOS A	1.9	16.5	0.22	0.38	0.22	38.6
All Vehicles		1476	14.1	1476	14.1	0.906	8.5	NA	35.7	266.1	0.57	0.47	0.64	34.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Attachment D

SIDRA results

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2021 baseline AM (Site Folder: Maximum daily production)]

Network: N101 [2021 Baseline AM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Sheraton Road														
1	L2	397	5.6	397	5.6	0.660	13.6	LOS A	5.9	43.1	0.92	1.08	1.27	49.4
2	T1	211	10.0	211	10.0	0.424	9.6	LOS A	2.7	20.6	0.82	0.92	0.91	51.6
3	R2	37	5.7	37	5.7	0.424	15.2	LOS B	2.7	20.6	0.82	0.92	0.91	53.3
Approach		644	7.0	644	7.0	0.660	12.4	LOS A	5.9	43.1	0.88	1.02	1.13	50.3
East: Mitchell Highway														
4	L2	62	20.3	62	20.3	0.693	24.3	LOS B	6.3	46.6	0.95	1.16	1.54	38.4
5	T1	482	3.9	482	3.9	0.693	22.9	LOS B	6.3	46.6	0.95	1.16	1.54	49.2
6	R2	81	19.5	81	19.5	0.693	30.5	LOS C	6.3	46.8	0.95	1.16	1.54	46.8
Approach		625	7.6	625	7.6	0.693	24.0	LOS B	6.3	46.8	0.95	1.16	1.54	48.1
North: Sheraton Road														
7	L2	94	11.2	94	11.2	0.549	13.7	LOS A	4.0	29.5	0.88	1.02	1.14	51.3
8	T1	311	5.8	311	5.8	0.549	13.1	LOS A	4.0	28.9	0.88	1.03	1.14	41.7
9	R2	164	2.6	164	2.6	0.549	18.7	LOS B	4.0	28.9	0.88	1.04	1.14	50.9
Approach		568	5.7	568	5.7	0.549	14.8	LOS B	4.0	29.5	0.88	1.03	1.14	47.0
West: Mitchell Highway														
10	L2	66	4.8	66	4.8	0.408	7.2	LOS A	2.9	22.1	0.67	0.66	0.67	56.0
11	T1	306	11.0	306	11.0	0.408	7.6	LOS A	2.9	22.1	0.67	0.66	0.67	60.6
12	R2	521	5.1	521	5.1	0.554	14.3	LOS A	4.9	35.5	0.76	0.81	0.80	47.1
Approach		894	7.1	894	7.1	0.554	11.5	LOS A	4.9	35.5	0.72	0.74	0.75	53.5
All Vehicles		2732	6.9	2732	6.9	0.693	15.2	LOS B	6.3	46.8	0.85	0.96	1.10	49.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2021 baseline AM (Site Folder: Maximum daily production)]

Network: N101 [2021 Baseline AM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	581	8.9	581	8.9	0.423	2.3	LOS A	2.5	19.0	0.11	0.35	0.11	37.9
Approach		581	8.9	581	8.9	0.423	2.3	LOS A	2.5	19.0	0.11	0.35	0.11	37.9
North: Sheraton Road														
8	T1	858	6.4	858	6.4	0.617	2.4	LOS A	5.5	40.4	0.17	0.35	0.17	38.7
Approach		858	6.4	858	6.4	0.617	2.4	LOS A	5.5	40.4	0.17	0.35	0.17	38.7
All Vehicles		1439	7.4	1439	7.4	0.617	2.4	NA	5.5	40.4	0.15	0.35	0.15	38.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2021 baseline PM (Site Folder: Maximum daily production)]

Network: N101 [2021 Baseline PM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	424	6.2	424	6.2	0.607	8.3	LOS A	5.1	37.4	0.85	1.01	1.10	46.0
2	T1	176	10.2	176	10.2	0.330	4.1	LOS A	1.9	14.2	0.73	0.67	0.73	46.7
3	R2	49	6.4	49	6.4	0.330	9.1	LOS A	1.9	14.2	0.73	0.67	0.73	48.0
Approach		649	7.3	649	7.3	0.607	7.2	LOS A	5.1	37.4	0.81	0.89	0.97	46.3
East: Mitchell Highway														
4	L2	16	0.0	16	0.0	0.373	8.8	LOS A	2.3	16.3	0.74	0.80	0.74	52.1
5	T1	381	3.3	381	3.3	0.373	9.1	LOS A	2.3	16.3	0.74	0.81	0.74	59.4
6	R2	153	2.8	153	2.8	0.373	15.1	LOS B	2.3	16.3	0.74	0.85	0.74	55.5
Approach		549	3.1	549	3.1	0.373	10.8	LOS A	2.3	16.3	0.74	0.82	0.74	58.1
North: Sheraton Road														
7	L2	86	11.0	86	11.0	0.282	8.2	LOS A	1.6	11.9	0.74	0.81	0.74	55.0
8	T1	184	10.9	184	10.9	0.282	8.0	LOS A	1.6	11.7	0.74	0.82	0.74	46.4
9	R2	92	3.4	92	3.4	0.282	13.5	LOS A	1.6	11.7	0.74	0.84	0.74	54.5
Approach		362	9.0	362	9.0	0.282	9.4	LOS A	1.6	11.9	0.74	0.82	0.74	51.5
West: Mitchell Highway														
10	L2	116	3.6	116	3.6	0.409	7.6	LOS A	2.9	20.9	0.69	0.69	0.69	56.1
11	T1	295	6.4	295	6.4	0.409	7.8	LOS A	2.9	20.9	0.69	0.70	0.69	60.4
12	R2	333	5.1	333	5.1	0.409	13.8	LOS A	2.9	20.9	0.69	0.77	0.69	48.2
Approach		743	5.4	743	5.4	0.409	10.4	LOS A	2.9	20.9	0.69	0.73	0.69	55.2
All Vehicles		2304	5.9	2304	5.9	0.607	9.5	LOS A	5.1	37.4	0.74	0.81	0.79	52.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2021 baseline PM (Site Folder: Maximum daily production)]

Network: N101 [2021 Baseline PM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	508	11.2	508	11.2	0.383	2.6	LOS A	2.1	16.2	0.18	0.36	0.18	37.8
Approach		508	11.2	508	11.2	0.383	2.6	LOS A	2.1	16.2	0.18	0.36	0.18	37.8
North: Sheraton Road														
8	T1	309	16.7	309	16.7	0.240	2.6	LOS A	1.1	8.7	0.15	0.36	0.15	38.7
Approach		309	16.7	309	16.7	0.240	2.6	LOS A	1.1	8.7	0.15	0.36	0.15	38.7
All Vehicles		818	13.3	818	13.3	0.383	2.6	NA	2.1	16.2	0.17	0.36	0.17	38.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2021 dev AM (Site Folder: Maximum daily production)]

Network: N101 [2021 Dev AM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total	HV]	ARRIVAL FLOWS [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh.	Dist]	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	418	10.3	418	10.3	0.723	16.0	LOS B	7.1	53.9	0.95	1.15	1.43	47.3
2	T1	211	10.0	211	10.0	0.425	9.6	LOS A	2.7	20.7	0.82	0.93	0.91	51.6
3	R2	37	5.7	37	5.7	0.425	15.2	LOS B	2.7	20.7	0.82	0.93	0.91	53.3
Approach		665	10.0	665	10.0	0.723	13.9	LOS A	7.1	53.9	0.90	1.07	1.23	48.9
East: Mitchell Highway														
4	L2	62	20.3	62	20.3	0.722	27.0	LOS B	6.8	50.7	0.96	1.19	1.65	36.5
5	T1	482	3.9	482	3.9	0.722	25.4	LOS B	6.8	50.7	0.96	1.19	1.65	47.6
6	R2	81	19.5	81	19.5	0.722	33.1	LOS C	6.8	50.9	0.96	1.19	1.65	45.3
Approach		625	7.6	625	7.6	0.722	26.6	LOS B	6.8	50.9	0.96	1.19	1.65	46.5
North: Sheraton Road														
7	L2	94	11.2	94	11.2	0.573	14.7	LOS B	4.2	31.6	0.90	1.04	1.20	50.5
8	T1	311	5.8	311	5.8	0.573	14.1	LOS A	4.3	30.9	0.90	1.05	1.19	40.9
9	R2	164	2.6	164	2.6	0.573	19.7	LOS B	4.3	30.9	0.90	1.06	1.19	50.3
Approach		568	5.7	568	5.7	0.573	15.8	LOS B	4.3	31.6	0.90	1.05	1.19	46.2
West: Mitchell Highway														
10	L2	66	4.8	66	4.8	0.408	7.2	LOS A	2.9	22.1	0.67	0.66	0.67	56.0
11	T1	306	11.0	306	11.0	0.408	7.6	LOS A	2.9	22.1	0.67	0.66	0.67	60.6
12	R2	542	8.7	542	8.7	0.590	15.0	LOS B	5.6	42.0	0.79	0.83	0.86	46.7
Approach		915	9.2	915	9.2	0.590	11.9	LOS A	5.6	42.0	0.74	0.76	0.79	53.1
All Vehicles		2774	8.3	2774	8.3	0.723	16.5	LOS B	7.1	53.9	0.86	0.99	1.17	48.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2021 dev AM (Site Folder: Maximum daily production)]

Network: N101 [2021 Dev AM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	602	12.1	602	12.1	0.445	2.4	LOS A	2.8	21.3	0.12	0.35	0.12	37.9
Approach		602	12.1	602	12.1	0.445	2.4	LOS A	2.8	21.3	0.12	0.35	0.12	37.9
North: Sheraton Road														
8	T1	879	8.6	879	8.6	0.639	2.4	LOS A	6.0	45.0	0.18	0.35	0.18	38.7
Approach		879	8.6	879	8.6	0.639	2.4	LOS A	6.0	45.0	0.18	0.35	0.18	38.7
All Vehicles		1481	10.0	1481	10.0	0.639	2.4	NA	6.0	45.0	0.15	0.35	0.15	38.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2021 dev PM (Site Folder: Maximum daily production)]

Network: N101 [2021 Dev PM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	445	10.6	445	10.6	0.660	9.7	LOS A	6.0	45.7	0.89	1.08	1.21	44.8
2	T1	176	10.2	176	10.2	0.331	4.1	LOS A	1.9	14.3	0.74	0.67	0.74	46.7
3	R2	49	6.4	49	6.4	0.331	9.1	LOS A	1.9	14.3	0.74	0.67	0.74	48.0
Approach		671	10.2	671	10.2	0.660	8.2	LOS A	6.0	45.7	0.84	0.94	1.05	45.5
East: Mitchell Highway														
4	L2	16	0.0	16	0.0	0.388	9.2	LOS A	2.4	17.4	0.77	0.84	0.79	51.9
5	T1	381	3.3	381	3.3	0.388	9.6	LOS A	2.4	17.4	0.77	0.86	0.79	59.2
6	R2	153	2.8	153	2.8	0.388	15.6	LOS B	2.4	17.4	0.77	0.88	0.79	55.2
Approach		549	3.1	549	3.1	0.388	11.2	LOS A	2.4	17.4	0.77	0.86	0.79	57.9
North: Sheraton Road														
7	L2	86	11.0	86	11.0	0.293	8.4	LOS A	1.6	12.4	0.75	0.83	0.75	54.9
8	T1	184	10.9	184	10.9	0.293	8.3	LOS A	1.6	12.1	0.75	0.84	0.75	46.2
9	R2	92	3.4	92	3.4	0.293	13.7	LOS A	1.6	12.1	0.75	0.86	0.75	54.3
Approach		362	9.0	362	9.0	0.293	9.7	LOS A	1.6	12.4	0.75	0.84	0.75	51.3
West: Mitchell Highway														
10	L2	116	3.6	116	3.6	0.428	7.6	LOS A	3.0	22.2	0.70	0.69	0.70	56.0
11	T1	295	6.4	295	6.4	0.428	7.9	LOS A	3.0	22.2	0.70	0.70	0.70	60.5
12	R2	354	10.7	354	10.7	0.428	14.0	LOS A	3.0	22.9	0.70	0.78	0.70	47.8
Approach		764	8.0	764	8.0	0.428	10.7	LOS A	3.0	22.9	0.70	0.74	0.70	55.0
All Vehicles		2346	7.6	2346	7.6	0.660	9.9	LOS A	6.0	45.7	0.76	0.84	0.83	52.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2021 dev PM (Site Folder: Maximum daily production)]

Network: N101 [2021 Dev PM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	529	14.7	529	14.7	0.406	2.7	LOS A	2.3	18.3	0.19	0.37	0.19	37.7
Approach		529	14.7	529	14.7	0.406	2.7	LOS A	2.3	18.3	0.19	0.37	0.19	37.7
North: Sheraton Road														
8	T1	331	22.0	331	22.0	0.262	2.6	LOS A	1.2	10.2	0.16	0.36	0.16	38.7
Approach		331	22.0	331	22.0	0.262	2.6	LOS A	1.2	10.2	0.16	0.36	0.16	38.7
All Vehicles		860	17.5	860	17.5	0.406	2.6	NA	2.3	18.3	0.18	0.36	0.18	38.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2021 dev AM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2021 Dev AM cumulative (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	768	5.9	723	5.9	1.220	220.0	LOS F	97.6	717.9	1.00	4.62	10.75	11.1
2	T1	388	6.0	366	5.9	0.726	15.5	LOS B	7.2	53.0	0.95	1.15	1.43	47.0
3	R2	69	4.5	65	4.5	0.726	21.3	LOS B	7.2	53.0	0.95	1.15	1.43	48.6
Approach		1226	5.8	1154[N1]	5.8	1.220	144.0	LOS F	97.6	717.9	0.98	3.32	7.27	15.7
East: Mitchell Highway														
4	L2	74	18.6	74	18.6	0.928	64.0	LOS E	14.1	105.2	1.00	1.58	2.93	21.6
5	T1	482	3.9	482	3.9	0.928	62.3	LOS E	14.1	105.2	1.00	1.58	2.92	32.5
6	R2	81	19.5	81	19.5	0.928	70.4	LOS E	14.1	105.4	1.00	1.58	2.92	31.5
Approach		637	7.6	637	7.6	0.928	63.5	LOS E	14.1	105.4	1.00	1.58	2.92	31.3
North: Sheraton Road														
7	L2	94	11.2	94	11.2	0.768	25.7	LOS B	7.2	53.3	0.98	1.23	1.68	44.1
8	T1	349	5.7	349	5.7	0.768	24.9	LOS B	7.2	52.5	0.99	1.23	1.67	33.5
9	R2	164	2.6	164	2.6	0.768	30.3	LOS C	7.2	52.5	0.99	1.23	1.67	44.2
Approach		607	5.7	607	5.7	0.768	26.5	LOS B	7.2	53.3	0.99	1.23	1.67	39.0
West: Mitchell Highway														
10	L2	66	4.8	66	4.8	0.531	10.8	LOS A	4.7	35.5	0.87	0.91	1.00	54.3
11	T1	306	11.0	306	11.0	0.531	11.2	LOS A	4.7	35.5	0.87	0.91	1.00	58.6
12	R2	636	7.8	636	7.8	0.894	34.2	LOS C	18.9	141.2	1.00	1.38	2.07	32.6
Approach		1008	8.6	1008	8.6	0.894	25.7	LOS B	18.9	141.2	0.95	1.21	1.67	42.0
All Vehicles		3479	6.9	3407[N1]	7.1	1.220	73.0	LOS F	97.6	717.9	0.98	2.00	3.80	25.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2021 dev AM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2021 Dev AM cumulative (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	1163	6.7	1163	6.7	1.080	91.3	LOS F	233.9	1730.9	1.00	0.44	1.21	13.3
Approach		1163	6.7	1163	6.7	1.080	91.3	LOS F	233.9	1730.9	1.00	0.44	1.21	13.3
North: Sheraton Road														
8	T1	1023	7.9	1023	7.9	0.741	2.6	LOS A	9.5	71.3	0.25	0.34	0.25	38.6
Approach		1023	7.9	1023	7.9	0.741	2.6	LOS A	9.5	71.3	0.25	0.34	0.25	38.6
All Vehicles		2186	7.3	2186	7.3	1.080	49.8	NA	233.9	1730.9	0.65	0.39	0.76	21.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2021 dev PM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2021 Dev PM cumulative (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	539	9.2	539	9.2	0.823	15.8	LOS B	10.7	80.7	1.00	1.37	1.69	41.1
2	T1	215	9.3	215	9.3	0.420	4.9	LOS A	2.7	20.5	0.79	0.79	0.85	46.4
3	R2	61	6.9	61	6.9	0.420	9.9	LOS A	2.7	20.5	0.79	0.79	0.85	47.5
Approach		815	9.0	815	9.0	0.823	12.5	LOS A	10.7	80.7	0.93	1.18	1.41	42.9
East: Mitchell Highway														
4	L2	83	1.3	83	1.3	0.984	89.7	LOS F	18.7	134.0	1.00	1.77	3.62	16.5
5	T1	381	3.3	381	3.3	0.984	90.2	LOS F	18.7	134.0	1.00	1.77	3.62	26.2
6	R2	153	2.8	153	2.8	0.984	96.1	LOS F	18.7	134.1	1.00	1.77	3.62	25.6
Approach		617	2.9	617	2.9	0.984	91.6	LOS F	18.7	134.1	1.00	1.77	3.62	25.0
North: Sheraton Road														
7	L2	86	11.0	86	11.0	0.809	32.7	LOS C	8.0	59.7	1.00	1.30	1.87	40.7
8	T1	398	5.6	398	5.6	0.809	31.8	LOS C	8.1	59.2	1.00	1.29	1.87	30.1
9	R2	92	3.4	92	3.4	0.809	37.3	LOS C	8.1	59.2	1.00	1.29	1.87	41.3
Approach		576	6.0	576	6.0	0.809	32.8	LOS C	8.1	59.7	1.00	1.29	1.87	34.3
West: Mitchell Highway														
10	L2	116	3.6	116	3.6	0.486	8.6	LOS A	3.8	27.8	0.77	0.78	0.80	55.5
11	T1	295	6.4	295	6.4	0.486	8.9	LOS A	3.8	27.8	0.77	0.78	0.80	60.2
12	R2	739	5.4	739	5.4	0.874	27.6	LOS B	18.0	131.9	1.00	1.23	1.78	36.4
Approach		1149	5.5	1149	5.5	0.874	20.9	LOS B	18.0	131.9	0.92	1.07	1.43	44.9
All Vehicles		3157	6.0	3157	6.0	0.984	34.7	LOS C	18.7	134.1	0.95	1.28	1.93	35.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2021 dev PM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2021 Dev PM cumulative (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	674	12.3	674	12.3	0.511	2.7	LOS A	3.5	27.0	0.22	0.37	0.22	37.6
Approach		674	12.3	674	12.3	0.511	2.7	LOS A	3.5	27.0	0.22	0.37	0.22	37.6
North: Sheraton Road														
8	T1	997	7.8	997	7.8	0.739	3.2	LOS A	8.9	66.3	0.39	0.38	0.39	38.3
Approach		997	7.8	997	7.8	0.739	3.2	LOS A	8.9	66.3	0.39	0.38	0.39	38.3
All Vehicles		1671	9.6	1671	9.6	0.739	3.0	NA	8.9	66.3	0.32	0.37	0.32	38.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 baseline AM (Site Folder: Maximum daily production)]

Network: N101 [2031 Baseline AM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	469	5.6	469	5.6	0.878	28.3	LOS B	12.3	90.5	1.00	1.41	2.15	39.7
2	T1	249	10.1	249	10.1	0.567	13.1	LOS A	4.3	32.4	0.89	1.03	1.16	48.7
3	R2	44	7.1	44	7.1	0.567	18.8	LOS B	4.3	32.4	0.89	1.03	1.16	49.9
Approach		763	7.2	763	7.2	0.878	22.8	LOS B	12.3	90.5	0.96	1.27	1.77	42.9
East: Mitchell Highway														
4	L2	69	21.2	69	21.2	0.931	62.4	LOS E	15.0	111.4	1.00	1.61	3.03	22.1
5	T1	531	4.0	531	4.0	0.931	60.4	LOS E	15.0	111.4	1.00	1.61	3.03	33.0
6	R2	91	19.8	91	19.8	0.931	68.5	LOS E	14.9	111.6	1.00	1.61	3.03	31.9
Approach		691	7.8	691	7.8	0.931	61.7	LOS E	15.0	111.6	1.00	1.61	3.03	32.0
North: Sheraton Road														
7	L2	112	11.3	112	11.3	0.754	22.4	LOS B	7.0	52.3	0.97	1.20	1.61	45.8
8	T1	368	6.0	368	6.0	0.754	21.6	LOS B	7.1	51.4	0.97	1.20	1.61	35.4
9	R2	195	2.7	195	2.7	0.754	27.0	LOS B	7.1	51.4	0.97	1.21	1.61	45.8
Approach		675	5.9	675	5.9	0.754	23.3	LOS B	7.1	52.3	0.97	1.20	1.61	41.1
West: Mitchell Highway														
10	L2	74	5.7	74	5.7	0.489	8.3	LOS A	3.9	29.4	0.77	0.76	0.79	55.4
11	T1	338	11.2	338	11.2	0.489	8.6	LOS A	3.9	29.4	0.77	0.76	0.79	60.0
12	R2	574	5.1	574	5.1	0.660	17.1	LOS B	7.4	54.1	0.88	0.93	1.07	44.6
Approach		985	7.3	985	7.3	0.660	13.5	LOS A	7.4	54.1	0.83	0.86	0.95	51.8
All Vehicles		3114	7.1	3114	7.1	0.931	28.6	LOS C	15.0	111.6	0.93	1.20	1.76	40.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 baseline AM (Site Folder: Maximum daily production)]

Network: N101 [2031 Baseline AM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	686	8.9	686	8.9	0.500	2.4	LOS A	3.4	25.8	0.13	0.35	0.13	37.9
Approach		686	8.9	686	8.9	0.500	2.4	LOS A	3.4	25.8	0.13	0.35	0.13	37.9
North: Sheraton Road														
8	T1	1014	6.4	1014	6.4	0.729	2.5	LOS A	9.0	66.4	0.23	0.34	0.23	38.6
Approach		1014	6.4	1014	6.4	0.729	2.5	LOS A	9.0	66.4	0.23	0.34	0.23	38.6
All Vehicles		1700	7.4	1700	7.4	0.729	2.5	NA	9.0	66.4	0.19	0.35	0.19	38.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 baseline PM (Site Folder: Maximum daily production)]

Network: N101 [2031 Baseline PM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	502	6.3	502	6.3	0.792	14.9	LOS B	9.1	67.0	0.97	1.31	1.61	41.7
2	T1	208	10.6	208	10.6	0.434	5.8	LOS A	2.8	21.0	0.80	0.88	0.89	46.0
3	R2	59	7.1	59	7.1	0.434	10.8	LOS A	2.8	21.0	0.80	0.88	0.89	47.1
Approach		769	7.5	769	7.5	0.792	12.2	LOS A	9.1	67.0	0.91	1.16	1.36	43.2
East: Mitchell Highway														
4	L2	18	0.0	18	0.0	0.460	10.8	LOS A	3.2	23.0	0.81	0.93	0.93	50.1
5	T1	420	3.5	420	3.5	0.460	11.2	LOS A	3.2	23.0	0.81	0.94	0.93	58.0
6	R2	169	3.1	169	3.1	0.460	17.2	LOS B	3.2	23.0	0.81	0.96	0.93	54.0
Approach		607	3.3	607	3.3	0.460	12.9	LOS A	3.2	23.0	0.81	0.95	0.93	56.7
North: Sheraton Road														
7	L2	103	11.2	103	11.2	0.375	9.4	LOS A	2.2	17.0	0.80	0.89	0.85	54.2
8	T1	219	11.1	219	11.1	0.375	9.2	LOS A	2.2	16.6	0.80	0.91	0.84	45.4
9	R2	109	3.8	109	3.8	0.375	14.7	LOS B	2.2	16.6	0.80	0.92	0.84	53.7
Approach		432	9.3	432	9.3	0.375	10.7	LOS A	2.2	17.0	0.80	0.91	0.84	50.6
West: Mitchell Highway														
10	L2	128	4.1	128	4.1	0.490	8.8	LOS A	3.8	28.2	0.77	0.79	0.82	55.4
11	T1	325	6.5	325	6.5	0.490	9.1	LOS A	3.8	28.2	0.77	0.80	0.82	59.6
12	R2	366	5.2	366	5.2	0.490	15.1	LOS B	3.8	28.2	0.77	0.84	0.82	47.0
Approach		820	5.5	820	5.5	0.490	11.7	LOS A	3.8	28.2	0.77	0.82	0.82	54.3
All Vehicles		2628	6.2	2628	6.2	0.792	11.9	LOS A	9.1	67.0	0.83	0.96	1.01	50.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 baseline PM (Site Folder: Maximum daily production)]

Network: N101 [2031 Baseline PM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	601	11.2	601	11.2	0.453	2.7	LOS A	2.8	21.4	0.20	0.37	0.20	37.7
Approach		601	11.2	601	11.2	0.453	2.7	LOS A	2.8	21.4	0.20	0.37	0.20	37.7
North: Sheraton Road														
8	T1	366	16.7	366	16.7	0.284	2.6	LOS A	1.4	10.8	0.16	0.36	0.16	38.7
Approach		366	16.7	366	16.7	0.284	2.6	LOS A	1.4	10.8	0.16	0.36	0.16	38.7
All Vehicles		967	13.3	967	13.3	0.453	2.6	NA	2.8	21.4	0.19	0.36	0.19	38.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 dev AM (Site Folder: Maximum daily production)]

Network: N101 [2031 Dev AM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total	HV]	ARRIVAL FLOWS [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh.	Dist]	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	491	9.7	491	9.7	0.951	44.0	LOS D	18.3	139.0	1.00	1.71	2.96	32.7
2	T1	249	10.1	249	10.1	0.569	13.1	LOS A	4.3	32.5	0.89	1.03	1.16	48.7
3	R2	44	7.1	44	7.1	0.569	18.8	LOS B	4.3	32.5	0.89	1.03	1.16	49.9
Approach		784	9.7	784	9.7	0.951	32.7	LOS C	18.3	139.0	0.96	1.46	2.28	37.5
East: Mitchell Highway														
4	L2	69	21.2	69	21.2	0.973	80.0	LOS F	18.6	138.5	1.00	1.78	3.63	18.5
5	T1	531	4.0	531	4.0	0.973	77.9	LOS F	18.6	138.5	1.00	1.78	3.62	28.6
6	R2	91	19.8	91	19.8	0.973	86.1	LOS F	18.5	138.7	1.00	1.78	3.62	27.8
Approach		691	7.8	691	7.8	0.973	79.2	LOS F	18.6	138.7	1.00	1.78	3.62	27.7
North: Sheraton Road														
7	L2	112	11.3	112	11.3	0.794	26.1	LOS B	7.9	58.6	0.98	1.26	1.77	43.8
8	T1	368	6.0	368	6.0	0.794	25.3	LOS B	8.0	57.6	0.98	1.26	1.77	33.2
9	R2	195	2.7	195	2.7	0.794	30.7	LOS C	8.0	57.6	0.99	1.26	1.77	43.9
Approach		675	5.9	675	5.9	0.794	27.0	LOS B	8.0	58.6	0.98	1.26	1.77	39.0
West: Mitchell Highway														
10	L2	74	5.7	74	5.7	0.490	8.3	LOS A	3.9	29.4	0.77	0.76	0.79	55.4
11	T1	338	11.2	338	11.2	0.490	8.6	LOS A	3.9	29.4	0.77	0.76	0.79	60.0
12	R2	595	8.5	595	8.5	0.700	18.2	LOS B	8.5	64.1	0.91	0.97	1.16	43.5
Approach		1006	9.2	1006	9.2	0.700	14.3	LOS A	8.5	64.1	0.85	0.88	1.01	51.0
All Vehicles		3156	8.3	3156	8.3	0.973	35.8	LOS C	18.6	139.0	0.94	1.30	2.06	37.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 dev AM (Site Folder: Maximum daily production)]

Network: N101 [2031 Dev AM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	707	11.6	707	11.6	0.522	2.4	LOS A	3.7	28.7	0.14	0.35	0.14	37.9
Approach		707	11.6	707	11.6	0.522	2.4	LOS A	3.7	28.7	0.14	0.35	0.14	37.9
North: Sheraton Road														
8	T1	1035	8.3	1035	8.3	0.751	2.6	LOS A	10.0	75.2	0.25	0.34	0.25	38.5
Approach		1035	8.3	1035	8.3	0.751	2.6	LOS A	10.0	75.2	0.25	0.34	0.25	38.5
All Vehicles		1742	9.7	1742	9.7	0.751	2.5	NA	10.0	75.2	0.21	0.34	0.21	38.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 dev PM (Site Folder: Maximum daily production)]

Network: N101 [2031 Dev PM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	523	10.1	523	10.1	0.853	19.5	LOS B	11.5	87.6	1.00	1.47	1.91	39.1
2	T1	208	10.6	208	10.6	0.435	5.8	LOS A	2.8	21.2	0.80	0.88	0.90	46.0
3	R2	59	7.1	59	7.1	0.435	10.8	LOS A	2.8	21.2	0.80	0.88	0.90	47.1
Approach		791	10.0	791	10.0	0.853	15.2	LOS B	11.5	87.6	0.93	1.27	1.57	41.3
East: Mitchell Highway														
4	L2	18	0.0	18	0.0	0.479	11.6	LOS A	3.4	24.8	0.83	0.95	0.98	49.2
5	T1	420	3.5	420	3.5	0.479	11.9	LOS A	3.4	24.8	0.83	0.96	0.98	57.3
6	R2	169	3.1	169	3.1	0.479	17.9	LOS B	3.4	24.8	0.83	0.98	0.98	53.5
Approach		607	3.3	607	3.3	0.479	13.6	LOS A	3.4	24.8	0.83	0.97	0.98	56.0
North: Sheraton Road														
7	L2	103	11.2	103	11.2	0.390	9.9	LOS A	2.3	18.0	0.81	0.91	0.88	53.8
8	T1	219	11.1	219	11.1	0.390	9.7	LOS A	2.4	17.6	0.81	0.92	0.88	44.9
9	R2	109	3.8	109	3.8	0.390	15.2	LOS B	2.4	17.6	0.81	0.94	0.88	53.3
Approach		432	9.3	432	9.3	0.390	11.2	LOS A	2.4	18.0	0.81	0.92	0.88	50.1
West: Mitchell Highway														
10	L2	128	4.1	128	4.1	0.510	9.1	LOS A	4.2	30.7	0.79	0.81	0.85	55.3
11	T1	325	6.5	325	6.5	0.510	9.4	LOS A	4.2	30.7	0.79	0.81	0.85	59.6
12	R2	387	10.3	387	10.3	0.510	15.6	LOS B	4.2	31.6	0.79	0.87	0.86	46.4
Approach		841	7.9	841	7.9	0.510	12.2	LOS A	4.2	31.6	0.79	0.84	0.85	53.9
All Vehicles		2671	7.7	2671	7.7	0.853	13.3	LOS A	11.5	87.6	0.85	1.01	1.10	49.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 dev PM (Site Folder: Maximum daily production)]

Network: N101 [2031 Dev PM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	DEMAND FLOWS HV] %	ARRIVAL FLOWS [Total veh/h	ARRIVAL FLOWS HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	95% BACK OF QUEUE Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	622	14.2	622	14.2	0.476	2.7	LOS A	3.1	24.0	0.21	0.37	0.21	37.7
Approach		622	14.2	622	14.2	0.476	2.7	LOS A	3.1	24.0	0.21	0.37	0.21	37.7
North: Sheraton Road														
8	T1	387	21.2	387	21.2	0.306	2.6	LOS A	1.5	12.5	0.17	0.36	0.17	38.7
Approach		387	21.2	387	21.2	0.306	2.6	LOS A	1.5	12.5	0.17	0.36	0.17	38.7
All Vehicles		1009	16.9	1009	16.9	0.476	2.7	NA	3.1	24.0	0.19	0.37	0.19	38.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 dev AM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2031 Dev AM cumulative (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total	HV]	ARRIVAL FLOWS [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh.	Dist]	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	841	5.9	730	5.8	1.199	201.9	LOS F	92.4	679.3	1.00	4.44	10.18	11.9
2	T1	427	6.4	371	6.3	0.721	15.0	LOS B	7.1	52.5	0.94	1.14	1.40	47.3
3	R2	77	5.5	67	5.4	0.721	20.9	LOS B	7.1	52.5	0.94	1.14	1.40	48.8
Approach		1345	6.0	1167[N1]	6.0	1.199	132.2	LOS F	92.4	679.3	0.98	3.21	6.89	16.7
East: Mitchell Highway														
4	L2	81	19.5	81	19.5	1.208	242.3	LOS F	50.9	379.1	1.00	2.98	7.75	7.2
5	T1	531	4.0	531	4.0	1.208	240.5	LOS F	50.9	379.1	1.00	2.98	7.74	12.7
6	R2	91	19.8	91	19.8	1.208	248.6	LOS F	50.6	379.0	1.00	2.98	7.74	12.6
Approach		702	7.8	702	7.8	1.208	241.8	LOS F	50.9	379.1	1.00	2.98	7.74	12.1
North: Sheraton Road														
7	L2	112	11.3	112	11.3	1.026	93.8	LOS F	23.2	173.4	1.00	2.07	4.19	24.4
8	T1	407	5.9	407	5.9	1.026	92.7	LOS F	23.7	172.2	1.00	2.07	4.21	15.6
9	R2	195	2.7	195	2.7	1.026	97.8	LOS F	23.7	172.2	1.00	2.07	4.22	24.8
Approach		714	5.9	714	5.9	1.026	94.3	LOS F	23.7	173.4	1.00	2.07	4.21	19.9
West: Mitchell Highway														
10	L2	74	5.7	74	5.7	0.591	12.0	LOS A	5.7	43.7	0.91	0.96	1.10	53.3
11	T1	338	11.2	338	11.2	0.591	12.4	LOS A	5.7	43.7	0.91	0.96	1.10	57.6
12	R2	688	7.6	688	7.6	0.972	53.0	LOS D	30.8	229.4	1.00	1.74	3.00	25.2
Approach		1100	8.6	1100	8.6	0.972	37.8	LOS C	30.8	229.4	0.96	1.45	2.29	35.4
All Vehicles		3861	7.1	3683[N1]	7.4	1.208	117.5	LOS F	92.4	679.3	0.98	2.42	5.16	18.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

[N1] Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 dev AM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2031 Dev AM cumulative (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	DEMAND FLOWS HV] %	ARRIVAL FLOWS [Total veh/h	ARRIVAL FLOWS HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	95% BACK OF QUEUE Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	1268	6.9	1268	6.9	1.144	147.0	LOS F	262.5	1946.3	1.00	0.52	1.33	9.5
Approach		1268	6.9	1268	6.9	1.144	147.0	LOS F	262.5	1946.3	1.00	0.52	1.33	9.5
North: Sheraton Road														
8	T1	1179	7.8	1154	7.6	0.835	2.8	LOS A	16.3	121.6	0.37	0.33	0.37	38.3
Approach		1179	7.8	1154[N1]	7.6	0.835	2.8	LOS A	16.3	121.6	0.37	0.33	0.37	38.3
All Vehicles		2447	7.3	2422[N1]	7.4	1.144	78.3	NA	262.5	1946.3	0.70	0.43	0.87	17.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 dev PM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2031 Dev PM cumulative (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	617	8.9	617	8.9	0.917	24.8	LOS B	17.1	129.0	1.00	1.69	2.27	36.5
2	T1	247	9.8	247	9.8	0.474	5.3	LOS A	3.3	24.8	0.80	0.86	0.90	46.3
3	R2	71	7.5	71	7.5	0.474	10.3	LOS A	3.3	24.8	0.80	0.86	0.90	47.3
Approach		935	9.0	935	9.0	0.917	18.5	LOS B	17.1	129.0	0.93	1.41	1.81	39.5
East: Mitchell Highway														
4	L2	85	1.2	85	1.2	1.201	236.9	LOS F	48.4	347.3	1.00	2.83	7.32	7.3
5	T1	420	3.5	420	3.5	1.201	237.4	LOS F	48.4	347.3	1.00	2.83	7.32	12.9
6	R2	169	3.1	169	3.1	1.201	243.4	LOS F	48.3	347.3	1.00	2.83	7.31	12.8
Approach		675	3.1	675	3.1	1.201	238.9	LOS F	48.4	347.3	1.00	2.83	7.32	12.2
North: Sheraton Road														
7	L2	103	11.2	103	11.2	1.018	95.4	LOS F	21.1	157.8	1.00	1.99	3.97	24.2
8	T1	433	6.1	433	6.1	1.018	94.3	LOS F	21.5	157.0	1.00	1.99	3.98	15.4
9	R2	109	3.8	109	3.8	1.018	99.6	LOS F	21.5	157.0	1.00	1.99	3.99	24.6
Approach		645	6.5	645	6.5	1.018	95.4	LOS F	21.5	157.8	1.00	1.99	3.98	18.7
West: Mitchell Highway														
10	L2	128	4.1	128	4.1	0.566	10.3	LOS A	5.2	38.1	0.84	0.88	0.97	54.7
11	T1	325	6.5	325	6.5	0.566	10.6	LOS A	5.2	38.1	0.84	0.88	0.97	59.3
12	R2	773	5.4	773	5.4	0.961	45.2	LOS D	30.5	223.6	1.00	1.62	2.73	27.8
Approach		1226	5.6	1226	5.6	0.961	32.4	LOS C	30.5	223.6	0.94	1.34	2.08	37.9
All Vehicles		3481	6.2	3481	6.2	1.201	80.4	LOS F	48.4	347.3	0.96	1.77	3.37	22.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 dev PM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2031 Dev PM cumulative (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
2	T1	766	12.2	766	12.2	0.580	2.8	LOS A	4.6	35.3	0.26	0.37	0.26	37.5
Approach		766	12.2	766	12.2	0.580	2.8	LOS A	4.6	35.3	0.26	0.37	0.26	37.5
North: Sheraton Road														
8	T1	1054	8.3	1036	8.4	0.770	3.3	LOS A	10.3	77.5	0.43	0.38	0.43	38.2
Approach		1054	8.3	1036[N1]	8.4	0.770	3.3	LOS A	10.3	77.5	0.43	0.38	0.43	38.2
All Vehicles		1820	9.9	1802[N1]	10.0	0.770	3.1	NA	10.3	77.5	0.36	0.38	0.36	38.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2046 baseline AM (Site Folder: Maximum daily production)]

Network: N101 [2046 Baseline AM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	577	5.7	577	5.7	1.002	60.2	LOS E	28.4	208.4	1.00	2.08	3.95	27.8
2	T1	305	10.0	305	10.0	0.642	13.9	LOS A	5.4	41.0	0.91	1.08	1.26	48.1
3	R2	54	5.9	54	5.9	0.642	19.5	LOS B	5.4	41.0	0.91	1.08	1.26	49.6
Approach		936	7.1	936	7.1	1.002	42.8	LOS D	28.4	208.4	0.97	1.70	2.92	33.4
East: Mitchell Highway														
4	L2	78	20.3	78	20.3	1.282	299.5	LOS F	66.7	496.0	1.00	3.49	9.46	5.9
5	T1	603	4.0	603	4.0	1.282	297.8	LOS F	66.7	496.0	1.00	3.48	9.44	10.6
6	R2	102	19.6	102	19.6	1.282	305.7	LOS F	66.2	495.9	1.00	3.48	9.42	10.6
Approach		783	7.7	783	7.7	1.282	299.0	LOS F	66.7	496.0	1.00	3.48	9.44	10.2
North: Sheraton Road														
7	L2	137	11.5	137	11.5	1.152	177.6	LOS F	46.6	348.0	1.00	3.06	7.15	15.7
8	T1	452	5.8	452	5.8	1.152	176.6	LOS F	48.0	347.4	1.00	3.07	7.19	9.3
9	R2	239	2.6	239	2.6	1.152	181.8	LOS F	48.0	347.4	1.00	3.08	7.25	16.0
Approach		827	5.9	827	5.9	1.152	178.3	LOS F	48.0	348.0	1.00	3.07	7.20	12.5
West: Mitchell Highway														
10	L2	83	5.1	83	5.1	0.600	10.8	LOS A	5.9	45.0	0.87	0.91	1.04	54.3
11	T1	383	11.0	383	11.0	0.600	11.2	LOS A	5.9	45.0	0.87	0.91	1.04	58.6
12	R2	653	5.2	653	5.2	0.814	23.7	LOS B	13.3	97.2	1.00	1.14	1.54	39.0
Approach		1119	7.1	1119	7.1	0.814	18.5	LOS B	13.3	97.2	0.95	1.04	1.33	47.8
All Vehicles		3665	7.0	3665	7.0	1.282	120.7	LOS F	66.7	496.0	0.98	2.19	4.79	18.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2046 baseline AM (Site Folder: Maximum daily production)]

Network: N101 [2046 Baseline AM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
2	T1	844	9.0	844	9.0	0.615	2.4	LOS A	5.4	40.8	0.17	0.35	0.17	37.8
Approach		844	9.0	844	9.0	0.615	2.4	LOS A	5.4	40.8	0.17	0.35	0.17	37.8
North: Sheraton Road														
8	T1	1245	6.4	1169	6.3	0.840	2.8	LOS A	16.9	124.3	0.38	0.33	0.38	38.3
Approach		1245	6.4	1169[N1]	6.3	0.840	2.8	LOS A	16.9	124.3	0.38	0.33	0.38	38.3
All Vehicles		2089	7.5	2013[N1]	7.7	0.840	2.7	NA	16.9	124.3	0.29	0.34	0.29	38.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: EMM CONSULTING | Licence: NETWORK / 1PC | Processed: Tuesday, May 25, 2021 4:24:41 PM
Project: \\emmsvr1\EMM3\2021\J210189 - Dubbo Quarry Continuation Project RtS\Technical studies\Transport\SIDRA\SIDRA v0.3 Additional scenarios.sip9

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2046 baseline PM (Site Folder: Maximum daily production)]

Network: N101 [2046 Baseline PM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	617	6.3	617	6.3	1.115	132.5	LOS F	57.1	421.7	1.00	4.20	7.41	15.6
2	T1	256	10.3	256	10.3	0.610	10.0	LOS A	4.8	36.3	0.90	1.07	1.21	43.3
3	R2	73	7.2	73	7.2	0.610	14.9	LOS B	4.8	36.3	0.90	1.07	1.21	44.2
Approach		945	7.5	945	7.5	1.115	90.3	LOS F	57.1	421.7	0.96	3.11	5.25	20.3
East: Mitchell Highway														
4	L2	20	0.0	20	0.0	0.608	15.5	LOS B	5.2	37.0	0.91	1.06	1.26	44.7
5	T1	477	3.3	477	3.3	0.608	15.9	LOS B	5.2	37.0	0.91	1.06	1.26	54.1
6	R2	192	2.7	192	2.7	0.608	21.9	LOS B	5.2	37.0	0.91	1.08	1.26	50.7
Approach		688	3.1	688	3.1	0.608	17.6	LOS B	5.2	37.0	0.91	1.07	1.26	52.9
North: Sheraton Road														
7	L2	126	11.7	126	11.7	0.539	13.3	LOS A	3.8	29.3	0.89	1.02	1.13	51.3
8	T1	268	11.0	268	11.0	0.539	13.1	LOS A	3.9	28.7	0.89	1.02	1.13	41.7
9	R2	134	3.9	134	3.9	0.539	18.4	LOS B	3.9	28.7	0.89	1.03	1.12	51.0
Approach		528	9.4	528	9.4	0.539	14.5	LOS A	3.9	29.3	0.89	1.02	1.13	47.4
West: Mitchell Highway														
10	L2	145	3.6	145	3.6	0.625	12.7	LOS A	6.5	47.5	0.91	0.98	1.15	52.9
11	T1	369	6.6	369	6.6	0.625	13.0	LOS A	6.5	47.4	0.91	0.99	1.15	56.6
12	R2	416	5.1	416	5.1	0.625	18.9	LOS B	6.5	47.4	0.91	1.00	1.15	43.3
Approach		931	5.4	931	5.4	0.625	15.6	LOS B	6.5	47.5	0.91	0.99	1.15	51.1
All Vehicles		3093	6.2	3093	6.2	1.115	38.7	LOS C	57.1	421.7	0.92	1.66	2.42	35.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2046 baseline PM (Site Folder: Maximum daily production)]

Network: N101 [2046 Baseline PM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	739	11.3	739	11.3	0.605	2.8	LOS A	5.0	38.6	0.25	0.37	0.25	37.6
Approach		739	11.3	739	11.3	0.605	2.8	LOS A	5.0	38.6	0.25	0.37	0.25	37.6
North: Sheraton Road														
8	T1	451	16.8	451	16.8	0.349	2.6	LOS A	1.8	14.6	0.17	0.36	0.17	38.7
Approach		451	16.8	451	16.8	0.349	2.6	LOS A	1.8	14.6	0.17	0.36	0.17	38.7
All Vehicles		1189	13.4	1189	13.4	0.605	2.7	NA	5.0	38.6	0.22	0.37	0.22	38.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2046 dev AM (Site Folder: Maximum daily production)]

Network: N101 [2046 Dev AM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	598	9.0	598	9.0	1.037	79.0	LOS F	36.7	276.7	1.00	2.44	4.86	23.5
2	T1	305	10.0	305	10.0	0.624	13.2	LOS A	5.2	39.3	0.90	1.06	1.22	48.7
3	R2	54	5.9	54	5.9	0.624	18.8	LOS B	5.2	39.3	0.90	1.06	1.22	50.2
Approach		957	9.1	957	9.1	1.037	54.6	LOS D	36.7	276.7	0.96	1.92	3.49	29.4
East: Mitchell Highway														
4	L2	78	20.3	78	20.3	1.307	320.7	LOS F	70.3	522.6	1.00	3.56	9.71	5.6
5	T1	603	4.0	603	4.0	1.307	319.1	LOS F	70.3	522.6	1.00	3.56	9.69	10.0
6	R2	102	19.6	102	19.6	1.307	327.0	LOS F	69.8	522.5	1.00	3.56	9.67	10.0
Approach		783	7.7	783	7.7	1.307	320.3	LOS F	70.3	522.6	1.00	3.56	9.69	9.6
North: Sheraton Road														
7	L2	137	11.5	137	11.5	1.208	224.2	LOS F	56.0	418.3	1.00	3.42	8.27	13.1
8	T1	452	5.8	452	5.8	1.208	223.3	LOS F	57.7	418.1	1.00	3.43	8.32	7.6
9	R2	239	2.6	239	2.6	1.208	228.5	LOS F	57.7	418.1	1.00	3.45	8.40	13.4
Approach		827	5.9	827	5.9	1.208	225.0	LOS F	57.7	418.3	1.00	3.43	8.33	10.3
West: Mitchell Highway														
10	L2	83	5.1	83	5.1	0.598	10.7	LOS A	5.9	44.7	0.87	0.91	1.03	54.3
11	T1	383	11.0	383	11.0	0.598	11.2	LOS A	5.9	44.7	0.87	0.91	1.03	58.7
12	R2	674	8.1	674	8.1	0.854	26.8	LOS B	15.9	119.2	1.00	1.21	1.70	36.9
Approach		1140	8.9	1140	8.9	0.854	20.4	LOS B	15.9	119.2	0.95	1.09	1.43	46.2
All Vehicles		3707	8.0	3707	8.0	1.307	138.2	LOS F	70.3	522.6	0.97	2.35	5.25	16.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2046 dev AM (Site Folder: Maximum daily production)]

Network: N101 [2046 Dev AM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
2	T1	865	11.2	865	11.2	0.645	2.5	LOS A	6.1	47.1	0.18	0.35	0.18	37.8
Approach		865	11.2	865	11.2	0.645	2.5	LOS A	6.1	47.1	0.18	0.35	0.18	37.8
North: Sheraton Road														
8	T1	1266	8.0	1170	7.9	0.848	2.9	LOS A	17.8	133.3	0.40	0.33	0.40	38.3
Approach		1266	8.0	1170[N1]	7.9	0.848	2.9	LOS A	17.8	133.3	0.40	0.33	0.40	38.3
All Vehicles		2132	9.3	2035[N1]	9.7	0.848	2.7	NA	17.8	133.3	0.31	0.34	0.31	38.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2046 dev PM (Site Folder: Maximum daily production)]

Network: N101 [2046 Dev PM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total	HV]	ARRIVAL FLOWS [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh.	Dist]	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	638	9.4	638	9.4	1.187	191.5	LOS F	78.3	592.1	1.00	5.33	9.63	11.9
2	T1	256	10.3	256	10.3	0.612	10.0	LOS A	4.8	36.6	0.90	1.07	1.21	43.3
3	R2	73	7.2	73	7.2	0.612	15.0	LOS B	4.8	36.6	0.90	1.07	1.21	44.2
Approach		966	9.5	966	9.5	1.187	130.2	LOS F	78.3	592.1	0.97	3.88	6.77	15.9
East: Mitchell Highway														
4	L2	20	0.0	20	0.0	0.636	17.0	LOS B	5.6	40.3	0.93	1.09	1.34	43.3
5	T1	477	3.3	477	3.3	0.636	17.4	LOS B	5.6	40.3	0.93	1.09	1.34	52.9
6	R2	192	2.7	192	2.7	0.636	23.4	LOS B	5.6	40.3	0.93	1.10	1.34	49.7
Approach		688	3.1	688	3.1	0.636	19.1	LOS B	5.6	40.3	0.93	1.09	1.34	51.8
North: Sheraton Road														
7	L2	126	11.7	126	11.7	0.562	14.2	LOS A	4.1	31.1	0.90	1.03	1.17	50.6
8	T1	268	11.0	268	11.0	0.562	14.0	LOS A	4.1	30.5	0.90	1.04	1.17	41.0
9	R2	134	3.9	134	3.9	0.562	19.3	LOS B	4.1	30.5	0.90	1.05	1.17	50.4
Approach		528	9.4	528	9.4	0.562	15.4	LOS B	4.1	31.1	0.90	1.04	1.17	46.7
West: Mitchell Highway														
10	L2	145	3.6	145	3.6	0.649	13.3	LOS A	7.0	51.6	0.92	1.01	1.20	52.5
11	T1	369	6.6	369	6.6	0.649	13.6	LOS A	7.0	51.6	0.92	1.01	1.20	56.3
12	R2	437	9.6	437	9.6	0.649	19.8	LOS B	7.0	52.8	0.92	1.03	1.20	42.4
Approach		952	7.5	952	7.5	0.649	16.4	LOS B	7.0	52.8	0.92	1.02	1.20	50.3
All Vehicles		3135	7.5	3135	7.5	1.187	51.9	LOS D	78.3	592.1	0.93	1.92	2.94	30.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2046 dev PM (Site Folder: Maximum daily production)]

Network: N101 [2046 Dev PM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	760	13.7	760	13.7	0.686	2.9	LOS A	7.0	54.8	0.28	0.37	0.28	37.5
Approach		760	13.7	760	13.7	0.686	2.9	LOS A	7.0	54.8	0.28	0.37	0.28	37.5
North: Sheraton Road														
8	T1	472	20.5	472	20.5	0.372	2.7	LOS A	2.0	16.6	0.18	0.37	0.18	38.6
Approach		472	20.5	472	20.5	0.372	2.7	LOS A	2.0	16.6	0.18	0.37	0.18	38.6
All Vehicles		1232	16.3	1232	16.3	0.686	2.8	NA	7.0	54.8	0.25	0.37	0.25	38.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2046 dev AM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2046 Dev AM cumulative (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	1181	4.7	742	4.6	1.166	173.4	LOS F	83.9	610.4	1.00	4.07	9.15	13.4
2	T1	600	5.4	377	5.3	0.701	13.9	LOS A	6.9	50.2	0.94	1.11	1.34	48.1
3	R2	107	3.9	68	3.8	0.701	19.7	LOS B	6.9	50.2	0.94	1.11	1.34	50.0
Approach		1888	4.9	1187 N1	4.7	1.166	114.0	LOS F	83.9	610.4	0.98	2.96	6.22	18.6
East: Mitchell Highway														
4	L2	96	17.6	96	17.6	1.354	359.9	LOS F	78.2	581.5	1.00	3.75	10.33	5.0
5	T1	603	4.0	603	4.0	1.354	358.6	LOS F	78.2	581.5	1.00	3.75	10.31	9.1
6	R2	102	19.6	102	19.6	1.354	366.4	LOS F	77.7	581.2	1.00	3.75	10.29	9.0
Approach		801	7.6	801	7.6	1.354	359.7	LOS F	78.2	581.5	1.00	3.75	10.31	8.6
North: Sheraton Road														
7	L2	137	11.5	137	11.5	1.419	405.2	LOS F	92.5	688.3	1.00	4.57	11.79	8.0
8	T1	515	5.5	515	5.5	1.419	404.4	LOS F	95.2	689.2	1.00	4.58	11.87	4.5
9	R2	239	2.6	239	2.6	1.419	409.8	LOS F	95.2	689.2	1.00	4.60	11.98	8.2
Approach		891	5.7	891	5.7	1.419	405.9	LOS F	95.2	689.2	1.00	4.58	11.89	6.1
West: Mitchell Highway														
10	L2	83	5.1	83	5.1	0.670	14.0	LOS A	7.5	57.2	0.96	1.04	1.26	51.9
11	T1	383	11.0	383	11.0	0.670	14.4	LOS A	7.5	57.2	0.96	1.04	1.26	55.8
12	R2	829	6.9	829	6.9	1.167	183.2	LOS F	97.8	724.9	1.00	3.69	8.16	9.7
Approach		1296	8.0	1296	8.0	1.167	122.4	LOS F	97.8	724.9	0.98	2.74	5.68	16.6
All Vehicles		4876	6.3	4174 N1	7.4	1.419	226.0	LOS F	97.8	724.9	0.99	3.39	8.05	10.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2046 dev AM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2046 Dev AM cumulative (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
2	T1	1797	5.7	1797	5.7	1.559	516.2	LOS F	448.4	3291.7	1.00	0.89	1.86	3.3
Approach		1797	5.7	1797	5.7	1.559	516.2	LOS F	448.4	3291.7	1.00	0.89	1.86	3.3
North: Sheraton Road														
8	T1	1503	7.1	1199	7.1	0.865	2.9	LOS A	20.2	150.3	0.45	0.33	0.45	38.2
Approach		1503	7.1	1199[N1]	7.1	0.865	2.9	LOS A	20.2	150.3	0.45	0.33	0.45	38.2
All Vehicles		3300	6.3	2996[N1]	7.0	1.559	310.8	NA	448.4	3291.7	0.78	0.67	1.30	6.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2046 dev PM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2046 Dev PM cumulative (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	794	7.8	794	7.8	1.223	218.1	LOS F	100.8	753.1	1.00	6.29	10.90	10.8
2	T1	319	8.9	319	8.9	0.634	8.3	LOS A	5.6	41.9	0.90	1.06	1.18	44.3
3	R2	91	7.0	91	7.0	0.634	13.4	LOS A	5.6	41.9	0.90	1.06	1.18	45.4
Approach		1203	8.0	1203	8.0	1.223	147.1	LOS F	100.8	753.1	0.96	4.51	7.59	14.6
East: Mitchell Highway														
4	L2	108	1.0	108	1.0	1.217	243.0	LOS F	56.7	406.2	1.00	3.12	8.24	7.1
5	T1	477	3.3	477	3.3	1.217	243.5	LOS F	56.7	406.2	1.00	3.12	8.23	12.6
6	R2	192	2.7	192	2.7	1.217	249.4	LOS F	56.6	406.3	1.00	3.11	8.23	12.5
Approach		777	2.8	777	2.8	1.217	244.9	LOS F	56.7	406.3	1.00	3.12	8.23	11.9
North: Sheraton Road														
7	L2	126	11.7	126	11.7	1.338	334.8	LOS F	78.7	585.0	1.00	4.17	10.55	9.4
8	T1	599	5.3	599	5.3	1.338	333.9	LOS F	80.3	585.4	1.00	4.18	10.60	5.3
9	R2	134	3.9	134	3.9	1.338	339.5	LOS F	80.3	585.4	1.00	4.19	10.65	9.6
Approach		859	6.0	859	6.0	1.338	334.9	LOS F	80.3	585.4	1.00	4.18	10.60	6.7
West: Mitchell Highway														
10	L2	145	3.6	145	3.6	0.750	18.0	LOS B	10.0	73.4	1.00	1.16	1.51	49.2
11	T1	369	6.6	369	6.6	0.750	18.3	LOS B	10.0	73.4	1.00	1.16	1.51	52.9
12	R2	1055	4.2	1055	4.2	1.520	490.9	LOS F	246.4	1787.1	1.00	6.75	16.71	4.0
Approach		1569	4.7	1569	4.7	1.520	335.9	LOS F	246.4	1787.1	1.00	4.92	11.73	7.0
All Vehicles		4408	5.5	4408	5.5	1.520	268.1	LOS F	246.4	1787.1	0.99	4.35	9.76	9.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2046 dev PM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2046 Dev PM cumulative (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	997	11.0	997	11.0	1.000	31.7	LOS C	114.5	876.7	1.00	0.54	1.18	23.7
Approach		997	11.0	997	11.0	1.000	31.7	LOS C	114.5	876.7	1.00	0.54	1.18	23.7
North: Sheraton Road														
8	T1	1508	6.8	1055	7.4	0.780	3.3	LOS A	10.9	81.1	0.45	0.38	0.45	38.2
Approach		1508	6.8	1055[N1]	7.4	0.780	3.3	LOS A	10.9	81.1	0.45	0.38	0.45	38.2
All Vehicles		2505	8.4	2052[N1]	10.3	1.000	17.1	NA	114.5	876.7	0.72	0.46	0.80	31.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

[N1] Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 baseline AM sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Baseline AM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total	HV]	ARRIVAL FLOWS [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh.	Dist]	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	469	5.6	469	5.6	0.898	31.6	LOS C	13.4	98.1	1.00	1.48	2.32	38.0
2	T1	249	10.1	249	10.1	0.581	13.5	LOS A	4.4	33.1	0.90	1.04	1.18	48.4
3	R2	44	7.1	44	7.1	0.581	19.2	LOS B	4.4	33.1	0.90	1.04	1.18	49.6
Approach		763	7.2	763	7.2	0.898	25.0	LOS B	13.4	98.1	0.96	1.31	1.88	41.6
East: Mitchell Highway														
4	L2	75	21.1	75	21.1	1.067	130.4	LOS F	31.7	236.3	1.00	2.31	5.40	12.4
5	T1	571	4.1	571	4.1	1.067	128.4	LOS F	31.7	236.3	1.00	2.31	5.39	20.6
6	R2	97	19.6	97	19.6	1.067	136.5	LOS F	31.6	236.5	1.00	2.31	5.39	20.2
Approach		742	7.8	742	7.8	1.067	129.7	LOS F	31.7	236.5	1.00	2.31	5.39	19.8
North: Sheraton Road														
7	L2	112	11.3	112	11.3	0.835	30.9	LOS C	8.8	66.1	0.99	1.33	1.97	41.5
8	T1	368	6.0	368	6.0	0.835	30.1	LOS C	9.0	65.0	1.00	1.33	1.97	30.7
9	R2	195	2.7	195	2.7	0.835	35.4	LOS C	9.0	65.0	1.00	1.32	1.96	41.7
Approach		675	5.9	675	5.9	0.835	31.7	LOS C	9.0	66.1	1.00	1.33	1.96	36.6
West: Mitchell Highway														
10	L2	79	5.3	79	5.3	0.526	8.7	LOS A	4.4	33.8	0.79	0.79	0.85	55.3
11	T1	362	11.0	362	11.0	0.526	9.1	LOS A	4.4	33.8	0.79	0.79	0.85	59.8
12	R2	616	5.1	616	5.1	0.711	18.3	LOS B	8.9	65.2	0.92	0.97	1.17	43.4
Approach		1057	7.2	1057	7.2	0.711	14.4	LOS A	8.9	65.2	0.87	0.90	1.04	51.0
All Vehicles		3237	7.1	3237	7.1	1.067	46.9	LOS D	31.7	236.5	0.95	1.41	2.43	32.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 baseline AM sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Baseline AM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	686	8.9	686	8.9	0.500	2.4	LOS A	3.4	25.8	0.13	0.35	0.13	37.9
Approach		686	8.9	686	8.9	0.500	2.4	LOS A	3.4	25.8	0.13	0.35	0.13	37.9
North: Sheraton Road														
8	T1	1014	6.4	1009	6.4	0.726	2.5	LOS A	8.8	65.3	0.23	0.34	0.23	38.6
Approach		1014	6.4	1009 N1	6.4	0.726	2.5	LOS A	8.8	65.3	0.23	0.34	0.23	38.6
All Vehicles		1700	7.4	1696 N1	7.4	0.726	2.5	NA	8.8	65.3	0.19	0.35	0.19	38.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 baseline PM sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Baseline PM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	502	6.3	502	6.3	0.837	18.6	LOS B	10.6	77.9	1.00	1.43	1.84	39.6
2	T1	208	10.6	208	10.6	0.458	6.6	LOS A	3.0	22.8	0.82	0.91	0.95	45.5
3	R2	59	7.1	59	7.1	0.458	11.5	LOS A	3.0	22.8	0.82	0.91	0.95	46.5
Approach		769	7.5	769	7.5	0.837	14.8	LOS B	10.6	77.9	0.94	1.25	1.53	41.6
East: Mitchell Highway														
4	L2	19	0.0	19	0.0	0.511	12.0	LOS A	3.8	27.7	0.85	0.97	1.03	48.7
5	T1	451	3.5	451	3.5	0.511	12.4	LOS A	3.8	27.6	0.85	0.98	1.03	56.9
6	R2	181	2.9	181	2.9	0.511	18.4	LOS B	3.8	27.6	0.85	1.00	1.03	53.2
Approach		651	3.2	651	3.2	0.511	14.0	LOS A	3.8	27.7	0.85	0.99	1.03	55.7
North: Sheraton Road														
7	L2	103	11.2	103	11.2	0.401	10.3	LOS A	2.4	18.8	0.82	0.92	0.91	53.5
8	T1	219	11.1	219	11.1	0.401	10.1	LOS A	2.5	18.4	0.82	0.93	0.91	44.5
9	R2	109	3.8	109	3.8	0.401	15.5	LOS B	2.5	18.4	0.82	0.95	0.90	53.0
Approach		432	9.3	432	9.3	0.401	11.5	LOS A	2.5	18.8	0.82	0.93	0.91	49.8
West: Mitchell Highway														
10	L2	138	3.8	138	3.8	0.533	9.6	LOS A	4.6	33.6	0.81	0.84	0.90	55.1
11	T1	349	6.6	349	6.6	0.533	9.9	LOS A	4.6	33.5	0.81	0.84	0.90	59.2
12	R2	393	5.1	393	5.1	0.533	15.8	LOS B	4.6	33.5	0.81	0.88	0.90	46.3
Approach		880	5.5	880	5.5	0.533	12.5	LOS A	4.6	33.6	0.81	0.86	0.90	53.8
All Vehicles		2732	6.1	2732	6.1	0.837	13.4	LOS A	10.6	77.9	0.86	1.01	1.11	49.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 baseline PM sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Baseline PM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	601	11.2	601	11.2	0.453	2.7	LOS A	2.8	21.4	0.20	0.37	0.20	37.7
Approach		601	11.2	601	11.2	0.453	2.7	LOS A	2.8	21.4	0.20	0.37	0.20	37.7
North: Sheraton Road														
8	T1	366	16.7	366	16.7	0.284	2.6	LOS A	1.4	10.8	0.16	0.36	0.16	38.7
Approach		366	16.7	366	16.7	0.284	2.6	LOS A	1.4	10.8	0.16	0.36	0.16	38.7
All Vehicles		967	13.3	967	13.3	0.453	2.6	NA	2.8	21.4	0.19	0.36	0.19	38.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 dev AM sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Dev AM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	491	9.7	491	9.7	0.924	35.9	LOS C	15.6	118.4	1.00	1.58	2.57	35.9
2	T1	249	10.1	249	10.1	0.553	12.4	LOS A	4.1	30.8	0.88	1.02	1.12	49.3
3	R2	44	7.1	44	7.1	0.553	18.1	LOS B	4.1	30.8	0.88	1.02	1.12	50.5
Approach		784	9.7	784	9.7	0.924	27.4	LOS B	15.6	118.4	0.96	1.37	2.03	40.1
East: Mitchell Highway														
4	L2	75	21.1	75	21.1	1.130	177.1	LOS F	41.5	309.4	1.00	2.67	6.62	9.6
5	T1	571	4.1	571	4.1	1.130	175.2	LOS F	41.5	309.4	1.00	2.67	6.62	16.4
6	R2	97	19.6	97	19.6	1.130	183.2	LOS F	41.3	309.6	1.00	2.67	6.61	16.1
Approach		742	7.8	742	7.8	1.130	176.4	LOS F	41.5	309.6	1.00	2.67	6.62	15.7
North: Sheraton Road														
7	L2	112	11.3	112	11.3	0.879	38.5	LOS C	10.4	77.5	1.00	1.42	2.25	38.3
8	T1	368	6.0	368	6.0	0.879	37.6	LOS C	10.5	76.3	1.00	1.42	2.25	27.5
9	R2	195	2.7	195	2.7	0.879	42.8	LOS D	10.5	76.3	1.00	1.42	2.25	38.6
Approach		675	5.9	675	5.9	0.879	39.2	LOS C	10.5	77.5	1.00	1.42	2.25	33.4
West: Mitchell Highway														
10	L2	79	5.3	79	5.3	0.522	8.6	LOS A	4.4	33.2	0.78	0.79	0.83	55.3
11	T1	362	11.0	362	11.0	0.522	9.0	LOS A	4.4	33.2	0.78	0.79	0.83	59.9
12	R2	637	8.3	637	8.3	0.745	19.4	LOS B	10.1	75.8	0.95	1.00	1.26	42.5
Approach		1078	9.0	1078	9.0	0.745	15.1	LOS B	10.1	75.8	0.88	0.91	1.08	50.3
All Vehicles		3279	8.3	3279	8.3	1.130	59.5	LOS E	41.5	309.6	0.95	1.52	2.80	28.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 dev AM sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Dev AM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
2	T1	707	11.6	707	11.6	0.522	2.4	LOS A	3.7	28.7	0.14	0.35	0.14	37.9
Approach		707	11.6	707	11.6	0.522	2.4	LOS A	3.7	28.7	0.14	0.35	0.14	37.9
North: Sheraton Road														
8	T1	1035	8.3	1026	8.2	0.745	2.6	LOS A	9.7	72.8	0.25	0.34	0.25	38.5
Approach		1035	8.3	1026[N1]	8.2	0.745	2.6	LOS A	9.7	72.8	0.25	0.34	0.25	38.5
All Vehicles		1742	9.7	1734[N1]	9.7	0.745	2.5	NA	9.7	72.8	0.20	0.34	0.20	38.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 dev PM sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Dev PM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	523	10.1	523	10.1	0.902	26.4	LOS B	14.2	108.2	1.00	1.66	2.29	35.8
2	T1	208	10.6	208	10.6	0.460	6.6	LOS A	3.0	23.0	0.83	0.92	0.95	45.4
3	R2	59	7.1	59	7.1	0.460	11.6	LOS A	3.0	23.0	0.83	0.92	0.95	46.5
Approach		791	10.0	791	10.0	0.902	20.1	LOS B	14.2	108.2	0.94	1.41	1.84	38.7
East: Mitchell Highway														
4	L2	19	0.0	19	0.0	0.534	12.9	LOS A	4.1	29.9	0.87	1.00	1.09	47.6
5	T1	451	3.5	451	3.5	0.534	13.3	LOS A	4.1	29.8	0.87	1.00	1.09	56.2
6	R2	181	2.9	181	2.9	0.534	19.3	LOS B	4.1	29.8	0.87	1.02	1.09	52.5
Approach		651	3.2	651	3.2	0.534	14.9	LOS B	4.1	29.9	0.87	1.01	1.09	54.9
North: Sheraton Road														
7	L2	103	11.2	103	11.2	0.417	10.9	LOS A	2.6	19.8	0.84	0.94	0.94	53.1
8	T1	219	11.1	219	11.1	0.417	10.7	LOS A	2.6	19.4	0.84	0.95	0.94	43.9
9	R2	109	3.8	109	3.8	0.417	16.1	LOS B	2.6	19.4	0.84	0.96	0.94	52.6
Approach		432	9.3	432	9.3	0.417	12.1	LOS A	2.6	19.8	0.84	0.95	0.94	49.3
West: Mitchell Highway														
10	L2	138	3.8	138	3.8	0.554	10.0	LOS A	5.0	36.4	0.82	0.85	0.93	55.0
11	T1	349	6.6	349	6.6	0.554	10.2	LOS A	5.0	36.4	0.82	0.86	0.93	59.2
12	R2	414	9.9	414	9.9	0.554	16.5	LOS B	4.9	37.4	0.82	0.90	0.94	45.6
Approach		901	7.7	901	7.7	0.554	13.1	LOS A	5.0	37.4	0.82	0.88	0.94	53.3
All Vehicles		2774	7.6	2774	7.6	0.902	15.3	LOS B	14.2	108.2	0.87	1.07	1.23	48.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 dev PM sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Dev PM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	622	14.2	622	14.2	0.476	2.7	LOS A	3.1	24.0	0.21	0.37	0.21	37.7
Approach		622	14.2	622	14.2	0.476	2.7	LOS A	3.1	24.0	0.21	0.37	0.21	37.7
North: Sheraton Road														
8	T1	387	21.2	387	21.2	0.306	2.6	LOS A	1.5	12.5	0.17	0.36	0.17	38.7
Approach		387	21.2	387	21.2	0.306	2.6	LOS A	1.5	12.5	0.17	0.36	0.17	38.7
All Vehicles		1009	16.9	1009	16.9	0.476	2.7	NA	3.1	24.0	0.19	0.37	0.19	38.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: EMM CONSULTING | Licence: NETWORK / 1PC | Processed: Tuesday, May 25, 2021 2:38:43 PM
Project: \\emmsvr1\EMM3\2021\J210189 - Dubbo Quarry Continuation Project RtS\Technical studies\Transport\SIDRA\SIDRA v0.3 Additional scenarios.sip9

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 dev AM cumulative sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Dev AM cumulative (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total	HV]	ARRIVAL FLOWS [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh.	Dist]	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	841	5.9	734	5.8	1.181	186.3	LOS F	87.6	643.7	1.00	4.26	9.62	12.7
2	T1	427	6.4	373	6.3	0.710	14.4	LOS A	6.9	51.1	0.94	1.12	1.36	47.8
3	R2	77	5.5	67	5.4	0.710	20.2	LOS B	6.9	51.1	0.94	1.12	1.36	49.3
Approach		1345	6.0	1174[N1]	6.0	1.181	122.2	LOS F	87.6	643.7	0.98	3.08	6.53	17.7
East: Mitchell Highway														
4	L2	86	19.5	86	19.5	1.303	319.1	LOS F	67.4	502.8	1.00	3.47	9.39	5.6
5	T1	571	4.1	571	4.1	1.303	317.5	LOS F	67.4	502.8	1.00	3.47	9.38	10.1
6	R2	97	19.6	97	19.6	1.303	325.4	LOS F	67.2	502.7	1.00	3.46	9.37	10.0
Approach		754	7.8	754	7.8	1.303	318.7	LOS F	67.4	502.8	1.00	3.47	9.38	9.6
North: Sheraton Road														
7	L2	112	11.3	112	11.3	1.095	140.0	LOS F	33.0	246.0	1.00	2.51	5.54	18.7
8	T1	407	5.9	407	5.9	1.095	138.9	LOS F	33.8	245.3	1.00	2.51	5.57	11.4
9	R2	195	2.7	195	2.7	1.095	144.0	LOS F	33.8	245.3	1.00	2.52	5.60	19.0
Approach		714	5.9	714	5.9	1.095	140.5	LOS F	33.8	246.0	1.00	2.52	5.57	14.9
West: Mitchell Highway														
10	L2	79	5.3	79	5.3	0.633	12.9	LOS A	6.6	50.3	0.93	1.00	1.18	52.6
11	T1	362	11.0	362	11.0	0.633	13.4	LOS A	6.6	50.3	0.93	1.00	1.18	56.7
12	R2	731	7.5	731	7.5	1.030	81.0	LOS F	46.1	343.6	1.00	2.22	4.26	18.8
Approach		1172	8.4	1172	8.4	1.030	55.5	LOS D	46.1	343.6	0.97	1.76	3.10	28.7
All Vehicles		3984	7.1	3813[N1]	7.4	1.303	144.0	LOS F	87.6	643.7	0.98	2.65	5.86	15.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 dev AM cumulative sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Dev AM cumulative (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Sheraton Road														
2	T1	1268	6.9	1268	6.9	1.116	122.7	LOS F	250.2	1854.6	1.00	0.49	1.28	10.8
Approach		1268	6.9	1268	6.9	1.116	122.7	LOS F	250.2	1854.6	1.00	0.49	1.28	10.8
North: Sheraton Road														
8	T1	1179	7.8	1103	7.6	0.798	2.7	LOS A	13.0	96.7	0.31	0.34	0.31	38.4
Approach		1179	7.8	1103[N1]	7.6	0.798	2.7	LOS A	13.0	96.7	0.31	0.34	0.31	38.4
All Vehicles		2447	7.3	2372[N1]	7.5	1.116	66.9	NA	250.2	1854.6	0.68	0.42	0.83	18.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

[N1] Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 dev PM cumulative sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Dev PM cumulative (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	617	8.9	617	8.9	0.903	22.2	LOS B	15.9	120.0	1.00	1.62	2.12	37.7
2	T1	247	9.8	247	9.8	0.467	5.0	LOS A	3.2	24.2	0.80	0.83	0.89	46.3
3	R2	71	7.5	71	7.5	0.467	10.1	LOS A	3.2	24.2	0.80	0.83	0.89	47.4
Approach		935	9.0	935	9.0	0.903	16.8	LOS B	15.9	120.0	0.93	1.35	1.70	40.4
East: Mitchell Highway														
4	L2	86	1.2	86	1.2	1.293	311.9	LOS F	63.6	456.5	1.00	3.26	8.79	5.7
5	T1	451	3.5	451	3.5	1.293	312.3	LOS F	63.6	456.5	1.00	3.26	8.78	10.2
6	R2	181	2.9	181	2.9	1.293	318.3	LOS F	63.5	456.5	1.00	3.26	8.78	10.2
Approach		718	3.1	718	3.1	1.293	313.8	LOS F	63.6	456.5	1.00	3.26	8.78	9.7
North: Sheraton Road														
7	L2	103	11.2	103	11.2	1.095	145.4	LOS F	30.8	229.8	1.00	2.42	5.32	18.2
8	T1	433	6.1	433	6.1	1.095	144.3	LOS F	31.3	229.3	1.00	2.43	5.34	11.0
9	R2	109	3.8	109	3.8	1.095	149.7	LOS F	31.3	229.3	1.00	2.43	5.36	18.5
Approach		645	6.5	645	6.5	1.095	145.4	LOS F	31.3	229.8	1.00	2.43	5.34	13.7
West: Mitchell Highway														
10	L2	138	3.8	138	3.8	0.606	11.0	LOS A	6.0	44.1	0.86	0.91	1.04	54.2
11	T1	349	6.6	349	6.6	0.606	11.3	LOS A	6.0	44.1	0.86	0.91	1.04	58.7
12	R2	799	5.4	799	5.4	0.991	56.0	LOS D	37.9	277.5	1.00	1.83	3.25	24.3
Approach		1286	5.6	1286	5.6	0.991	39.0	LOS C	37.9	277.5	0.95	1.48	2.41	34.8
All Vehicles		3584	6.1	3584	6.1	1.293	107.4	LOS F	63.6	456.5	0.96	1.97	4.03	18.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 dev PM cumulative sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Dev PM cumulative (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total	HV]	ARRIVAL FLOWS [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh.	Dist]	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
2	T1	766	12.2	766	12.2	0.580	2.8	LOS A	4.6	35.3	0.26	0.37	0.26	37.5
Approach		766	12.2	766	12.2	0.580	2.8	LOS A	4.6	35.3	0.26	0.37	0.26	37.5
North: Sheraton Road														
8	T1	1054	8.3	1009	8.4	0.750	3.2	LOS A	9.4	70.3	0.40	0.38	0.40	38.3
Approach		1054	8.3	1009[N1]	8.4	0.750	3.2	LOS A	9.4	70.3	0.40	0.38	0.40	38.3
All Vehicles		1820	9.9	1775[N1]	10.2	0.750	3.1	NA	9.4	70.3	0.34	0.38	0.34	38.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Attachment A

Intersection traffic data provided by TfNSW

TTM Reference: 19SYD0213
Location: Wellington Rd & Sheraton Rd
Suburb: Dubbo
Date: Wednesday 4th Dec 2019
AM Peak: 0800-0900
Weather: Fine

www.ttmgroup.com.au

17		1	10	0	11	Bus
0		0	0	1	1	Multi Artic
4		0	1	4	5	Art.
14		2	5	4	11	Rigid
291		146	268	76	490	Light
326	0	149	284	84	517	**Total**

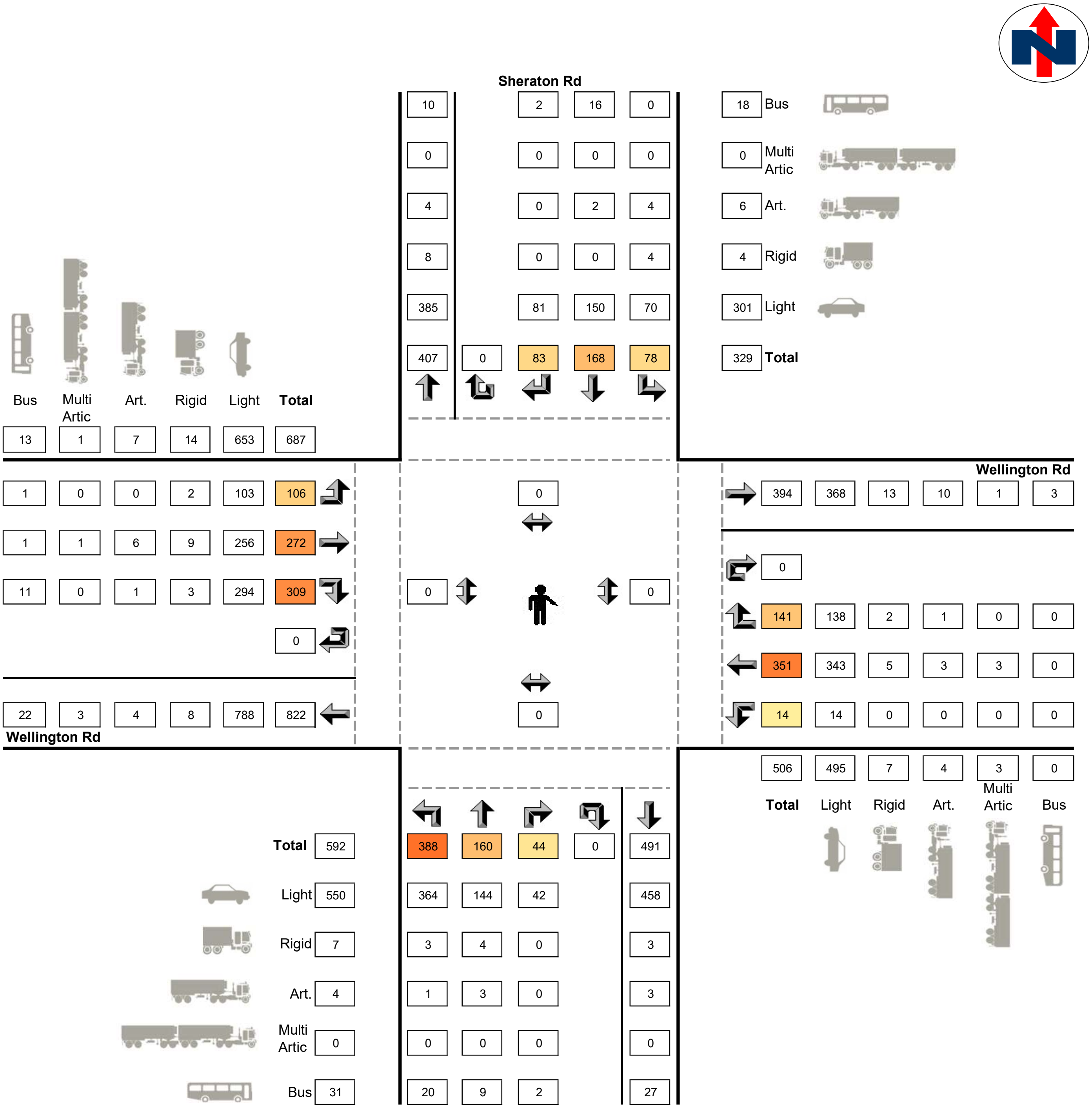
Bus	Multi Artic	Art.	Rigid	Light	**Total**
17	1	22	17	771	827
1	0	0	1	58	60
0	1	21	9	253	283
16	0	1	7	460	484
					0
20	0	6	14	920	960

Total	Light	Rigid	Art.	Multi Artic	Bus
399	360	14	25	2	0
0					
74	60	12	2	0	0
448	431	9	5	0	3
57	46	2	3	0	6
579	537	23	10	0	9

Total	587	363	192	32	0	825
Light	547	343	173	31		774
Rigid	5	3	1	1		14
Art.	3	1	2	0		5
Multi Artic	0	0	0	0		0
Bus	32	16	16	0		32

TTM Reference: 19SYD0213
Location: Wellington Rd & Sheraton Rd
Suburb: Dubbo
Date: Wednesday 4th Dec 2019
PM Peak: 1500-1600
Weather: Fine

www.ttmgroup.com.au



Attachment B

PBS Permit

Permit Number

136197 v5

Class 2 – Heavy Vehicle PBS Authorisation Permit

Note:
This Permit is issued under the provisions of ***Section 143 of the Heavy Vehicle National Law Act 2012*** for the operation of a complying Class 2 vehicle subject to the conditions of the *National Class 2 PBS Level 1 & 2A Truck and Dog Trailer Authorisation Notice* and/or any additional conditions or attachments set out in this Permit.

Permit details

This Permit is issued to

Gramardi Transport Pty Ltd

Address

34L North Burrabadine Road
Dubbo, NSW Postcode 2830

Description of vehicle combination

3 Axle Truck and 4 Axle Dog Trailer

Issue period

From 01/10/2020

To 24/06/2021

Authorised Routes/Area

Route/s ☐ Area ☑

Level 1 - General Mass Limits (GML)
The vehicle is permitted to operate at (GML) 50.5 tonnes on the following numbered routes/area (1-36)

Level 2 - General Mass Limits (GML) or Concessional Mass Limits (CML)
The vehicle is permitted to operate at General Mass Limits (GML) 56.0 tonnes or Concessional Mass Limits (CML) 57.5 tonnes on the following numbered routes/area (1-30, 32-46)

1) Start: PBS Level 2A GML and CML Network, Mitchell Hwy, Dubbo NSW 2830
Sheraton Rd, Dubbo
End: Holcim Quarry, Sheraton Rd, Dubbo NSW 2830

2) Start: PBS Level 2A GML and CML Network, Newell Hwy, Brocklehurst NSW 2830
Burraway Rd, Brocklehurst
End: Dubbo Sand Quarry, Burraway Rd, Brocklehurst NSW 2830

3) Start: PBS Level 2A GML and CML Network, Newell Hwy, Brocklehurst NSW 2830
Burraway St, Brocklehurst
Dubbo St, Brocklehurst
End: Boral Quarry, Old Gilgandra Rd, Dubbo NSW 2830

4) Start: PBS Level 2A GML and CML Network, Mitchell Hwy, Narromine NSW 2821
Warren Rd, Narromine
Eumungerie Rd, [Narromine - Burroway]
Dubbo-Burroway Rd, [Burroway - Rawsonville]
Burraway Rd, Rawsonville
Rawsonville Rd, Rawsonville
Whylandra Crossing Rd, Rawsonville
End: Dubbo Sand Quarry, Whylandra Crossing Rd, Rawsonville NSW 2830

5) Start: PBS Level 2A GML and CML Network, Intersection of Culling St and Mitchell Hwy, Narromine NSW 2821
Mitchell Hwy, Narromine
End: PBS Level 2A GML and CML Network, Intersection of Burraway St and Mitchell Hwy, Narromine NSW 2821

6) Start: PBS Level 2A GML and CML Network, Mitchell Hwy, Narromine NSW 2821
Macquarie Dr, Narromine
Industry Ave, Narromine
End: KB Concrete Plant, Industry Ave, Narromine NSW 2821

7) Start: PBS Level 2A GML and CML Network, Castlereagh Hwy, Mudgee NSW 2850
Putta Bucca Rd, Putta Bucca
End: Putta Bucca Landscape Supplies, 69 Putta Bucca Rd, Putta Bucca NSW 2850

8) Start: PBS Level 2A GML and CML Network, Ulan Rd, Ulan NSW 2850
Toole Rd, Ulan
End: Holcim, 10 Toole Rd, Ulan NSW 2850

9) Start: PBS Level 2A GML and CML Network, Peabody Rd, Molong NSW 2866
Packham Dr, Molong
End: Packham Concrete, 231 Packham Dr, Molong NSW 2866

Permit Number

103377 v8

Class 2 – Heavy Vehicle PBS Authorisation Permit

Note:
This Permit is issued under the provisions of ***Section 143 of the Heavy Vehicle National Law Act 2012*** for the operation of a complying Class 2 vehicle subject to the conditions of the *National Class 2 PBS Level 1 & 2A Truck and Dog Trailer Authorisation Notice* and/or any additional conditions or attachments set out in this Permit.

Permit details

This Permit is issued to

Advance Truck Driving School

Address

14 Sheraton Road
Dubbo NSW
Postcode

Description of vehicle combination

3 Axle Truck and 4 Axle Dog Trailer

Issue period

From 11/09/2020

To 10/09/2021

Authorised Routes/Area

Route/s ☐ Area ☑

Level 2 - Higher Mass Limits (HML)
The vehicle is permitted to operate at Higher Mass Limits (HML) 56.5 tonnes in the following areas:

Dubbo Regional Council
The vehicle is permitted to operate on all HML 25/26m B-Double routes approved in Dubbo Regional Council.

Narromine Shire Council
The vehicle is permitted to operate on all 25/26m B-Double routes approved in Narromine Shire Council

Route/s ☑ Area ☐

Level 2 - General Mass Limits (GML) or Concessional Mass Limits (CML)
The vehicle is permitted to operate at General Mass Limits (GML) 55.0 tonnes or Concessional Mass Limits (CML) 56.0 tonnes on the following numbered routes/area (1-39)

Level 2 - Higher Mass Limits (HML)
The vehicle is permitted to operate at Higher Mass Limits (HML) 56.5 tonnes on the following numbered routes/area (1-20, 22-43)

1) Start: PBS Level 2A HML Network, Castlereagh Hwy, Mudgee NSW 2850
Putta Bucca Rd, Mudgee
End: Boral Quarry, 69 Putta Bucca Rd, Putta Bucca NSW 2850

2) Start: PBS Level 2A HML Network, Mitchell Hwy, Dubbo NSW 2830
Bunglegumbie Rd, Dubbo
End: Access to Sand Plant, Bunglegumbie Rd, Dubbo NSW 2830

3) Start: PBS Level 2A HML Network, Mitchell Hwy, Orange NSW 2800
Dairy Creek Rd, Orange
Blowes Rd, Orange
Elsham Ave, Orange
Ash St, Orange
Scott Pl, Orange
End: Boral Concrete, Scott Pl, Orange NSW 2800

4) Start: PBS Level 2A HML Network, Newell Hwy, Brocklehurst NSW 2830
Burraway St, Brocklehurst
Dubbo St, Brocklehurst
End: Boral Concrete, Dubbo St, Brocklehurst NSW 2830

5) Start: PBS Level 2A HML Network, Mitchell Hwy, Dubbo NSW 2830
Sheraton Rd, Dubbo
End: Yuruga, 26R Sheraton Rd, Dubbo NSW 2830

6) Start: PBS Level 2A HML Network, Newell Hwy, Dubbo NSW 2830
Mitchell Hwy, Dubbo
End: PBS Level 2A HML Network, Mitchell Hwy, Dubbo NSW 2830

7) Start: PBS Level 2A HML Network, Castlereagh Hwy, Coonamble NSW 2829
Railway St, Coonamble

Authorised Routes/Area

Route/s ☑ Area ☑

Level 2 - General Mass Limits (GML) or Concessional Mass Limits (CML)
The vehicle is permitted to operate at General Mass Limits (GML) 56.0 tonnes or Concessional Mass Limits (CML) 57.5 tonnes on the following numbered routes/area (1-27, 29-30)

Level 2 - Higher Mass Limits (HML)
The vehicle is permitted to operate at Higher Mass Limits (HML) 57.5 tonnes on the following numbered routes/area (28)

1) Start: Start: PBS Level 2A GML and CML Network, Mitchell Highway, Dubbo NSW 2830
Sheraton Rd, Dubbo
End: Holcim Quarry, Sheraton Rd, Dubbo NSW 2830

2) Start: PBS Level 2A GML and CML Network, Redfern St, Cowra NSW 2794
Mulyan St, Cowra
North Logan Rd, Cowra
Glenlogan Rd, Cowra
End: PBS Level 2A GML and CML Network, Glenlogan Rd, Cowra NSW 2794

3) Start: PBS Level 2A GML and CML Network, Warraderry Way, Gooloogong NSW 2805
Warraderry Way, Gooloogong
Casuarina Dr, [Gooloogong - Eugowra]
End: PBS Level 2A GML and CML Network, Casuarina Dr, Eugowra NSW 2806

4) Start: PBS Level 2A GML and CML Network, Ulan Rd, Ulan NSW 2850
Toole Rd, Ulan
End: Holcim, 10 Toole Rd, Ulan NSW 2850

5) Start: PBS Level 2A GML and CML Network, Great Western Hwy, Marrangaroo NSW 2790
Great Western Hwy, [Marrangaroo - Lithgow]
Main St, Lithgow
Lithgow St, Lithgow
Mort St, Lithgow
Chifley Rd, [Lithgow - Clarence]
Clarence Colliery Rd, Clarence
End: Hanson Quarry, Clarence Colliery Rd, Clarence NSW 2790

6) Start: PBS Level 2A GML and CML Network, Great Western Hwy, Marrangaroo NSW 2790
Great Western Hwy, [Marrangaroo - Lithgow]
Main St, Lithgow
Lithgow St, Lithgow
Mort St, Lithgow
Bridge St, Lithgow
Inch St,[Lithgow - Oaky Park]
Bells Rd, Oaky Park
End: Holcim Australia, Bells Rd, Oaky Park NSW 2790

7) Start: PBS Level 2A GML and CML Network, Ulan Rd, Turill NSW 2850
Ulan Rd, [Turill - Cassilis]
End: PBS Level 2A GML and CML Network, Golden Hwy, Cassilis NSW 2329

8) Start: PBS Level 2A GML and CML Network, Newell Hwy, Brocklehurst NSW 2830
Burraway Rd, [Brocklehurst - Rawsonville]

Attachment C

SIDRA results for PM 15-minute period (calibration)

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2021 baseline PM 15 min (Site Folder: Maximum daily production)]

Network: N101 [2021 Baseline PM 15 min (Network Folder: Validation)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	708	6.2	708	6.2	1.145	153.1	LOS F	73.3	540.7	1.00	4.91	8.62	14.1
2	T1	336	7.1	336	7.1	0.751	12.1	LOS A	7.7	56.3	0.95	1.22	1.46	41.9
3	R2	132	0.0	132	0.0	0.751	16.8	LOS B	7.7	56.3	0.95	1.22	1.46	44.0
Approach		1176	5.8	1176	5.8	1.145	97.5	LOS F	73.3	540.7	0.98	3.45	5.77	19.4
East: Mitchell Highway														
4	L2	16	0.0	16	0.0	0.511	11.6	LOS A	3.8	27.4	0.84	0.96	1.01	49.2
5	T1	476	3.4	476	3.4	0.511	11.9	LOS A	3.8	27.4	0.84	0.97	1.01	57.4
6	R2	172	4.7	172	4.7	0.511	18.0	LOS B	3.8	27.6	0.84	0.99	1.01	53.6
Approach		664	3.6	664	3.6	0.511	13.5	LOS A	3.8	27.6	0.84	0.98	1.01	56.2
North: Sheraton Road														
7	L2	80	15.0	80	15.0	0.360	8.9	LOS A	2.1	17.1	0.79	0.88	0.81	54.3
8	T1	276	18.8	276	18.8	0.360	9.0	LOS A	2.1	16.7	0.79	0.88	0.81	46.2
9	R2	64	0.0	64	0.0	0.360	13.8	LOS A	2.1	16.7	0.79	0.88	0.81	55.6
Approach		420	15.2	420	15.2	0.360	9.7	LOS A	2.1	17.1	0.79	0.88	0.81	50.2
West: Mitchell Highway														
10	L2	120	0.0	120	0.0	0.534	12.8	LOS A	4.8	35.0	0.92	0.99	1.10	52.6
11	T1	208	9.6	208	9.6	0.534	13.6	LOS A	4.8	35.0	0.92	0.99	1.10	56.7
12	R2	344	8.1	344	8.1	0.568	20.3	LOS B	5.3	39.7	0.93	1.04	1.17	41.7
Approach		672	7.1	672	7.1	0.568	16.9	LOS B	5.3	39.7	0.93	1.02	1.14	49.3
All Vehicles		2932	7.0	2932	7.0	1.145	47.4	LOS D	73.3	540.7	0.91	1.96	2.92	31.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2021 baseline PM 15 min (Site Folder: Maximum daily production)]

Network: N101 [2021 Baseline PM 15 min (Network Folder: Validation)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	1048	7.6	1048	7.6	0.906	10.8	LOS A	35.7	266.1	0.71	0.51	0.82	32.4
Approach		1048	7.6	1048	7.6	0.906	10.8	LOS A	35.7	266.1	0.71	0.51	0.82	32.4
North: Sheraton Road														
8	T1	428	29.9	428	29.9	0.358	3.0	LOS A	1.9	16.5	0.22	0.38	0.22	38.6
Approach		428	29.9	428	29.9	0.358	3.0	LOS A	1.9	16.5	0.22	0.38	0.22	38.6
All Vehicles		1476	14.1	1476	14.1	0.906	8.5	NA	35.7	266.1	0.57	0.47	0.64	34.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Attachment D

SIDRA results

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2021 baseline AM (Site Folder: Maximum daily production)]

Network: N101 [2021 Baseline AM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	DEMAND FLOWS HV] %	ARRIVAL FLOWS [Total veh/h	ARRIVAL FLOWS HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	95% BACK OF QUEUE Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	397	5.6	397	5.6	0.660	13.6	LOS A	5.9	43.1	0.92	1.08	1.27	49.4
2	T1	211	10.0	211	10.0	0.424	9.6	LOS A	2.7	20.6	0.82	0.92	0.91	51.6
3	R2	37	5.7	37	5.7	0.424	15.2	LOS B	2.7	20.6	0.82	0.92	0.91	53.3
Approach		644	7.0	644	7.0	0.660	12.4	LOS A	5.9	43.1	0.88	1.02	1.13	50.3
East: Mitchell Highway														
4	L2	62	20.3	62	20.3	0.693	24.3	LOS B	6.3	46.6	0.95	1.16	1.54	38.4
5	T1	482	3.9	482	3.9	0.693	22.9	LOS B	6.3	46.6	0.95	1.16	1.54	49.2
6	R2	81	19.5	81	19.5	0.693	30.5	LOS C	6.3	46.8	0.95	1.16	1.54	46.8
Approach		625	7.6	625	7.6	0.693	24.0	LOS B	6.3	46.8	0.95	1.16	1.54	48.1
North: Sheraton Road														
7	L2	94	11.2	94	11.2	0.549	13.7	LOS A	4.0	29.5	0.88	1.02	1.14	51.3
8	T1	311	5.8	311	5.8	0.549	13.1	LOS A	4.0	28.9	0.88	1.03	1.14	41.7
9	R2	164	2.6	164	2.6	0.549	18.7	LOS B	4.0	28.9	0.88	1.04	1.14	50.9
Approach		568	5.7	568	5.7	0.549	14.8	LOS B	4.0	29.5	0.88	1.03	1.14	47.0
West: Mitchell Highway														
10	L2	66	4.8	66	4.8	0.408	7.2	LOS A	2.9	22.1	0.67	0.66	0.67	56.0
11	T1	306	11.0	306	11.0	0.408	7.6	LOS A	2.9	22.1	0.67	0.66	0.67	60.6
12	R2	521	5.1	521	5.1	0.554	14.3	LOS A	4.9	35.5	0.76	0.81	0.80	47.1
Approach		894	7.1	894	7.1	0.554	11.5	LOS A	4.9	35.5	0.72	0.74	0.75	53.5
All Vehicles		2732	6.9	2732	6.9	0.693	15.2	LOS B	6.3	46.8	0.85	0.96	1.10	49.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2021 baseline AM (Site Folder: Maximum daily production)]

Network: N101 [2021 Baseline AM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	581	8.9	581	8.9	0.423	2.3	LOS A	2.5	19.0	0.11	0.35	0.11	37.9
Approach		581	8.9	581	8.9	0.423	2.3	LOS A	2.5	19.0	0.11	0.35	0.11	37.9
North: Sheraton Road														
8	T1	858	6.4	858	6.4	0.617	2.4	LOS A	5.5	40.4	0.17	0.35	0.17	38.7
Approach		858	6.4	858	6.4	0.617	2.4	LOS A	5.5	40.4	0.17	0.35	0.17	38.7
All Vehicles		1439	7.4	1439	7.4	0.617	2.4	NA	5.5	40.4	0.15	0.35	0.15	38.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2021 baseline PM (Site Folder: Maximum daily production)]

Network: N101 [2021 Baseline PM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	424	6.2	424	6.2	0.607	8.3	LOS A	5.1	37.4	0.85	1.01	1.10	46.0
2	T1	176	10.2	176	10.2	0.330	4.1	LOS A	1.9	14.2	0.73	0.67	0.73	46.7
3	R2	49	6.4	49	6.4	0.330	9.1	LOS A	1.9	14.2	0.73	0.67	0.73	48.0
Approach		649	7.3	649	7.3	0.607	7.2	LOS A	5.1	37.4	0.81	0.89	0.97	46.3
East: Mitchell Highway														
4	L2	16	0.0	16	0.0	0.373	8.8	LOS A	2.3	16.3	0.74	0.80	0.74	52.1
5	T1	381	3.3	381	3.3	0.373	9.1	LOS A	2.3	16.3	0.74	0.81	0.74	59.4
6	R2	153	2.8	153	2.8	0.373	15.1	LOS B	2.3	16.3	0.74	0.85	0.74	55.5
Approach		549	3.1	549	3.1	0.373	10.8	LOS A	2.3	16.3	0.74	0.82	0.74	58.1
North: Sheraton Road														
7	L2	86	11.0	86	11.0	0.282	8.2	LOS A	1.6	11.9	0.74	0.81	0.74	55.0
8	T1	184	10.9	184	10.9	0.282	8.0	LOS A	1.6	11.7	0.74	0.82	0.74	46.4
9	R2	92	3.4	92	3.4	0.282	13.5	LOS A	1.6	11.7	0.74	0.84	0.74	54.5
Approach		362	9.0	362	9.0	0.282	9.4	LOS A	1.6	11.9	0.74	0.82	0.74	51.5
West: Mitchell Highway														
10	L2	116	3.6	116	3.6	0.409	7.6	LOS A	2.9	20.9	0.69	0.69	0.69	56.1
11	T1	295	6.4	295	6.4	0.409	7.8	LOS A	2.9	20.9	0.69	0.70	0.69	60.4
12	R2	333	5.1	333	5.1	0.409	13.8	LOS A	2.9	20.9	0.69	0.77	0.69	48.2
Approach		743	5.4	743	5.4	0.409	10.4	LOS A	2.9	20.9	0.69	0.73	0.69	55.2
All Vehicles		2304	5.9	2304	5.9	0.607	9.5	LOS A	5.1	37.4	0.74	0.81	0.79	52.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2021 baseline PM (Site Folder: Maximum daily production)]

Network: N101 [2021 Baseline PM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	508	11.2	508	11.2	0.383	2.6	LOS A	2.1	16.2	0.18	0.36	0.18	37.8
Approach		508	11.2	508	11.2	0.383	2.6	LOS A	2.1	16.2	0.18	0.36	0.18	37.8
North: Sheraton Road														
8	T1	309	16.7	309	16.7	0.240	2.6	LOS A	1.1	8.7	0.15	0.36	0.15	38.7
Approach		309	16.7	309	16.7	0.240	2.6	LOS A	1.1	8.7	0.15	0.36	0.15	38.7
All Vehicles		818	13.3	818	13.3	0.383	2.6	NA	2.1	16.2	0.17	0.36	0.17	38.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2021 dev AM (Site Folder: Maximum daily production)]

Network: N101 [2021 Dev AM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	418	10.3	418	10.3	0.723	16.0	LOS B	7.1	53.9	0.95	1.15	1.43	47.3
2	T1	211	10.0	211	10.0	0.425	9.6	LOS A	2.7	20.7	0.82	0.93	0.91	51.6
3	R2	37	5.7	37	5.7	0.425	15.2	LOS B	2.7	20.7	0.82	0.93	0.91	53.3
Approach		665	10.0	665	10.0	0.723	13.9	LOS A	7.1	53.9	0.90	1.07	1.23	48.9
East: Mitchell Highway														
4	L2	62	20.3	62	20.3	0.722	27.0	LOS B	6.8	50.7	0.96	1.19	1.65	36.5
5	T1	482	3.9	482	3.9	0.722	25.4	LOS B	6.8	50.7	0.96	1.19	1.65	47.6
6	R2	81	19.5	81	19.5	0.722	33.1	LOS C	6.8	50.9	0.96	1.19	1.65	45.3
Approach		625	7.6	625	7.6	0.722	26.6	LOS B	6.8	50.9	0.96	1.19	1.65	46.5
North: Sheraton Road														
7	L2	94	11.2	94	11.2	0.573	14.7	LOS B	4.2	31.6	0.90	1.04	1.20	50.5
8	T1	311	5.8	311	5.8	0.573	14.1	LOS A	4.3	30.9	0.90	1.05	1.19	40.9
9	R2	164	2.6	164	2.6	0.573	19.7	LOS B	4.3	30.9	0.90	1.06	1.19	50.3
Approach		568	5.7	568	5.7	0.573	15.8	LOS B	4.3	31.6	0.90	1.05	1.19	46.2
West: Mitchell Highway														
10	L2	66	4.8	66	4.8	0.408	7.2	LOS A	2.9	22.1	0.67	0.66	0.67	56.0
11	T1	306	11.0	306	11.0	0.408	7.6	LOS A	2.9	22.1	0.67	0.66	0.67	60.6
12	R2	542	8.7	542	8.7	0.590	15.0	LOS B	5.6	42.0	0.79	0.83	0.86	46.7
Approach		915	9.2	915	9.2	0.590	11.9	LOS A	5.6	42.0	0.74	0.76	0.79	53.1
All Vehicles		2774	8.3	2774	8.3	0.723	16.5	LOS B	7.1	53.9	0.86	0.99	1.17	48.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2021 dev AM (Site Folder: Maximum daily production)]

Network: N101 [2021 Dev AM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	602	12.1	602	12.1	0.445	2.4	LOS A	2.8	21.3	0.12	0.35	0.12	37.9
Approach		602	12.1	602	12.1	0.445	2.4	LOS A	2.8	21.3	0.12	0.35	0.12	37.9
North: Sheraton Road														
8	T1	879	8.6	879	8.6	0.639	2.4	LOS A	6.0	45.0	0.18	0.35	0.18	38.7
Approach		879	8.6	879	8.6	0.639	2.4	LOS A	6.0	45.0	0.18	0.35	0.18	38.7
All Vehicles		1481	10.0	1481	10.0	0.639	2.4	NA	6.0	45.0	0.15	0.35	0.15	38.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2021 dev PM (Site Folder: Maximum daily production)]

Network: N101 [2021 Dev PM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	445	10.6	445	10.6	0.660	9.7	LOS A	6.0	45.7	0.89	1.08	1.21	44.8
2	T1	176	10.2	176	10.2	0.331	4.1	LOS A	1.9	14.3	0.74	0.67	0.74	46.7
3	R2	49	6.4	49	6.4	0.331	9.1	LOS A	1.9	14.3	0.74	0.67	0.74	48.0
Approach		671	10.2	671	10.2	0.660	8.2	LOS A	6.0	45.7	0.84	0.94	1.05	45.5
East: Mitchell Highway														
4	L2	16	0.0	16	0.0	0.388	9.2	LOS A	2.4	17.4	0.77	0.84	0.79	51.9
5	T1	381	3.3	381	3.3	0.388	9.6	LOS A	2.4	17.4	0.77	0.86	0.79	59.2
6	R2	153	2.8	153	2.8	0.388	15.6	LOS B	2.4	17.4	0.77	0.88	0.79	55.2
Approach		549	3.1	549	3.1	0.388	11.2	LOS A	2.4	17.4	0.77	0.86	0.79	57.9
North: Sheraton Road														
7	L2	86	11.0	86	11.0	0.293	8.4	LOS A	1.6	12.4	0.75	0.83	0.75	54.9
8	T1	184	10.9	184	10.9	0.293	8.3	LOS A	1.6	12.1	0.75	0.84	0.75	46.2
9	R2	92	3.4	92	3.4	0.293	13.7	LOS A	1.6	12.1	0.75	0.86	0.75	54.3
Approach		362	9.0	362	9.0	0.293	9.7	LOS A	1.6	12.4	0.75	0.84	0.75	51.3
West: Mitchell Highway														
10	L2	116	3.6	116	3.6	0.428	7.6	LOS A	3.0	22.2	0.70	0.69	0.70	56.0
11	T1	295	6.4	295	6.4	0.428	7.9	LOS A	3.0	22.2	0.70	0.70	0.70	60.5
12	R2	354	10.7	354	10.7	0.428	14.0	LOS A	3.0	22.9	0.70	0.78	0.70	47.8
Approach		764	8.0	764	8.0	0.428	10.7	LOS A	3.0	22.9	0.70	0.74	0.70	55.0
All Vehicles		2346	7.6	2346	7.6	0.660	9.9	LOS A	6.0	45.7	0.76	0.84	0.83	52.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2021 dev PM (Site Folder: Maximum daily production)]

Network: N101 [2021 Dev PM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
2	T1	529	14.7	529	14.7	0.406	2.7	LOS A	2.3	18.3	0.19	0.37	0.19	37.7
Approach		529	14.7	529	14.7	0.406	2.7	LOS A	2.3	18.3	0.19	0.37	0.19	37.7
North: Sheraton Road														
8	T1	331	22.0	331	22.0	0.262	2.6	LOS A	1.2	10.2	0.16	0.36	0.16	38.7
Approach		331	22.0	331	22.0	0.262	2.6	LOS A	1.2	10.2	0.16	0.36	0.16	38.7
All Vehicles		860	17.5	860	17.5	0.406	2.6	NA	2.3	18.3	0.18	0.36	0.18	38.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2021 dev AM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2021 Dev AM cumulative (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total	HV]	ARRIVAL FLOWS [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh.	Dist]	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	768	5.9	723	5.9	1.220	220.0	LOS F	97.6	717.9	1.00	4.62	10.75	11.1
2	T1	388	6.0	366	5.9	0.726	15.5	LOS B	7.2	53.0	0.95	1.15	1.43	47.0
3	R2	69	4.5	65	4.5	0.726	21.3	LOS B	7.2	53.0	0.95	1.15	1.43	48.6
Approach		1226	5.8	1154 N1	5.8	1.220	144.0	LOS F	97.6	717.9	0.98	3.32	7.27	15.7
East: Mitchell Highway														
4	L2	74	18.6	74	18.6	0.928	64.0	LOS E	14.1	105.2	1.00	1.58	2.93	21.6
5	T1	482	3.9	482	3.9	0.928	62.3	LOS E	14.1	105.2	1.00	1.58	2.92	32.5
6	R2	81	19.5	81	19.5	0.928	70.4	LOS E	14.1	105.4	1.00	1.58	2.92	31.5
Approach		637	7.6	637	7.6	0.928	63.5	LOS E	14.1	105.4	1.00	1.58	2.92	31.3
North: Sheraton Road														
7	L2	94	11.2	94	11.2	0.768	25.7	LOS B	7.2	53.3	0.98	1.23	1.68	44.1
8	T1	349	5.7	349	5.7	0.768	24.9	LOS B	7.2	52.5	0.99	1.23	1.67	33.5
9	R2	164	2.6	164	2.6	0.768	30.3	LOS C	7.2	52.5	0.99	1.23	1.67	44.2
Approach		607	5.7	607	5.7	0.768	26.5	LOS B	7.2	53.3	0.99	1.23	1.67	39.0
West: Mitchell Highway														
10	L2	66	4.8	66	4.8	0.531	10.8	LOS A	4.7	35.5	0.87	0.91	1.00	54.3
11	T1	306	11.0	306	11.0	0.531	11.2	LOS A	4.7	35.5	0.87	0.91	1.00	58.6
12	R2	636	7.8	636	7.8	0.894	34.2	LOS C	18.9	141.2	1.00	1.38	2.07	32.6
Approach		1008	8.6	1008	8.6	0.894	25.7	LOS B	18.9	141.2	0.95	1.21	1.67	42.0
All Vehicles		3479	6.9	3407 N1	7.1	1.220	73.0	LOS F	97.6	717.9	0.98	2.00	3.80	25.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2021 dev AM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2021 Dev AM cumulative (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	1163	6.7	1163	6.7	1.080	91.3	LOS F	233.9	1730.9	1.00	0.44	1.21	13.3
Approach		1163	6.7	1163	6.7	1.080	91.3	LOS F	233.9	1730.9	1.00	0.44	1.21	13.3
North: Sheraton Road														
8	T1	1023	7.9	1023	7.9	0.741	2.6	LOS A	9.5	71.3	0.25	0.34	0.25	38.6
Approach		1023	7.9	1023	7.9	0.741	2.6	LOS A	9.5	71.3	0.25	0.34	0.25	38.6
All Vehicles		2186	7.3	2186	7.3	1.080	49.8	NA	233.9	1730.9	0.65	0.39	0.76	21.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2021 dev PM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2021 Dev PM cumulative (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	539	9.2	539	9.2	0.823	15.8	LOS B	10.7	80.7	1.00	1.37	1.69	41.1
2	T1	215	9.3	215	9.3	0.420	4.9	LOS A	2.7	20.5	0.79	0.79	0.85	46.4
3	R2	61	6.9	61	6.9	0.420	9.9	LOS A	2.7	20.5	0.79	0.79	0.85	47.5
Approach		815	9.0	815	9.0	0.823	12.5	LOS A	10.7	80.7	0.93	1.18	1.41	42.9
East: Mitchell Highway														
4	L2	83	1.3	83	1.3	0.984	89.7	LOS F	18.7	134.0	1.00	1.77	3.62	16.5
5	T1	381	3.3	381	3.3	0.984	90.2	LOS F	18.7	134.0	1.00	1.77	3.62	26.2
6	R2	153	2.8	153	2.8	0.984	96.1	LOS F	18.7	134.1	1.00	1.77	3.62	25.6
Approach		617	2.9	617	2.9	0.984	91.6	LOS F	18.7	134.1	1.00	1.77	3.62	25.0
North: Sheraton Road														
7	L2	86	11.0	86	11.0	0.809	32.7	LOS C	8.0	59.7	1.00	1.30	1.87	40.7
8	T1	398	5.6	398	5.6	0.809	31.8	LOS C	8.1	59.2	1.00	1.29	1.87	30.1
9	R2	92	3.4	92	3.4	0.809	37.3	LOS C	8.1	59.2	1.00	1.29	1.87	41.3
Approach		576	6.0	576	6.0	0.809	32.8	LOS C	8.1	59.7	1.00	1.29	1.87	34.3
West: Mitchell Highway														
10	L2	116	3.6	116	3.6	0.486	8.6	LOS A	3.8	27.8	0.77	0.78	0.80	55.5
11	T1	295	6.4	295	6.4	0.486	8.9	LOS A	3.8	27.8	0.77	0.78	0.80	60.2
12	R2	739	5.4	739	5.4	0.874	27.6	LOS B	18.0	131.9	1.00	1.23	1.78	36.4
Approach		1149	5.5	1149	5.5	0.874	20.9	LOS B	18.0	131.9	0.92	1.07	1.43	44.9
All Vehicles		3157	6.0	3157	6.0	0.984	34.7	LOS C	18.7	134.1	0.95	1.28	1.93	35.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2021 dev PM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2021 Dev PM cumulative (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	674	12.3	674	12.3	0.511	2.7	LOS A	3.5	27.0	0.22	0.37	0.22	37.6
Approach		674	12.3	674	12.3	0.511	2.7	LOS A	3.5	27.0	0.22	0.37	0.22	37.6
North: Sheraton Road														
8	T1	997	7.8	997	7.8	0.739	3.2	LOS A	8.9	66.3	0.39	0.38	0.39	38.3
Approach		997	7.8	997	7.8	0.739	3.2	LOS A	8.9	66.3	0.39	0.38	0.39	38.3
All Vehicles		1671	9.6	1671	9.6	0.739	3.0	NA	8.9	66.3	0.32	0.37	0.32	38.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 baseline AM (Site Folder: Maximum daily production)]

Network: N101 [2031 Baseline AM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total	HV]	ARRIVAL FLOWS [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh.	Dist]	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	469	5.6	469	5.6	0.878	28.3	LOS B	12.3	90.5	1.00	1.41	2.15	39.7
2	T1	249	10.1	249	10.1	0.567	13.1	LOS A	4.3	32.4	0.89	1.03	1.16	48.7
3	R2	44	7.1	44	7.1	0.567	18.8	LOS B	4.3	32.4	0.89	1.03	1.16	49.9
Approach		763	7.2	763	7.2	0.878	22.8	LOS B	12.3	90.5	0.96	1.27	1.77	42.9
East: Mitchell Highway														
4	L2	69	21.2	69	21.2	0.931	62.4	LOS E	15.0	111.4	1.00	1.61	3.03	22.1
5	T1	531	4.0	531	4.0	0.931	60.4	LOS E	15.0	111.4	1.00	1.61	3.03	33.0
6	R2	91	19.8	91	19.8	0.931	68.5	LOS E	14.9	111.6	1.00	1.61	3.03	31.9
Approach		691	7.8	691	7.8	0.931	61.7	LOS E	15.0	111.6	1.00	1.61	3.03	32.0
North: Sheraton Road														
7	L2	112	11.3	112	11.3	0.754	22.4	LOS B	7.0	52.3	0.97	1.20	1.61	45.8
8	T1	368	6.0	368	6.0	0.754	21.6	LOS B	7.1	51.4	0.97	1.20	1.61	35.4
9	R2	195	2.7	195	2.7	0.754	27.0	LOS B	7.1	51.4	0.97	1.21	1.61	45.8
Approach		675	5.9	675	5.9	0.754	23.3	LOS B	7.1	52.3	0.97	1.20	1.61	41.1
West: Mitchell Highway														
10	L2	74	5.7	74	5.7	0.489	8.3	LOS A	3.9	29.4	0.77	0.76	0.79	55.4
11	T1	338	11.2	338	11.2	0.489	8.6	LOS A	3.9	29.4	0.77	0.76	0.79	60.0
12	R2	574	5.1	574	5.1	0.660	17.1	LOS B	7.4	54.1	0.88	0.93	1.07	44.6
Approach		985	7.3	985	7.3	0.660	13.5	LOS A	7.4	54.1	0.83	0.86	0.95	51.8
All Vehicles		3114	7.1	3114	7.1	0.931	28.6	LOS C	15.0	111.6	0.93	1.20	1.76	40.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: \\emmsvr1\EMM3\2021\J210189 - Dubbo Quarry Continuation Project RtS\Technical studies\Transport\SIDRA\SIDRA v0.3 Additional scenarios.sip9

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 baseline AM (Site Folder: Maximum daily production)]

Network: N101 [2031 Baseline AM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	686	8.9	686	8.9	0.500	2.4	LOS A	3.4	25.8	0.13	0.35	0.13	37.9
Approach		686	8.9	686	8.9	0.500	2.4	LOS A	3.4	25.8	0.13	0.35	0.13	37.9
North: Sheraton Road														
8	T1	1014	6.4	1014	6.4	0.729	2.5	LOS A	9.0	66.4	0.23	0.34	0.23	38.6
Approach		1014	6.4	1014	6.4	0.729	2.5	LOS A	9.0	66.4	0.23	0.34	0.23	38.6
All Vehicles		1700	7.4	1700	7.4	0.729	2.5	NA	9.0	66.4	0.19	0.35	0.19	38.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 baseline PM (Site Folder: Maximum daily production)]

Network: N101 [2031 Baseline PM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	502	6.3	502	6.3	0.792	14.9	LOS B	9.1	67.0	0.97	1.31	1.61	41.7
2	T1	208	10.6	208	10.6	0.434	5.8	LOS A	2.8	21.0	0.80	0.88	0.89	46.0
3	R2	59	7.1	59	7.1	0.434	10.8	LOS A	2.8	21.0	0.80	0.88	0.89	47.1
Approach		769	7.5	769	7.5	0.792	12.2	LOS A	9.1	67.0	0.91	1.16	1.36	43.2
East: Mitchell Highway														
4	L2	18	0.0	18	0.0	0.460	10.8	LOS A	3.2	23.0	0.81	0.93	0.93	50.1
5	T1	420	3.5	420	3.5	0.460	11.2	LOS A	3.2	23.0	0.81	0.94	0.93	58.0
6	R2	169	3.1	169	3.1	0.460	17.2	LOS B	3.2	23.0	0.81	0.96	0.93	54.0
Approach		607	3.3	607	3.3	0.460	12.9	LOS A	3.2	23.0	0.81	0.95	0.93	56.7
North: Sheraton Road														
7	L2	103	11.2	103	11.2	0.375	9.4	LOS A	2.2	17.0	0.80	0.89	0.85	54.2
8	T1	219	11.1	219	11.1	0.375	9.2	LOS A	2.2	16.6	0.80	0.91	0.84	45.4
9	R2	109	3.8	109	3.8	0.375	14.7	LOS B	2.2	16.6	0.80	0.92	0.84	53.7
Approach		432	9.3	432	9.3	0.375	10.7	LOS A	2.2	17.0	0.80	0.91	0.84	50.6
West: Mitchell Highway														
10	L2	128	4.1	128	4.1	0.490	8.8	LOS A	3.8	28.2	0.77	0.79	0.82	55.4
11	T1	325	6.5	325	6.5	0.490	9.1	LOS A	3.8	28.2	0.77	0.80	0.82	59.6
12	R2	366	5.2	366	5.2	0.490	15.1	LOS B	3.8	28.2	0.77	0.84	0.82	47.0
Approach		820	5.5	820	5.5	0.490	11.7	LOS A	3.8	28.2	0.77	0.82	0.82	54.3
All Vehicles		2628	6.2	2628	6.2	0.792	11.9	LOS A	9.1	67.0	0.83	0.96	1.01	50.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 baseline PM (Site Folder: Maximum daily production)]

Network: N101 [2031 Baseline PM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	601	11.2	601	11.2	0.453	2.7	LOS A	2.8	21.4	0.20	0.37	0.20	37.7
Approach		601	11.2	601	11.2	0.453	2.7	LOS A	2.8	21.4	0.20	0.37	0.20	37.7
North: Sheraton Road														
8	T1	366	16.7	366	16.7	0.284	2.6	LOS A	1.4	10.8	0.16	0.36	0.16	38.7
Approach		366	16.7	366	16.7	0.284	2.6	LOS A	1.4	10.8	0.16	0.36	0.16	38.7
All Vehicles		967	13.3	967	13.3	0.453	2.6	NA	2.8	21.4	0.19	0.36	0.19	38.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 dev AM (Site Folder: Maximum daily production)]

Network: N101 [2031 Dev AM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total	HV]	ARRIVAL FLOWS [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh.	Dist]	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	491	9.7	491	9.7	0.951	44.0	LOS D	18.3	139.0	1.00	1.71	2.96	32.7
2	T1	249	10.1	249	10.1	0.569	13.1	LOS A	4.3	32.5	0.89	1.03	1.16	48.7
3	R2	44	7.1	44	7.1	0.569	18.8	LOS B	4.3	32.5	0.89	1.03	1.16	49.9
Approach		784	9.7	784	9.7	0.951	32.7	LOS C	18.3	139.0	0.96	1.46	2.28	37.5
East: Mitchell Highway														
4	L2	69	21.2	69	21.2	0.973	80.0	LOS F	18.6	138.5	1.00	1.78	3.63	18.5
5	T1	531	4.0	531	4.0	0.973	77.9	LOS F	18.6	138.5	1.00	1.78	3.62	28.6
6	R2	91	19.8	91	19.8	0.973	86.1	LOS F	18.5	138.7	1.00	1.78	3.62	27.8
Approach		691	7.8	691	7.8	0.973	79.2	LOS F	18.6	138.7	1.00	1.78	3.62	27.7
North: Sheraton Road														
7	L2	112	11.3	112	11.3	0.794	26.1	LOS B	7.9	58.6	0.98	1.26	1.77	43.8
8	T1	368	6.0	368	6.0	0.794	25.3	LOS B	8.0	57.6	0.98	1.26	1.77	33.2
9	R2	195	2.7	195	2.7	0.794	30.7	LOS C	8.0	57.6	0.99	1.26	1.77	43.9
Approach		675	5.9	675	5.9	0.794	27.0	LOS B	8.0	58.6	0.98	1.26	1.77	39.0
West: Mitchell Highway														
10	L2	74	5.7	74	5.7	0.490	8.3	LOS A	3.9	29.4	0.77	0.76	0.79	55.4
11	T1	338	11.2	338	11.2	0.490	8.6	LOS A	3.9	29.4	0.77	0.76	0.79	60.0
12	R2	595	8.5	595	8.5	0.700	18.2	LOS B	8.5	64.1	0.91	0.97	1.16	43.5
Approach		1006	9.2	1006	9.2	0.700	14.3	LOS A	8.5	64.1	0.85	0.88	1.01	51.0
All Vehicles		3156	8.3	3156	8.3	0.973	35.8	LOS C	18.6	139.0	0.94	1.30	2.06	37.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 dev AM (Site Folder: Maximum daily production)]

Network: N101 [2031 Dev AM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	707	11.6	707	11.6	0.522	2.4	LOS A	3.7	28.7	0.14	0.35	0.14	37.9
Approach		707	11.6	707	11.6	0.522	2.4	LOS A	3.7	28.7	0.14	0.35	0.14	37.9
North: Sheraton Road														
8	T1	1035	8.3	1035	8.3	0.751	2.6	LOS A	10.0	75.2	0.25	0.34	0.25	38.5
Approach		1035	8.3	1035	8.3	0.751	2.6	LOS A	10.0	75.2	0.25	0.34	0.25	38.5
All Vehicles		1742	9.7	1742	9.7	0.751	2.5	NA	10.0	75.2	0.21	0.34	0.21	38.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 dev PM (Site Folder: Maximum daily production)]

Network: N101 [2031 Dev PM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	523	10.1	523	10.1	0.853	19.5	LOS B	11.5	87.6	1.00	1.47	1.91	39.1
2	T1	208	10.6	208	10.6	0.435	5.8	LOS A	2.8	21.2	0.80	0.88	0.90	46.0
3	R2	59	7.1	59	7.1	0.435	10.8	LOS A	2.8	21.2	0.80	0.88	0.90	47.1
Approach		791	10.0	791	10.0	0.853	15.2	LOS B	11.5	87.6	0.93	1.27	1.57	41.3
East: Mitchell Highway														
4	L2	18	0.0	18	0.0	0.479	11.6	LOS A	3.4	24.8	0.83	0.95	0.98	49.2
5	T1	420	3.5	420	3.5	0.479	11.9	LOS A	3.4	24.8	0.83	0.96	0.98	57.3
6	R2	169	3.1	169	3.1	0.479	17.9	LOS B	3.4	24.8	0.83	0.98	0.98	53.5
Approach		607	3.3	607	3.3	0.479	13.6	LOS A	3.4	24.8	0.83	0.97	0.98	56.0
North: Sheraton Road														
7	L2	103	11.2	103	11.2	0.390	9.9	LOS A	2.3	18.0	0.81	0.91	0.88	53.8
8	T1	219	11.1	219	11.1	0.390	9.7	LOS A	2.4	17.6	0.81	0.92	0.88	44.9
9	R2	109	3.8	109	3.8	0.390	15.2	LOS B	2.4	17.6	0.81	0.94	0.88	53.3
Approach		432	9.3	432	9.3	0.390	11.2	LOS A	2.4	18.0	0.81	0.92	0.88	50.1
West: Mitchell Highway														
10	L2	128	4.1	128	4.1	0.510	9.1	LOS A	4.2	30.7	0.79	0.81	0.85	55.3
11	T1	325	6.5	325	6.5	0.510	9.4	LOS A	4.2	30.7	0.79	0.81	0.85	59.6
12	R2	387	10.3	387	10.3	0.510	15.6	LOS B	4.2	31.6	0.79	0.87	0.86	46.4
Approach		841	7.9	841	7.9	0.510	12.2	LOS A	4.2	31.6	0.79	0.84	0.85	53.9
All Vehicles		2671	7.7	2671	7.7	0.853	13.3	LOS A	11.5	87.6	0.85	1.01	1.10	49.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 dev PM (Site Folder: Maximum daily production)]

Network: N101 [2031 Dev PM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	622	14.2	622	14.2	0.476	2.7	LOS A	3.1	24.0	0.21	0.37	0.21	37.7
Approach		622	14.2	622	14.2	0.476	2.7	LOS A	3.1	24.0	0.21	0.37	0.21	37.7
North: Sheraton Road														
8	T1	387	21.2	387	21.2	0.306	2.6	LOS A	1.5	12.5	0.17	0.36	0.17	38.7
Approach		387	21.2	387	21.2	0.306	2.6	LOS A	1.5	12.5	0.17	0.36	0.17	38.7
All Vehicles		1009	16.9	1009	16.9	0.476	2.7	NA	3.1	24.0	0.19	0.37	0.19	38.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 dev AM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2031 Dev AM cumulative (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	841	5.9	730	5.8	1.199	201.9	LOS F	92.4	679.3	1.00	4.44	10.18	11.9
2	T1	427	6.4	371	6.3	0.721	15.0	LOS B	7.1	52.5	0.94	1.14	1.40	47.3
3	R2	77	5.5	67	5.4	0.721	20.9	LOS B	7.1	52.5	0.94	1.14	1.40	48.8
Approach		1345	6.0	1167 N1	6.0	1.199	132.2	LOS F	92.4	679.3	0.98	3.21	6.89	16.7
East: Mitchell Highway														
4	L2	81	19.5	81	19.5	1.208	242.3	LOS F	50.9	379.1	1.00	2.98	7.75	7.2
5	T1	531	4.0	531	4.0	1.208	240.5	LOS F	50.9	379.1	1.00	2.98	7.74	12.7
6	R2	91	19.8	91	19.8	1.208	248.6	LOS F	50.6	379.0	1.00	2.98	7.74	12.6
Approach		702	7.8	702	7.8	1.208	241.8	LOS F	50.9	379.1	1.00	2.98	7.74	12.1
North: Sheraton Road														
7	L2	112	11.3	112	11.3	1.026	93.8	LOS F	23.2	173.4	1.00	2.07	4.19	24.4
8	T1	407	5.9	407	5.9	1.026	92.7	LOS F	23.7	172.2	1.00	2.07	4.21	15.6
9	R2	195	2.7	195	2.7	1.026	97.8	LOS F	23.7	172.2	1.00	2.07	4.22	24.8
Approach		714	5.9	714	5.9	1.026	94.3	LOS F	23.7	173.4	1.00	2.07	4.21	19.9
West: Mitchell Highway														
10	L2	74	5.7	74	5.7	0.591	12.0	LOS A	5.7	43.7	0.91	0.96	1.10	53.3
11	T1	338	11.2	338	11.2	0.591	12.4	LOS A	5.7	43.7	0.91	0.96	1.10	57.6
12	R2	688	7.6	688	7.6	0.972	53.0	LOS D	30.8	229.4	1.00	1.74	3.00	25.2
Approach		1100	8.6	1100	8.6	0.972	37.8	LOS C	30.8	229.4	0.96	1.45	2.29	35.4
All Vehicles		3861	7.1	3683 N1	7.4	1.208	117.5	LOS F	92.4	679.3	0.98	2.42	5.16	18.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 dev AM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2031 Dev AM cumulative (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	1268	6.9	1268	6.9	1.144	147.0	LOS F	262.5	1946.3	1.00	0.52	1.33	9.5
Approach		1268	6.9	1268	6.9	1.144	147.0	LOS F	262.5	1946.3	1.00	0.52	1.33	9.5
North: Sheraton Road														
8	T1	1179	7.8	1154	7.6	0.835	2.8	LOS A	16.3	121.6	0.37	0.33	0.37	38.3
Approach		1179	7.8	1154 N1	7.6	0.835	2.8	LOS A	16.3	121.6	0.37	0.33	0.37	38.3
All Vehicles		2447	7.3	2422 N1	7.4	1.144	78.3	NA	262.5	1946.3	0.70	0.43	0.87	17.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 dev PM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2031 Dev PM cumulative (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total	HV]	ARRIVAL FLOWS [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh.	Dist]	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	617	8.9	617	8.9	0.917	24.8	LOS B	17.1	129.0	1.00	1.69	2.27	36.5
2	T1	247	9.8	247	9.8	0.474	5.3	LOS A	3.3	24.8	0.80	0.86	0.90	46.3
3	R2	71	7.5	71	7.5	0.474	10.3	LOS A	3.3	24.8	0.80	0.86	0.90	47.3
Approach		935	9.0	935	9.0	0.917	18.5	LOS B	17.1	129.0	0.93	1.41	1.81	39.5
East: Mitchell Highway														
4	L2	85	1.2	85	1.2	1.201	236.9	LOS F	48.4	347.3	1.00	2.83	7.32	7.3
5	T1	420	3.5	420	3.5	1.201	237.4	LOS F	48.4	347.3	1.00	2.83	7.32	12.9
6	R2	169	3.1	169	3.1	1.201	243.4	LOS F	48.3	347.3	1.00	2.83	7.31	12.8
Approach		675	3.1	675	3.1	1.201	238.9	LOS F	48.4	347.3	1.00	2.83	7.32	12.2
North: Sheraton Road														
7	L2	103	11.2	103	11.2	1.018	95.4	LOS F	21.1	157.8	1.00	1.99	3.97	24.2
8	T1	433	6.1	433	6.1	1.018	94.3	LOS F	21.5	157.0	1.00	1.99	3.98	15.4
9	R2	109	3.8	109	3.8	1.018	99.6	LOS F	21.5	157.0	1.00	1.99	3.99	24.6
Approach		645	6.5	645	6.5	1.018	95.4	LOS F	21.5	157.8	1.00	1.99	3.98	18.7
West: Mitchell Highway														
10	L2	128	4.1	128	4.1	0.566	10.3	LOS A	5.2	38.1	0.84	0.88	0.97	54.7
11	T1	325	6.5	325	6.5	0.566	10.6	LOS A	5.2	38.1	0.84	0.88	0.97	59.3
12	R2	773	5.4	773	5.4	0.961	45.2	LOS D	30.5	223.6	1.00	1.62	2.73	27.8
Approach		1226	5.6	1226	5.6	0.961	32.4	LOS C	30.5	223.6	0.94	1.34	2.08	37.9
All Vehicles		3481	6.2	3481	6.2	1.201	80.4	LOS F	48.4	347.3	0.96	1.77	3.37	22.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 dev PM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2031 Dev PM cumulative (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
2	T1	766	12.2	766	12.2	0.580	2.8	LOS A	4.6	35.3	0.26	0.37	0.26	37.5
Approach		766	12.2	766	12.2	0.580	2.8	LOS A	4.6	35.3	0.26	0.37	0.26	37.5
North: Sheraton Road														
8	T1	1054	8.3	1036	8.4	0.770	3.3	LOS A	10.3	77.5	0.43	0.38	0.43	38.2
Approach		1054	8.3	1036[N1]	8.4	0.770	3.3	LOS A	10.3	77.5	0.43	0.38	0.43	38.2
All Vehicles		1820	9.9	1802[N1]	10.0	0.770	3.1	NA	10.3	77.5	0.36	0.38	0.36	38.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2046 baseline AM (Site Folder: Maximum daily production)]

Network: N101 [2046 Baseline AM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	DEMAND FLOWS HV] %	ARRIVAL FLOWS [Total veh/h	ARRIVAL FLOWS HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	95% BACK OF QUEUE Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	577	5.7	577	5.7	1.002	60.2	LOS E	28.4	208.4	1.00	2.08	3.95	27.8
2	T1	305	10.0	305	10.0	0.642	13.9	LOS A	5.4	41.0	0.91	1.08	1.26	48.1
3	R2	54	5.9	54	5.9	0.642	19.5	LOS B	5.4	41.0	0.91	1.08	1.26	49.6
Approach		936	7.1	936	7.1	1.002	42.8	LOS D	28.4	208.4	0.97	1.70	2.92	33.4
East: Mitchell Highway														
4	L2	78	20.3	78	20.3	1.282	299.5	LOS F	66.7	496.0	1.00	3.49	9.46	5.9
5	T1	603	4.0	603	4.0	1.282	297.8	LOS F	66.7	496.0	1.00	3.48	9.44	10.6
6	R2	102	19.6	102	19.6	1.282	305.7	LOS F	66.2	495.9	1.00	3.48	9.42	10.6
Approach		783	7.7	783	7.7	1.282	299.0	LOS F	66.7	496.0	1.00	3.48	9.44	10.2
North: Sheraton Road														
7	L2	137	11.5	137	11.5	1.152	177.6	LOS F	46.6	348.0	1.00	3.06	7.15	15.7
8	T1	452	5.8	452	5.8	1.152	176.6	LOS F	48.0	347.4	1.00	3.07	7.19	9.3
9	R2	239	2.6	239	2.6	1.152	181.8	LOS F	48.0	347.4	1.00	3.08	7.25	16.0
Approach		827	5.9	827	5.9	1.152	178.3	LOS F	48.0	348.0	1.00	3.07	7.20	12.5
West: Mitchell Highway														
10	L2	83	5.1	83	5.1	0.600	10.8	LOS A	5.9	45.0	0.87	0.91	1.04	54.3
11	T1	383	11.0	383	11.0	0.600	11.2	LOS A	5.9	45.0	0.87	0.91	1.04	58.6
12	R2	653	5.2	653	5.2	0.814	23.7	LOS B	13.3	97.2	1.00	1.14	1.54	39.0
Approach		1119	7.1	1119	7.1	0.814	18.5	LOS B	13.3	97.2	0.95	1.04	1.33	47.8
All Vehicles		3665	7.0	3665	7.0	1.282	120.7	LOS F	66.7	496.0	0.98	2.19	4.79	18.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2046 baseline AM (Site Folder: Maximum daily production)]

Network: N101 [2046 Baseline AM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
2	T1	844	9.0	844	9.0	0.615	2.4	LOS A	5.4	40.8	0.17	0.35	0.17	37.8
Approach		844	9.0	844	9.0	0.615	2.4	LOS A	5.4	40.8	0.17	0.35	0.17	37.8
North: Sheraton Road														
8	T1	1245	6.4	1169	6.3	0.840	2.8	LOS A	16.9	124.3	0.38	0.33	0.38	38.3
Approach		1245	6.4	1169[N1]	6.3	0.840	2.8	LOS A	16.9	124.3	0.38	0.33	0.38	38.3
All Vehicles		2089	7.5	2013[N1]	7.7	0.840	2.7	NA	16.9	124.3	0.29	0.34	0.29	38.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2046 baseline PM (Site Folder: Maximum daily production)]

Network: N101 [2046 Baseline PM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	617	6.3	617	6.3	1.115	132.5	LOS F	57.1	421.7	1.00	4.20	7.41	15.6
2	T1	256	10.3	256	10.3	0.610	10.0	LOS A	4.8	36.3	0.90	1.07	1.21	43.3
3	R2	73	7.2	73	7.2	0.610	14.9	LOS B	4.8	36.3	0.90	1.07	1.21	44.2
Approach		945	7.5	945	7.5	1.115	90.3	LOS F	57.1	421.7	0.96	3.11	5.25	20.3
East: Mitchell Highway														
4	L2	20	0.0	20	0.0	0.608	15.5	LOS B	5.2	37.0	0.91	1.06	1.26	44.7
5	T1	477	3.3	477	3.3	0.608	15.9	LOS B	5.2	37.0	0.91	1.06	1.26	54.1
6	R2	192	2.7	192	2.7	0.608	21.9	LOS B	5.2	37.0	0.91	1.08	1.26	50.7
Approach		688	3.1	688	3.1	0.608	17.6	LOS B	5.2	37.0	0.91	1.07	1.26	52.9
North: Sheraton Road														
7	L2	126	11.7	126	11.7	0.539	13.3	LOS A	3.8	29.3	0.89	1.02	1.13	51.3
8	T1	268	11.0	268	11.0	0.539	13.1	LOS A	3.9	28.7	0.89	1.02	1.13	41.7
9	R2	134	3.9	134	3.9	0.539	18.4	LOS B	3.9	28.7	0.89	1.03	1.12	51.0
Approach		528	9.4	528	9.4	0.539	14.5	LOS A	3.9	29.3	0.89	1.02	1.13	47.4
West: Mitchell Highway														
10	L2	145	3.6	145	3.6	0.625	12.7	LOS A	6.5	47.5	0.91	0.98	1.15	52.9
11	T1	369	6.6	369	6.6	0.625	13.0	LOS A	6.5	47.4	0.91	0.99	1.15	56.6
12	R2	416	5.1	416	5.1	0.625	18.9	LOS B	6.5	47.4	0.91	1.00	1.15	43.3
Approach		931	5.4	931	5.4	0.625	15.6	LOS B	6.5	47.5	0.91	0.99	1.15	51.1
All Vehicles		3093	6.2	3093	6.2	1.115	38.7	LOS C	57.1	421.7	0.92	1.66	2.42	35.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2046 baseline PM (Site Folder: Maximum daily production)]

Network: N101 [2046 Baseline PM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	739	11.3	739	11.3	0.605	2.8	LOS A	5.0	38.6	0.25	0.37	0.25	37.6
Approach		739	11.3	739	11.3	0.605	2.8	LOS A	5.0	38.6	0.25	0.37	0.25	37.6
North: Sheraton Road														
8	T1	451	16.8	451	16.8	0.349	2.6	LOS A	1.8	14.6	0.17	0.36	0.17	38.7
Approach		451	16.8	451	16.8	0.349	2.6	LOS A	1.8	14.6	0.17	0.36	0.17	38.7
All Vehicles		1189	13.4	1189	13.4	0.605	2.7	NA	5.0	38.6	0.22	0.37	0.22	38.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2046 dev AM (Site Folder: Maximum daily production)]

Network: N101 [2046 Dev AM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	598	9.0	598	9.0	1.037	79.0	LOS F	36.7	276.7	1.00	2.44	4.86	23.5
2	T1	305	10.0	305	10.0	0.624	13.2	LOS A	5.2	39.3	0.90	1.06	1.22	48.7
3	R2	54	5.9	54	5.9	0.624	18.8	LOS B	5.2	39.3	0.90	1.06	1.22	50.2
Approach		957	9.1	957	9.1	1.037	54.6	LOS D	36.7	276.7	0.96	1.92	3.49	29.4
East: Mitchell Highway														
4	L2	78	20.3	78	20.3	1.307	320.7	LOS F	70.3	522.6	1.00	3.56	9.71	5.6
5	T1	603	4.0	603	4.0	1.307	319.1	LOS F	70.3	522.6	1.00	3.56	9.69	10.0
6	R2	102	19.6	102	19.6	1.307	327.0	LOS F	69.8	522.5	1.00	3.56	9.67	10.0
Approach		783	7.7	783	7.7	1.307	320.3	LOS F	70.3	522.6	1.00	3.56	9.69	9.6
North: Sheraton Road														
7	L2	137	11.5	137	11.5	1.208	224.2	LOS F	56.0	418.3	1.00	3.42	8.27	13.1
8	T1	452	5.8	452	5.8	1.208	223.3	LOS F	57.7	418.1	1.00	3.43	8.32	7.6
9	R2	239	2.6	239	2.6	1.208	228.5	LOS F	57.7	418.1	1.00	3.45	8.40	13.4
Approach		827	5.9	827	5.9	1.208	225.0	LOS F	57.7	418.3	1.00	3.43	8.33	10.3
West: Mitchell Highway														
10	L2	83	5.1	83	5.1	0.598	10.7	LOS A	5.9	44.7	0.87	0.91	1.03	54.3
11	T1	383	11.0	383	11.0	0.598	11.2	LOS A	5.9	44.7	0.87	0.91	1.03	58.7
12	R2	674	8.1	674	8.1	0.854	26.8	LOS B	15.9	119.2	1.00	1.21	1.70	36.9
Approach		1140	8.9	1140	8.9	0.854	20.4	LOS B	15.9	119.2	0.95	1.09	1.43	46.2
All Vehicles		3707	8.0	3707	8.0	1.307	138.2	LOS F	70.3	522.6	0.97	2.35	5.25	16.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2046 dev AM (Site Folder: Maximum daily production)]

Network: N101 [2046 Dev AM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total	HV]	ARRIVAL FLOWS [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh.	Dist]	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
2	T1	865	11.2	865	11.2	0.645	2.5	LOS A	6.1	47.1	0.18	0.35	0.18	37.8
Approach		865	11.2	865	11.2	0.645	2.5	LOS A	6.1	47.1	0.18	0.35	0.18	37.8
North: Sheraton Road														
8	T1	1266	8.0	1170	7.9	0.848	2.9	LOS A	17.8	133.3	0.40	0.33	0.40	38.3
Approach		1266	8.0	1170[N1]	7.9	0.848	2.9	LOS A	17.8	133.3	0.40	0.33	0.40	38.3
All Vehicles		2132	9.3	2035[N1]	9.7	0.848	2.7	NA	17.8	133.3	0.31	0.34	0.31	38.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: EMM CONSULTING | Licence: NETWORK / 1PC | Processed: Tuesday, May 25, 2021 2:38:21 PM
Project: \\emmsvr1\EMM3\2021\J210189 - Dubbo Quarry Continuation Project RtS\Technical studies\Transport\SIDRA\SIDRA v0.3 Additional scenarios.sip9

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2046 dev PM (Site Folder: Maximum daily production)]

Network: N101 [2046 Dev PM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total	HV]	ARRIVAL FLOWS [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh.	Dist]	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	638	9.4	638	9.4	1.187	191.5	LOS F	78.3	592.1	1.00	5.33	9.63	11.9
2	T1	256	10.3	256	10.3	0.612	10.0	LOS A	4.8	36.6	0.90	1.07	1.21	43.3
3	R2	73	7.2	73	7.2	0.612	15.0	LOS B	4.8	36.6	0.90	1.07	1.21	44.2
Approach		966	9.5	966	9.5	1.187	130.2	LOS F	78.3	592.1	0.97	3.88	6.77	15.9
East: Mitchell Highway														
4	L2	20	0.0	20	0.0	0.636	17.0	LOS B	5.6	40.3	0.93	1.09	1.34	43.3
5	T1	477	3.3	477	3.3	0.636	17.4	LOS B	5.6	40.3	0.93	1.09	1.34	52.9
6	R2	192	2.7	192	2.7	0.636	23.4	LOS B	5.6	40.3	0.93	1.10	1.34	49.7
Approach		688	3.1	688	3.1	0.636	19.1	LOS B	5.6	40.3	0.93	1.09	1.34	51.8
North: Sheraton Road														
7	L2	126	11.7	126	11.7	0.562	14.2	LOS A	4.1	31.1	0.90	1.03	1.17	50.6
8	T1	268	11.0	268	11.0	0.562	14.0	LOS A	4.1	30.5	0.90	1.04	1.17	41.0
9	R2	134	3.9	134	3.9	0.562	19.3	LOS B	4.1	30.5	0.90	1.05	1.17	50.4
Approach		528	9.4	528	9.4	0.562	15.4	LOS B	4.1	31.1	0.90	1.04	1.17	46.7
West: Mitchell Highway														
10	L2	145	3.6	145	3.6	0.649	13.3	LOS A	7.0	51.6	0.92	1.01	1.20	52.5
11	T1	369	6.6	369	6.6	0.649	13.6	LOS A	7.0	51.6	0.92	1.01	1.20	56.3
12	R2	437	9.6	437	9.6	0.649	19.8	LOS B	7.0	52.8	0.92	1.03	1.20	42.4
Approach		952	7.5	952	7.5	0.649	16.4	LOS B	7.0	52.8	0.92	1.02	1.20	50.3
All Vehicles		3135	7.5	3135	7.5	1.187	51.9	LOS D	78.3	592.1	0.93	1.92	2.94	30.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2046 dev PM (Site Folder: Maximum daily production)]

Network: N101 [2046 Dev PM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	760	13.7	760	13.7	0.686	2.9	LOS A	7.0	54.8	0.28	0.37	0.28	37.5
Approach		760	13.7	760	13.7	0.686	2.9	LOS A	7.0	54.8	0.28	0.37	0.28	37.5
North: Sheraton Road														
8	T1	472	20.5	472	20.5	0.372	2.7	LOS A	2.0	16.6	0.18	0.37	0.18	38.6
Approach		472	20.5	472	20.5	0.372	2.7	LOS A	2.0	16.6	0.18	0.37	0.18	38.6
All Vehicles		1232	16.3	1232	16.3	0.686	2.8	NA	7.0	54.8	0.25	0.37	0.25	38.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: EMM CONSULTING | Licence: NETWORK / 1PC | Processed: Tuesday, May 25, 2021 2:38:49 PM
Project: \\emmsvr1\EMM3\2021\J210189 - Dubbo Quarry Continuation Project RtS\Technical studies\Transport\SIDRA\SIDRA v0.3 Additional scenarios.sip9

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2046 dev AM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2046 Dev AM cumulative (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	1181	4.7	742	4.6	1.166	173.4	LOS F	83.9	610.4	1.00	4.07	9.15	13.4
2	T1	600	5.4	377	5.3	0.701	13.9	LOS A	6.9	50.2	0.94	1.11	1.34	48.1
3	R2	107	3.9	68	3.8	0.701	19.7	LOS B	6.9	50.2	0.94	1.11	1.34	50.0
Approach		1888	4.9	1187[N1]	4.7	1.166	114.0	LOS F	83.9	610.4	0.98	2.96	6.22	18.6
East: Mitchell Highway														
4	L2	96	17.6	96	17.6	1.354	359.9	LOS F	78.2	581.5	1.00	3.75	10.33	5.0
5	T1	603	4.0	603	4.0	1.354	358.6	LOS F	78.2	581.5	1.00	3.75	10.31	9.1
6	R2	102	19.6	102	19.6	1.354	366.4	LOS F	77.7	581.2	1.00	3.75	10.29	9.0
Approach		801	7.6	801	7.6	1.354	359.7	LOS F	78.2	581.5	1.00	3.75	10.31	8.6
North: Sheraton Road														
7	L2	137	11.5	137	11.5	1.419	405.2	LOS F	92.5	688.3	1.00	4.57	11.79	8.0
8	T1	515	5.5	515	5.5	1.419	404.4	LOS F	95.2	689.2	1.00	4.58	11.87	4.5
9	R2	239	2.6	239	2.6	1.419	409.8	LOS F	95.2	689.2	1.00	4.60	11.98	8.2
Approach		891	5.7	891	5.7	1.419	405.9	LOS F	95.2	689.2	1.00	4.58	11.89	6.1
West: Mitchell Highway														
10	L2	83	5.1	83	5.1	0.670	14.0	LOS A	7.5	57.2	0.96	1.04	1.26	51.9
11	T1	383	11.0	383	11.0	0.670	14.4	LOS A	7.5	57.2	0.96	1.04	1.26	55.8
12	R2	829	6.9	829	6.9	1.167	183.2	LOS F	97.8	724.9	1.00	3.69	8.16	9.7
Approach		1296	8.0	1296	8.0	1.167	122.4	LOS F	97.8	724.9	0.98	2.74	5.68	16.6
All Vehicles		4876	6.3	4174[N1]	7.4	1.419	226.0	LOS F	97.8	724.9	0.99	3.39	8.05	10.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

[N1] Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2046 dev AM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2046 Dev AM cumulative (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total	HV]	ARRIVAL FLOWS [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh.	Dist]	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
2	T1	1797	5.7	1797	5.7	1.559	516.2	LOS F	448.4	3291.7	1.00	0.89	1.86	3.3
Approach		1797	5.7	1797	5.7	1.559	516.2	LOS F	448.4	3291.7	1.00	0.89	1.86	3.3
North: Sheraton Road														
8	T1	1503	7.1	1199	7.1	0.865	2.9	LOS A	20.2	150.3	0.45	0.33	0.45	38.2
Approach		1503	7.1	1199[N1]	7.1	0.865	2.9	LOS A	20.2	150.3	0.45	0.33	0.45	38.2
All Vehicles		3300	6.3	2996[N1]	7.0	1.559	310.8	NA	448.4	3291.7	0.78	0.67	1.30	6.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2046 dev PM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2046 Dev PM cumulative (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	794	7.8	794	7.8	1.223	218.1	LOS F	100.8	753.1	1.00	6.29	10.90	10.8
2	T1	319	8.9	319	8.9	0.634	8.3	LOS A	5.6	41.9	0.90	1.06	1.18	44.3
3	R2	91	7.0	91	7.0	0.634	13.4	LOS A	5.6	41.9	0.90	1.06	1.18	45.4
Approach		1203	8.0	1203	8.0	1.223	147.1	LOS F	100.8	753.1	0.96	4.51	7.59	14.6
East: Mitchell Highway														
4	L2	108	1.0	108	1.0	1.217	243.0	LOS F	56.7	406.2	1.00	3.12	8.24	7.1
5	T1	477	3.3	477	3.3	1.217	243.5	LOS F	56.7	406.2	1.00	3.12	8.23	12.6
6	R2	192	2.7	192	2.7	1.217	249.4	LOS F	56.6	406.3	1.00	3.11	8.23	12.5
Approach		777	2.8	777	2.8	1.217	244.9	LOS F	56.7	406.3	1.00	3.12	8.23	11.9
North: Sheraton Road														
7	L2	126	11.7	126	11.7	1.338	334.8	LOS F	78.7	585.0	1.00	4.17	10.55	9.4
8	T1	599	5.3	599	5.3	1.338	333.9	LOS F	80.3	585.4	1.00	4.18	10.60	5.3
9	R2	134	3.9	134	3.9	1.338	339.5	LOS F	80.3	585.4	1.00	4.19	10.65	9.6
Approach		859	6.0	859	6.0	1.338	334.9	LOS F	80.3	585.4	1.00	4.18	10.60	6.7
West: Mitchell Highway														
10	L2	145	3.6	145	3.6	0.750	18.0	LOS B	10.0	73.4	1.00	1.16	1.51	49.2
11	T1	369	6.6	369	6.6	0.750	18.3	LOS B	10.0	73.4	1.00	1.16	1.51	52.9
12	R2	1055	4.2	1055	4.2	1.520	490.9	LOS F	246.4	1787.1	1.00	6.75	16.71	4.0
Approach		1569	4.7	1569	4.7	1.520	335.9	LOS F	246.4	1787.1	1.00	4.92	11.73	7.0
All Vehicles		4408	5.5	4408	5.5	1.520	268.1	LOS F	246.4	1787.1	0.99	4.35	9.76	9.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2046 dev PM cumulative (Site Folder: Maximum daily production)]

Network: N101 [2046 Dev PM cumulative (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
2	T1	997	11.0	997	11.0	1.000	31.7	LOS C	114.5	876.7	1.00	0.54	1.18	23.7
Approach		997	11.0	997	11.0	1.000	31.7	LOS C	114.5	876.7	1.00	0.54	1.18	23.7
North: Sheraton Road														
8	T1	1508	6.8	1055	7.4	0.780	3.3	LOS A	10.9	81.1	0.45	0.38	0.45	38.2
Approach		1508	6.8	1055[N1]	7.4	0.780	3.3	LOS A	10.9	81.1	0.45	0.38	0.45	38.2
All Vehicles		2505	8.4	2052[N1]	10.3	1.000	17.1	NA	114.5	876.7	0.72	0.46	0.80	31.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 baseline AM sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Baseline AM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	DEMAND FLOWS HV] %	ARRIVAL FLOWS [Total veh/h	ARRIVAL FLOWS HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	95% BACK OF QUEUE Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	469	5.6	469	5.6	0.898	31.6	LOS C	13.4	98.1	1.00	1.48	2.32	38.0
2	T1	249	10.1	249	10.1	0.581	13.5	LOS A	4.4	33.1	0.90	1.04	1.18	48.4
3	R2	44	7.1	44	7.1	0.581	19.2	LOS B	4.4	33.1	0.90	1.04	1.18	49.6
Approach		763	7.2	763	7.2	0.898	25.0	LOS B	13.4	98.1	0.96	1.31	1.88	41.6
East: Mitchell Highway														
4	L2	75	21.1	75	21.1	1.067	130.4	LOS F	31.7	236.3	1.00	2.31	5.40	12.4
5	T1	571	4.1	571	4.1	1.067	128.4	LOS F	31.7	236.3	1.00	2.31	5.39	20.6
6	R2	97	19.6	97	19.6	1.067	136.5	LOS F	31.6	236.5	1.00	2.31	5.39	20.2
Approach		742	7.8	742	7.8	1.067	129.7	LOS F	31.7	236.5	1.00	2.31	5.39	19.8
North: Sheraton Road														
7	L2	112	11.3	112	11.3	0.835	30.9	LOS C	8.8	66.1	0.99	1.33	1.97	41.5
8	T1	368	6.0	368	6.0	0.835	30.1	LOS C	9.0	65.0	1.00	1.33	1.97	30.7
9	R2	195	2.7	195	2.7	0.835	35.4	LOS C	9.0	65.0	1.00	1.32	1.96	41.7
Approach		675	5.9	675	5.9	0.835	31.7	LOS C	9.0	66.1	1.00	1.33	1.96	36.6
West: Mitchell Highway														
10	L2	79	5.3	79	5.3	0.526	8.7	LOS A	4.4	33.8	0.79	0.79	0.85	55.3
11	T1	362	11.0	362	11.0	0.526	9.1	LOS A	4.4	33.8	0.79	0.79	0.85	59.8
12	R2	616	5.1	616	5.1	0.711	18.3	LOS B	8.9	65.2	0.92	0.97	1.17	43.4
Approach		1057	7.2	1057	7.2	0.711	14.4	LOS A	8.9	65.2	0.87	0.90	1.04	51.0
All Vehicles		3237	7.1	3237	7.1	1.067	46.9	LOS D	31.7	236.5	0.95	1.41	2.43	32.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 baseline AM sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Baseline AM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total	HV]	ARRIVAL FLOWS [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh.	Dist]	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
2	T1	686	8.9	686	8.9	0.500	2.4	LOS A	3.4	25.8	0.13	0.35	0.13	37.9
Approach		686	8.9	686	8.9	0.500	2.4	LOS A	3.4	25.8	0.13	0.35	0.13	37.9
North: Sheraton Road														
8	T1	1014	6.4	1009	6.4	0.726	2.5	LOS A	8.8	65.3	0.23	0.34	0.23	38.6
Approach		1014	6.4	1009[N1]	6.4	0.726	2.5	LOS A	8.8	65.3	0.23	0.34	0.23	38.6
All Vehicles		1700	7.4	1696[N1]	7.4	0.726	2.5	NA	8.8	65.3	0.19	0.35	0.19	38.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

[N1] Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 baseline PM sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Baseline PM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total	HV]	ARRIVAL FLOWS [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh.	Dist]	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	502	6.3	502	6.3	0.837	18.6	LOS B	10.6	77.9	1.00	1.43	1.84	39.6
2	T1	208	10.6	208	10.6	0.458	6.6	LOS A	3.0	22.8	0.82	0.91	0.95	45.5
3	R2	59	7.1	59	7.1	0.458	11.5	LOS A	3.0	22.8	0.82	0.91	0.95	46.5
Approach		769	7.5	769	7.5	0.837	14.8	LOS B	10.6	77.9	0.94	1.25	1.53	41.6
East: Mitchell Highway														
4	L2	19	0.0	19	0.0	0.511	12.0	LOS A	3.8	27.7	0.85	0.97	1.03	48.7
5	T1	451	3.5	451	3.5	0.511	12.4	LOS A	3.8	27.6	0.85	0.98	1.03	56.9
6	R2	181	2.9	181	2.9	0.511	18.4	LOS B	3.8	27.6	0.85	1.00	1.03	53.2
Approach		651	3.2	651	3.2	0.511	14.0	LOS A	3.8	27.7	0.85	0.99	1.03	55.7
North: Sheraton Road														
7	L2	103	11.2	103	11.2	0.401	10.3	LOS A	2.4	18.8	0.82	0.92	0.91	53.5
8	T1	219	11.1	219	11.1	0.401	10.1	LOS A	2.5	18.4	0.82	0.93	0.91	44.5
9	R2	109	3.8	109	3.8	0.401	15.5	LOS B	2.5	18.4	0.82	0.95	0.90	53.0
Approach		432	9.3	432	9.3	0.401	11.5	LOS A	2.5	18.8	0.82	0.93	0.91	49.8
West: Mitchell Highway														
10	L2	138	3.8	138	3.8	0.533	9.6	LOS A	4.6	33.6	0.81	0.84	0.90	55.1
11	T1	349	6.6	349	6.6	0.533	9.9	LOS A	4.6	33.5	0.81	0.84	0.90	59.2
12	R2	393	5.1	393	5.1	0.533	15.8	LOS B	4.6	33.5	0.81	0.88	0.90	46.3
Approach		880	5.5	880	5.5	0.533	12.5	LOS A	4.6	33.6	0.81	0.86	0.90	53.8
All Vehicles		2732	6.1	2732	6.1	0.837	13.4	LOS A	10.6	77.9	0.86	1.01	1.11	49.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: \\emmsvr1\EMM3\2021\J210189 - Dubbo Quarry Continuation Project RtS\Technical studies\Transport\SIDRA\SIDRA v0.3 Additional scenarios.sip9

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 baseline PM sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Baseline PM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	601	11.2	601	11.2	0.453	2.7	LOS A	2.8	21.4	0.20	0.37	0.20	37.7
Approach		601	11.2	601	11.2	0.453	2.7	LOS A	2.8	21.4	0.20	0.37	0.20	37.7
North: Sheraton Road														
8	T1	366	16.7	366	16.7	0.284	2.6	LOS A	1.4	10.8	0.16	0.36	0.16	38.7
Approach		366	16.7	366	16.7	0.284	2.6	LOS A	1.4	10.8	0.16	0.36	0.16	38.7
All Vehicles		967	13.3	967	13.3	0.453	2.6	NA	2.8	21.4	0.19	0.36	0.19	38.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 dev AM sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Dev AM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total	HV]	ARRIVAL FLOWS [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh.	Dist]	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	491	9.7	491	9.7	0.924	35.9	LOS C	15.6	118.4	1.00	1.58	2.57	35.9
2	T1	249	10.1	249	10.1	0.553	12.4	LOS A	4.1	30.8	0.88	1.02	1.12	49.3
3	R2	44	7.1	44	7.1	0.553	18.1	LOS B	4.1	30.8	0.88	1.02	1.12	50.5
Approach		784	9.7	784	9.7	0.924	27.4	LOS B	15.6	118.4	0.96	1.37	2.03	40.1
East: Mitchell Highway														
4	L2	75	21.1	75	21.1	1.130	177.1	LOS F	41.5	309.4	1.00	2.67	6.62	9.6
5	T1	571	4.1	571	4.1	1.130	175.2	LOS F	41.5	309.4	1.00	2.67	6.62	16.4
6	R2	97	19.6	97	19.6	1.130	183.2	LOS F	41.3	309.6	1.00	2.67	6.61	16.1
Approach		742	7.8	742	7.8	1.130	176.4	LOS F	41.5	309.6	1.00	2.67	6.62	15.7
North: Sheraton Road														
7	L2	112	11.3	112	11.3	0.879	38.5	LOS C	10.4	77.5	1.00	1.42	2.25	38.3
8	T1	368	6.0	368	6.0	0.879	37.6	LOS C	10.5	76.3	1.00	1.42	2.25	27.5
9	R2	195	2.7	195	2.7	0.879	42.8	LOS D	10.5	76.3	1.00	1.42	2.25	38.6
Approach		675	5.9	675	5.9	0.879	39.2	LOS C	10.5	77.5	1.00	1.42	2.25	33.4
West: Mitchell Highway														
10	L2	79	5.3	79	5.3	0.522	8.6	LOS A	4.4	33.2	0.78	0.79	0.83	55.3
11	T1	362	11.0	362	11.0	0.522	9.0	LOS A	4.4	33.2	0.78	0.79	0.83	59.9
12	R2	637	8.3	637	8.3	0.745	19.4	LOS B	10.1	75.8	0.95	1.00	1.26	42.5
Approach		1078	9.0	1078	9.0	0.745	15.1	LOS B	10.1	75.8	0.88	0.91	1.08	50.3
All Vehicles		3279	8.3	3279	8.3	1.130	59.5	LOS E	41.5	309.6	0.95	1.52	2.80	28.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 dev AM sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Dev AM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	707	11.6	707	11.6	0.522	2.4	LOS A	3.7	28.7	0.14	0.35	0.14	37.9
Approach		707	11.6	707	11.6	0.522	2.4	LOS A	3.7	28.7	0.14	0.35	0.14	37.9
North: Sheraton Road														
8	T1	1035	8.3	1026	8.2	0.745	2.6	LOS A	9.7	72.8	0.25	0.34	0.25	38.5
Approach		1035	8.3	1026 N1	8.2	0.745	2.6	LOS A	9.7	72.8	0.25	0.34	0.25	38.5
All Vehicles		1742	9.7	1734 N1	9.7	0.745	2.5	NA	9.7	72.8	0.20	0.34	0.20	38.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 dev PM sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Dev PM (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Sheraton Road														
1	L2	523	10.1	523	10.1	0.902	26.4	LOS B	14.2	108.2	1.00	1.66	2.29	35.8
2	T1	208	10.6	208	10.6	0.460	6.6	LOS A	3.0	23.0	0.83	0.92	0.95	45.4
3	R2	59	7.1	59	7.1	0.460	11.6	LOS A	3.0	23.0	0.83	0.92	0.95	46.5
Approach		791	10.0	791	10.0	0.902	20.1	LOS B	14.2	108.2	0.94	1.41	1.84	38.7
East: Mitchell Highway														
4	L2	19	0.0	19	0.0	0.534	12.9	LOS A	4.1	29.9	0.87	1.00	1.09	47.6
5	T1	451	3.5	451	3.5	0.534	13.3	LOS A	4.1	29.8	0.87	1.00	1.09	56.2
6	R2	181	2.9	181	2.9	0.534	19.3	LOS B	4.1	29.8	0.87	1.02	1.09	52.5
Approach		651	3.2	651	3.2	0.534	14.9	LOS B	4.1	29.9	0.87	1.01	1.09	54.9
North: Sheraton Road														
7	L2	103	11.2	103	11.2	0.417	10.9	LOS A	2.6	19.8	0.84	0.94	0.94	53.1
8	T1	219	11.1	219	11.1	0.417	10.7	LOS A	2.6	19.4	0.84	0.95	0.94	43.9
9	R2	109	3.8	109	3.8	0.417	16.1	LOS B	2.6	19.4	0.84	0.96	0.94	52.6
Approach		432	9.3	432	9.3	0.417	12.1	LOS A	2.6	19.8	0.84	0.95	0.94	49.3
West: Mitchell Highway														
10	L2	138	3.8	138	3.8	0.554	10.0	LOS A	5.0	36.4	0.82	0.85	0.93	55.0
11	T1	349	6.6	349	6.6	0.554	10.2	LOS A	5.0	36.4	0.82	0.86	0.93	59.2
12	R2	414	9.9	414	9.9	0.554	16.5	LOS B	4.9	37.4	0.82	0.90	0.94	45.6
Approach		901	7.7	901	7.7	0.554	13.1	LOS A	5.0	37.4	0.82	0.88	0.94	53.3
All Vehicles		2774	7.6	2774	7.6	0.902	15.3	LOS B	14.2	108.2	0.87	1.07	1.23	48.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 dev PM sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Dev PM (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	622	14.2	622	14.2	0.476	2.7	LOS A	3.1	24.0	0.21	0.37	0.21	37.7
Approach		622	14.2	622	14.2	0.476	2.7	LOS A	3.1	24.0	0.21	0.37	0.21	37.7
North: Sheraton Road														
8	T1	387	21.2	387	21.2	0.306	2.6	LOS A	1.5	12.5	0.17	0.36	0.17	38.7
Approach		387	21.2	387	21.2	0.306	2.6	LOS A	1.5	12.5	0.17	0.36	0.17	38.7
All Vehicles		1009	16.9	1009	16.9	0.476	2.7	NA	3.1	24.0	0.19	0.37	0.19	38.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 dev AM cumulative sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Dev AM cumulative (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	841	5.9	734	5.8	1.181	186.3	LOS F	87.6	643.7	1.00	4.26	9.62	12.7
2	T1	427	6.4	373	6.3	0.710	14.4	LOS A	6.9	51.1	0.94	1.12	1.36	47.8
3	R2	77	5.5	67	5.4	0.710	20.2	LOS B	6.9	51.1	0.94	1.12	1.36	49.3
Approach		1345	6.0	1174[N1]	6.0	1.181	122.2	LOS F	87.6	643.7	0.98	3.08	6.53	17.7
East: Mitchell Highway														
4	L2	86	19.5	86	19.5	1.303	319.1	LOS F	67.4	502.8	1.00	3.47	9.39	5.6
5	T1	571	4.1	571	4.1	1.303	317.5	LOS F	67.4	502.8	1.00	3.47	9.38	10.1
6	R2	97	19.6	97	19.6	1.303	325.4	LOS F	67.2	502.7	1.00	3.46	9.37	10.0
Approach		754	7.8	754	7.8	1.303	318.7	LOS F	67.4	502.8	1.00	3.47	9.38	9.6
North: Sheraton Road														
7	L2	112	11.3	112	11.3	1.095	140.0	LOS F	33.0	246.0	1.00	2.51	5.54	18.7
8	T1	407	5.9	407	5.9	1.095	138.9	LOS F	33.8	245.3	1.00	2.51	5.57	11.4
9	R2	195	2.7	195	2.7	1.095	144.0	LOS F	33.8	245.3	1.00	2.52	5.60	19.0
Approach		714	5.9	714	5.9	1.095	140.5	LOS F	33.8	246.0	1.00	2.52	5.57	14.9
West: Mitchell Highway														
10	L2	79	5.3	79	5.3	0.633	12.9	LOS A	6.6	50.3	0.93	1.00	1.18	52.6
11	T1	362	11.0	362	11.0	0.633	13.4	LOS A	6.6	50.3	0.93	1.00	1.18	56.7
12	R2	731	7.5	731	7.5	1.030	81.0	LOS F	46.1	343.6	1.00	2.22	4.26	18.8
Approach		1172	8.4	1172	8.4	1.030	55.5	LOS D	46.1	343.6	0.97	1.76	3.10	28.7
All Vehicles		3984	7.1	3813[N1]	7.4	1.303	144.0	LOS F	87.6	643.7	0.98	2.65	5.86	15.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Organisation: EMM CONSULTING | Licence: NETWORK / 1PC | Processed: Tuesday, May 25, 2021 2:38:17 PM
Project: \\emmsvr1\EMM3\2021\J210189 - Dubbo Quarry Continuation Project RtS\Technical studies\Transport\SIDRA\SIDRA v0.3 Additional scenarios.sip9

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 dev AM cumulative sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Dev AM cumulative (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	1268	6.9	1268	6.9	1.116	122.7	LOS F	250.2	1854.6	1.00	0.49	1.28	10.8
Approach		1268	6.9	1268	6.9	1.116	122.7	LOS F	250.2	1854.6	1.00	0.49	1.28	10.8
North: Sheraton Road														
8	T1	1179	7.8	1103	7.6	0.798	2.7	LOS A	13.0	96.7	0.31	0.34	0.31	38.4
Approach		1179	7.8	1103[N1]	7.6	0.798	2.7	LOS A	13.0	96.7	0.31	0.34	0.31	38.4
All Vehicles		2447	7.3	2372[N1]	7.5	1.116	66.9	NA	250.2	1854.6	0.68	0.42	0.83	18.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 101 [Mitchell Hwy/Sheraton Rd 2031 dev PM cumulative sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Dev PM cumulative (Network Folder: General)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	617	8.9	617	8.9	0.903	22.2	LOS B	15.9	120.0	1.00	1.62	2.12	37.7
2	T1	247	9.8	247	9.8	0.467	5.0	LOS A	3.2	24.2	0.80	0.83	0.89	46.3
3	R2	71	7.5	71	7.5	0.467	10.1	LOS A	3.2	24.2	0.80	0.83	0.89	47.4
Approach		935	9.0	935	9.0	0.903	16.8	LOS B	15.9	120.0	0.93	1.35	1.70	40.4
East: Mitchell Highway														
4	L2	86	1.2	86	1.2	1.293	311.9	LOS F	63.6	456.5	1.00	3.26	8.79	5.7
5	T1	451	3.5	451	3.5	1.293	312.3	LOS F	63.6	456.5	1.00	3.26	8.78	10.2
6	R2	181	2.9	181	2.9	1.293	318.3	LOS F	63.5	456.5	1.00	3.26	8.78	10.2
Approach		718	3.1	718	3.1	1.293	313.8	LOS F	63.6	456.5	1.00	3.26	8.78	9.7
North: Sheraton Road														
7	L2	103	11.2	103	11.2	1.095	145.4	LOS F	30.8	229.8	1.00	2.42	5.32	18.2
8	T1	433	6.1	433	6.1	1.095	144.3	LOS F	31.3	229.3	1.00	2.43	5.34	11.0
9	R2	109	3.8	109	3.8	1.095	149.7	LOS F	31.3	229.3	1.00	2.43	5.36	18.5
Approach		645	6.5	645	6.5	1.095	145.4	LOS F	31.3	229.8	1.00	2.43	5.34	13.7
West: Mitchell Highway														
10	L2	138	3.8	138	3.8	0.606	11.0	LOS A	6.0	44.1	0.86	0.91	1.04	54.2
11	T1	349	6.6	349	6.6	0.606	11.3	LOS A	6.0	44.1	0.86	0.91	1.04	58.7
12	R2	799	5.4	799	5.4	0.991	56.0	LOS D	37.9	277.5	1.00	1.83	3.25	24.3
Approach		1286	5.6	1286	5.6	0.991	39.0	LOS C	37.9	277.5	0.95	1.48	2.41	34.8
All Vehicles		3584	6.1	3584	6.1	1.293	107.4	LOS F	63.6	456.5	0.96	1.97	4.03	18.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Sheraton Rd crossing 2031 dev PM cumulative sensitivity (Site Folder: Maximum daily production)]

Network: N101 [Sensitivity 2031 Dev PM cumulative (Network Folder: General)]

Site Category: (None)
Pedestrian Crossing (Unsignalised)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
2	T1	766	12.2	766	12.2	0.580	2.8	LOS A	4.6	35.3	0.26	0.37	0.26	37.5
Approach		766	12.2	766	12.2	0.580	2.8	LOS A	4.6	35.3	0.26	0.37	0.26	37.5
North: Sheraton Road														
8	T1	1054	8.3	1009	8.4	0.750	3.2	LOS A	9.4	70.3	0.40	0.38	0.40	38.3
Approach		1054	8.3	1009[N1]	8.4	0.750	3.2	LOS A	9.4	70.3	0.40	0.38	0.40	38.3
All Vehicles		1820	9.9	1775[N1]	10.2	0.750	3.1	NA	9.4	70.3	0.34	0.38	0.34	38.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: Akçelik M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

[N1] Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Appendix B

Updated mitigation measures

Mitigation measures

Aspect	Measures
Noise and blasting	Noise and vibration mitigation measures will be implemented in accordance with a Noise and Blasting Management Plan. **Construction:** Construction mitigation measures to address noise generation from work practice methods and plant and equipment suggested in the NVIA include: work practice methods: • regular reinforcement (such as toolbox talks) of the need to minimise noise; • review and implementation of feasible and reasonable mitigation measures to reduce noise; • limiting the use of portable radios, public address systems or other methods of site communication that may unnecessarily impact upon nearby residents; • developing routes for the delivery of materials and parking of vehicles to minimise noise; • where possible, avoiding the use of equipment that generates impulsive noise; and • notifying potentially affected residents prior to the commencement of works; plant and equipment: • where possible, choose quieter plant and equipment based on the optimal power and size to most efficiently perform the required tasks; • operate plant and equipment in the quietest and most efficient manner; and • regularly inspect and maintain plant and equipment to minimise noise level increases, to ensure that all noise attenuation devices are operating effectively. **Operation:** The project was designed iteratively to manage potential operational noise impacts. This included 'at the source' mitigation of the primary screen/secondary (cone) crusher and construction off the bund along the boundaries of the WEA and SEA. **Blasting:** The project will adopt good industry practice blast management including real time monitoring of all blasts. It is noted that blasting is generally undertaken no more than once per week and that blast criteria adopted herein are applied to all development, including relatively larger scale mining operations where blasting occurs daily through the year. The BMP will include blasting design considerations to minimise the potential for flyrock. **Negotiated agreements**: Holcim will use its best endeavours to negotiate noise agreements with the owners of R2 and R3 to mitigate the noise impacts of the project. Holcim will commence discussions with the landowners in early 2021 and will report on the progress of noise agreement negotiations in the Submissions Report for the project.
Air quality	**Legislative requirements** The quarry will continue to comply with the POEO requirements as follows: • as a scheduled activity under the POEO regulations, the quarry operates under EPL 2212 issued by the EPA and is required to comply with requirements including emission limits, monitoring and pollution-reduction programmes (PRPs); • the quarry does not feature significant odour-generating emission sources and is, therefore, unlikely to generate odorous emissions; and • no large-scale open burning is performed on-site. **Best practice dust control**

Mitigation measures

<table>
<tr><th>Aspect</th><th>Measures</th></tr>
<tr><td></td><td>From the data considered in the AQIA, it has been concluded that the most significant sources of particulate matter emissions from the project’s operations are associated with material handlings, hauling and wind erosion. To manage particulate matter emissions from the quarry’s existing and proposed operations, a range of mitigation measures and management practices are required.
Measures implemented at the quarry and include in the emissions estimation (where emission reduction factors exist) for both the existing and proposed scenarios include:
• water sprays at conveyor transfer points;
• scrapers used to clean conveyor belts;
• cyclone and water injection on drills;
• design blasts to minimise numbers needed per year;
• minimising truck and dozer travel speeds;
• ensure dozer routes are kept moist with the use of water carts;
• minimising trucks and front-end-loader (FEL) drop heights;
• watering of exposed areas where practical;
• watering unpaved haul routes;
• paved haul routes;
• bunds in the SEA and WEA;
• partial and full rehabilitation; and
• watering at coal crusher screen.
In addition to the above measures, Table 5.5 of Appendix E provides an overview of relevant applicable best practice dust control management measures as listed in the NSW Coal Benchmarking Study: International Best Practice to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining (the Best Practice Report) (Katestone 2011).</td></tr>
<tr><td></td><td>Potential measures to manage fly ash stored at the site include:
• locating stockpile(s) away from water courses and within impervious areas;
• administration of chemical suppressors on stockpiles where required; and
• fly ash to be ordered on an as needs basis and minimising the amounts of fly ash stored where possible.</td></tr>
<tr><td>Biodiversity</td><td>Offsets
A total of 132 ecosystem credits are required to offset the residual impacts of the project, comprising 127 credits from vegetation communities and 5 credits from paddock trees. 76
Biodiversity management measures
<table>
<tr><th>Impact</th><th>Action and outcome</th><th>Responsibility</th><th>Timing</th></tr>
<tr><td colspan="4">Direct impact/ prescribed impact</td></tr>
<tr><td>Clearing of native vegetation</td><td>Avoiding and minimising clearing impacts where possible.
Clearing limits will be clearly marked to prevent clearing beyond the extent of the disturbance area. Tree clearing and disturbance will be limited to the disturbance area.
Appropriate signage such as ‘No Go Zone’ or ‘Environmental Protection Area’ will be installed.</td><td>Construction site manager.</td><td>Prior to and during vegetation clearing.</td></tr>
</table>
</td></tr>
</table>

Mitigation measures

Aspect	Measures			
		The locations of 'No Go Zones' will be included in site inductions.		
	Clearing of hollow bearing trees/habitat trees, resulting in fauna injury and mortality	Limiting removal of trees (including dead trees) to that required within the disturbance area during the installation of project infrastructure. A clearing procedure will be implemented during the clearing of the disturbance area, as follows: preclearance surveys will be completed to determine if any nesting birds are present; and a suitably trained fauna handler will be present during hollow-bearing tree (including dead hollow-bearing trees) clearing to rescue and relocate displaced fauna if found on-site. Appropriate exclusion fencing will be installed around trees and woodland to be retained within the disturbance area during construction in accordance with Standards Australia (2009).	Construction site manager and suitably trained fauna handler.	Prior to and during tree clearing.
	Vehicle collision with fauna	The site speed limit will be 40 km/hr.	Construction site manager	During construction and operation.
	Disturbance of river/creek beds and banks during crossing construction (including construction of creek crossings).	An erosion and sediment control (ESC) plan will be prepared in accordance with *Managing Urban Stormwater: Soils and Construction* (Landcom 2004) prior to commencement of construction. Disturbed areas will be stabilised and rehabilitated as soon as possible to reduce the exposure period. Source controls, such as mulching, matting and sediment fences, will be utilised where appropriate. A specific creek crossing sub-plan will be included as part of the CEMP.	Construction site manager.	Design stage, during vegetation clearing and construction.
	Indirect impact			
	Transfer of weeds and pathogen to and from site.	Appropriate wash down facilities will be available to clean vehicles and equipment prior to arrival and when leaving site.	Construction site manager.	Design stage, during vegetation clearing and construction.
	Artificial lighting impacting fauna behaviour	Lighting will comply with Australian Standard AS4282 (INT) 1997 – Control of Obtrusive Effects of Outdoor Lighting.	Construction site manager.	During construction and operation.
Aboriginal heritage	**Management of identified sites within the survey area** Avoidance is proposed for three sites: DQ-IF2, DQ-OS1 and DQ-OS2. The three sites will be protected by a semi-permanent or permanent boundary fence around the visible extent of the sites and/or the PAD areas to avoid inadvertent impacts. The isolated artefact from Aboriginal site DQ-IF1 will be relocated by a qualified archaeologist and RAP representatives prior to any impacts for the site. Management measures proposed are summarised in the table below.			

Mitigation measures

Aspect	Measures

Site significance, impact, and management summary

Site name	AHIMS site number	Site type	Significance	Impact type	Project component	Minimum buffer required (m)	Management strategy
DQ-IF1	44-4-0383	Isolated find	Low	Direct	Haul road	N/A	Relocation
DQ-IF2	44-4-0384	Isolated find with PAD	Moderate	None	Nil	20 m	Avoidance
DQ-OS1	36-1-0773	Artefact scatter with PAD	Low	None	Nil	50 m	Avoidance
DQ-OS2	36-1-0774	Artefact scatter with PAD	Moderate	None	Nil	50 m	Avoidance

Special procedures

Special procedures will be implemented if ancestral remains or new sites are discovered during extraction works. These procedures are detailed in Appendix G and summarised below.

In the event that known or suspected human remains are encountered, the following procedure will be followed as soon as the suspected remains are discovered:

- all work in the immediate vicinity will cease and the site supervisor notified;
- the NSW Police and the State coroner to be notified;
- contact Heritage NSW for advice on identification; and
- if it is determined that the skeletal material is of Aboriginal ancestry, the RAPs will be contacted and consultative arrangements will be made to discuss ongoing care or reinterment of the remains.
- In the event of discovery of new Aboriginal sites within the development footprint, the following procedure will be followed:
- the immediate vicinity (an approximate 20 m buffer from the visible extent of the site) will be secured to protect the find;
- an archaeologist and select RAPs to determine the significance of the object(s); and
- any new sites must be registered in the AHIMS database.

In the event that newly identified sites will be impacted by the project and cannot be avoided, they will be managed in a manner commensurate with the assessed significance, consistent with the management measures provided for the identified sites similar.

Aboriginal Heritage Management Plan

An Aboriginal Heritage Management Plan will be developed in consultation with DPIE, the RAPs and Heritage NSW. It will provide detail of:

- all Aboriginal sites identified during the archaeological investigation for the project;
- management measures and their progress towards completion;
- measures to ensure ongoing consultation and involvement of project RAPs;
- protocols for newly identified sites;
- protocols for educating staff and contractors of their obligations relating to Aboriginal cultural heritage values through a site induction process;
- protocols for suspected human skeletal materials;

Mitigation measures

<table>
<thead>
<tr><th>Aspect</th><th>Measures</th></tr>
</thead>
<tbody>
<tr><td></td><td>

protocols for the ongoing care of salvaged Aboriginal objects; and
provisions for review and updates for the AHMP.

</td></tr>
<tr><td>Historical heritage</td><td>All workers and contractors will be informed of their obligations under the NSW <i>Heritage Act 1977</i>. If any potentially significant heritage items are uncovered during the course of the works, the Heritage Council of NSW and relevant Commonwealth department will be contacted for advice.</td></tr>
<tr><td>Surface water</td><td>
<p>All surface water management will be constructed in accordance with the methods recommended in <i>Managing Urban Stormwater: Volume 1</i> (Landcom 2004) and <i>Volume 2E</i> (for mines and quarries) (DECC 2008).</p>
<p>Holcim will continue monitoring water quality and levels in groundwater and surface water in the water storages and Eulomogo Creek.</p>
<p>A water management plan will also be prepared which details the management measures that will be implemented to manage quarry groundwater inflows and to monitor surface water levels and water quality.</p>
<p>Contingency measures to address excess water within the water management system are provided in the below table</p>
<p>Contingency measures</p>
<table>
<thead>
<tr><th>Trigger</th><th>Contingency measure</th></tr>
</thead>
<tbody>
<tr><td>Groundwater inflows exceed existing WAL allocations</td><td>

If practical, maintain higher water levels in pit sumps to reduce groundwater inflows.
Acquire additional WAL entitlements.

</td></tr>
<tr><td>The water management system is in surplus and discharges from the East Pit are required frequently, outside of significant wet weather events.</td><td>

Irrigation activities can be expanded to include the proposed bund walls around the WEA and SEA, new rehabilitation areas established progressively during the project life and unused haul roads. This would substantially increase water use.
There is potential for Holcim to supply water to nearby irrigators for beneficial use.

</td></tr>
</tbody>
</table>
</td></tr>
<tr><td>Groundwater</td><td>
<p>The potential for detrimental impacts to groundwater quality from a contamination event will be mitigated through standard construction environmental management including:</p>

development and implementation of an OEMP which would detail relevant procedures, including but not limited to;

plant and equipment refuelling;
vehicle wash down and/or cement truck washout; and
notification requirements to the EPA for incidents that cause material harm to the environment;

development and implementation of a site-specific spill management plan as part of the OEMP; and
all fuels and combustible liquids will be managed and handled in accordance with <i>AS 1940 The storage and handling of flammable liquids</i>, the WH&S Act and Regulation and the <i>Storage and Handling of Dangerous Goods – Code of Practice 2005</i> (WorkCover 2005).

</td></tr>
<tr><td>Land resources</td><td>
<p>Soil inventory</p>
<p>The details of the quality and distribution of soil materials able or unable to support plant growth will guide material handling processes (ie stripping, stockpiling, sorting and amelioration) and eventual rehabilitation of disturbed areas. The LSCA notes that effective soil management is imperative to successful rehabilitation, and post mining land use objectives.</p>
</td></tr>
</tbody>
</table>

Mitigation measures

Aspect	Measures
	The fertility of the topsoil materials has generally been assessed as moderate to high; however, handling and stockpiling could easily degrade the fertility of these soils. To assist with soil management, a summary of the estimated growth media volumes is provided in Table 12 of the LSCA. It is noted that bulk earthworks and handling of materials has the potential to mix different soil layers and materials and either improve, or degrade, the quality of materials as growth media. Landloch recommends that, should growth media be salvaged from these areas, it may be useful and cost-effective to undertake more detailed survey work to delineate soils and allow the segregation of undesirable materials during stripping **Contamination** To manage any potential contamination impacts associated with the construction and operation of the project, a construction environmental management plan (CEMP) should be prepared to address applicable provisions under the POEO Act. Work, health and safety controls to prevent exposure of construction workers to contamination would be implemented in accordance with the requirements of the *Work Health and Safety Act 2011* and the *Work Health and Safety Regulation 2017*. As well as typical environmental management measures, other components of the CEMP would include: • an unexpected finds protocol, including procedures to identify and manage contamination, if encountered; • procedures for the handling and storage of waste including contaminated materials; • surface water management and sediment and erosion control; • requirements for the storage of dangerous goods and other materials; and • decommissioning requirements, including remediation and rehabilitation if necessary. To manage spills and leaks associated during the operation of the project, spill containment measures will be installed in permanent operational facilities where there is a risk of impact from spills. Site management activities would be documented in an OEMP prepared for the project.
Rehabilitation	**Erosion and sediment control** The following erosion and sediment control measures will be implemented to mitigate erosion risk and predicted rates: • implementation of progressive erosion and sediment control plans for individual areas to ensure sediment erosion risks are identified and appropriately managed and mitigated; • rock/soil matrices and hydromulching will be implemented to further reduce erosion rates along pit walls; • dispersive soils will be treated with gypsum during the stripping process to improve electrochemical stability and such parameters as ESP and EMP; • a sump will be excavated into the floor of the SEA to collect runoff during the rehabilitation phase and until 60% of soil surface has been retained; and • implementation of sowing techniques for the revegetation of the final landforms. **Post-closure monitoring** Rehabilitation monitoring to assess rehabilitation progress will be undertaken annually during operation and every 5 years once rehabilitation has commenced (or less if the rehabilitation criteria have been met). Post-rehabilitation, review of the monitoring frequency will be undertaken based on the performance of the revegetation and an appropriate monitoring frequency determined. Rehabilitation monitoring will identify areas requiring maintenance and identify and address deviations from the expected. Rehabilitation areas will be assessed against performance indicators and regularly inspected for the following aspects: • evidence of any erosion or sedimentation; • success of initial establishment cover; • natural regeneration of improved pasture;

Mitigation measures

Aspect	Measures
	• weed infestation (primarily noxious weeds, but also where rehabilitation areas are dominated by other weed); • integrity of drainage, erosion and sediment control structures; and • general stability of the rehabilitation areas. Monitoring techniques will include photographic monitoring and soil sampling in established transects or quadrants within the rehabilitation areas. Specific monitoring within grazing and also native woodland and riparian rehabilitation areas will be undertaken such as indicators of grazing productivity and rapid ecological assessment techniques. **Post-closure maintenance** Where monitoring has identified that rehabilitation criteria has not been met, maintenance works may be undertaken and include: • re-seeding and, where necessary, re-soiling and/or the application of specialised treatments; • use of materials such as composted mulch to areas with poor vegetation establishment; • replacement of drainage controls if they are found to be inadequate for their intended purpose, or compromised by vegetation or wildlife; and • de-silting or repair of sediment control structures. Maintenance works will also be carried out to target specific issues, like weeds management, the upkeep of access tracks and public safety. The spreading of noxious weeds could impact the success of revegetation and will be controlled through the following measures: • herbicide spraying or scalping weeds; • post-closure use of rehabilitated areas as a working farm, with associated management practices; and • rehabilitation inspections to identify potential weed infestations. Access tracks may be required to facilitate the revegetation and ongoing maintenance of rehabilitation areas. These tracks will be kept to a practical minimum and will be designed prior to the completion of the project. Controls will be implemented to minimise the potential for impacts on public safety and may include maintenance of fencing and warning signs around areas that have the potential to cause harm and that are accessible to the public. As pit walls will be rehabilitated to a safe and stable gradient of 18°, permanent bunding is not anticipated to be required. Additionally, any large rocks within the pit walls that pose a safety risk post-rehabilitation will be removed and relocated. **Management and closure plans** A RMP will be developed to provide a structured and documented process for managing and improving rehabilitation activities at the quarry. The plan will serve as a process map for interdepartmental administration of rehabilitation activities within the quarry planning and implementation
Traffic and transport	**Driver's Code of Conduct** Holcim will implement a Driver's Code of Conduct to facilitate the future safe site operations for all the quarry trucks traffic using Sheraton Road, in combination with all the other road users (including school buses) and pedestrian traffic. The Code of Conduct will be required to be read and signed by all truck drivers operating to and from the quarry and will address all relevant road safety and traffic management measures such as, compliance with all rules and regulations, vehicle speeds, driver behaviour near schools, residential and shopping areas, courtesy to other road users, fatigue management, drug and alcohol testing, checking vehicles and covering loads, the appropriate use of compression braking, procedures for accidents and breakdowns, procedures for oversize vehicles accessing the site, and procedures for monitoring and compliance.

Mitigation measures

Aspect	Measures
	Outgoing heavy vehicle movements from the site will be suspended during 3:15-3:45pm on school days. **Road pavement maintenance** A road maintenance agreement for Sheraton Road will be discussed with the DRC. **Stakeholder engagement** Further meetings of the CCC will continue to address traffic and road safety related matters.
Social	The proposed mitigation and management strategies for potential social impacts are summarised in the below table.

Summary of mitigation and management strategies for identified social risks

Impact	Description of social risk	Proposed mitigation and management strategies	Responsibility
Way of life	Access to adequate employment (ongoing)	Local participation strategy and plan and provision of training and upskilling opportunities for workers	Holcim Truck contractors
	Access to adequate employment (short-term)	Local participation strategy and plan	Holcim Construction contractors
	Noise from truck movements causing amenity issues	Continued maintenance of community grievance mechanism	Holcim
	Noise from quarry operations causing amenity issues	Development of community and stakeholder engagement strategy that includes provisions for residents affected by noise Continued maintenance of community grievance mechanism	Holcim Contractors
	Dust causing amenity issues	Continued maintenance of community grievance mechanism	Holcim Contractors
	Voids and bunding affecting visual amenity	Development of community and stakeholder engagement strategy that includes provisions for residents affected by visual changes from voids and bunding Continued maintenance of community grievance mechanism	Holcim
	Land rehabilitation	Inclusion of local stakeholders in the rehabilitation and closure planning and implementation process	Holcim
Culture impacts	Destruction of culturally significant Indigenous artefacts	Development and implementation of AHMP, including avoidance measures and unexpected finds and discovery protocols	Holcim Contractors
Health and community well-being	Public safety issues due to truck movements through school zones	Implementation of Driver's Code of Conduct continued engagement in the form of the CCC and a grievance mechanism	Holcim Dubbo Regional Council Representatives of schools located

Mitigation measures

<table>
<tr><th>Aspect</th><th>Measures</th></tr>
<tr><td></td><td>
<table>
<tr><td></td><td></td><td></td><td>along Sheraton Road
South Keswick Quarry</td></tr>
<tr><td></td><td>Dust exacerbating health related issues</td><td>Include information about air quality in any updates provided to the local community as part of Holcim’s community and stakeholder engagement strategy
Continued maintenance of community grievance mechanism</td><td>Holcim
Contractors</td></tr>
<tr><td>Surrounding</td><td>Discharge of water from the quarry into Eulomogo Creek</td><td>Implementation of water management strategy</td><td>Holcim</td></tr>
<tr><td>Personal and property rights</td><td>Land rehabilitation</td><td>Inclusion of local stakeholders in the rehabilitation and closure planning and implementation process</td><td>Holcim</td></tr>
<tr><td>Fears and aspirations</td><td>Contributions to continued economic growth and development of the local area and the region</td><td>Operation of the Dubbo Quarry Continuation Project and liaison with Dubbo Regional Council for economic opportunities</td><td>Holcim</td></tr>
</table>
<p>The community grievance mechanism will be formalised with contact details provided on Holcim’s website and records of community correspondence kept at the quarry.</p>
<p>A monitoring and management framework will be developed to ensure that the identified social impacts are monitored over time to measure the effectiveness or otherwise of the proposed mitigation and management measures, including changing conditions and trends in the local and regional areas over the same period. This will:</p>

track progress of mitigation and management strategies;
access actual project impacts against predicted impacts;
identify how information will be captured for reporting to impacted stakeholders including landholders, communities and government on progress and achievements;
provide key performance indicators, targets and outcomes;
identify responsible parties; and
describe mechanisms for ongoing adaptation of management measures when and if required.

</td></tr>
<tr><td>Hazard</td><td>Hazard related procedures and plans currently implemented at the quarry will continue to operate under the project.</td></tr>
<tr><td>Bushfire</td><td>
<p>The table below provides a summary of recommendations to achieve compliance with the relevant requirements for PBP for bush fire protection for asset protection zones, construction standards, access, water supply, provision of services, and emergency management.</p>
<p>Summary of recommended management measures</p>
<table>
<tr><th>Mitigation element</th><th>Objectives</th></tr>
<tr><td>Asset protection zones</td><td>APZs are provided commensurate with the construction of the building.
A defendable space is provided.
Vegetation is managed within asset protection zones in perpetuity.</td></tr>
</table>
</td></tr>
</table>

Mitigation measures

Aspect	Measures	
	Property access	Safe access to/from the public road system is provided for firefighters providing property protection during a bushfire and for occupant egress for evacuation; Firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation. The capacity of access roads is adequate for firefighting vehicles. There is appropriate access to water supply.
	Water supply	Adequate services of water for the protection of buildings during and after the passage of bushfire are provided. Water supply requirements for firefighting are designed in accordance with the relevant Australian Standards and PBP.
	Other services	Location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings. Location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.
	Construction standards	The proposed building can withstand bush fire attack in the form of embers, radiant heat and flame contact.
	Landscaping	Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.
	Potential ignition sources	To provide for the storage of hazardous materials away from the hazard wherever possible.
	Bushfire management plan (including emergency management)	A BFMP for the construction and operation of the project, will provide details for the ongoing management and maintenance of bushfire protection measures. The BFMP should include a bushfire emergency management and evacuation plan to provide suitable emergency and evacuation (and relocation) arrangements for occupants of the development.
Visual	Consultation with rural residences R2 and R3 in regard to the overall moderate visual impacts of the project will inform the need for additional design solutions, mitigation measures, or interventions to reduce the level of visual impact. Additional tree plantings will be undertaken within the project area between the western disturbance boundary and the boundary with Lot 221.	

Appendix C

Aboriginal Cultural Heritage Assessment – Scar Tree Survey Addendum

Level 3, 175 Scott Street
Newcastle NSW 2300

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E info@emmconsulting.com.au

www.emmconsulting.com.au

11 May 2021

Holcim (Australia) Pty Ltd
Level 8, 799 Pacific Highway
CHATSWOOD NSW 2067

Re: Aboriginal Cultural Heritage Assessment Addendum - Southern Extension Area Tree Inspection

1 Introduction

Holcim (Australia) Pty Limited (Holcim) are the owners and operators of Dubbo Quarry (the quarry) located on Sheraton Road, Dubbo. The quarry has operated since 1980 under a development consent granted by Dubbo Regional Council (DRC). Accessible basalt resources within the existing quarry boundary are close to exhaustion and planning approval is required to allow the quarry to continue operating. Holcim is, therefore, seeking approval for the Dubbo Quarry Continuation Project (henceforth referred to as 'the project') which involves the continued operation of the quarry through the development of two new resource areas to the south (Southern Extension Area; SEA) and west (Western Extension Area; WEA) of the existing quarry boundary.

The project is classified as State significant development (SSD) under Part 4, Division 4.1 of the NSW *Environmental Planning Assessment Act 1979* (EP&A Act). An Environmental Impact Statement (EIS) was prepared for the project, which included completion of an Aboriginal Cultural Heritage Assessment (ACHA) in consultation with Registered Aboriginal Stakeholders (RAPs) which was finalised in December 2020. Public exhibition of the EIS has been completed March 2021.

The ACHA noted a limitation of the archaeological survey was that large quantities of rock mounded around some trees within the SEA prohibited comprehensive inspection for evidence of cultural scarring. There are 30 documented culturally modified (carved or scarred) trees within a 10 km radius of the project area, accounting for 38.5% of existing AHIMS registrations. As such, the ACHA included a recommendation that the rock be removed to allow inspection by a suitably qualified archaeologist.

The following presents the results of inspection of trees within the SEA disturbance footprint.

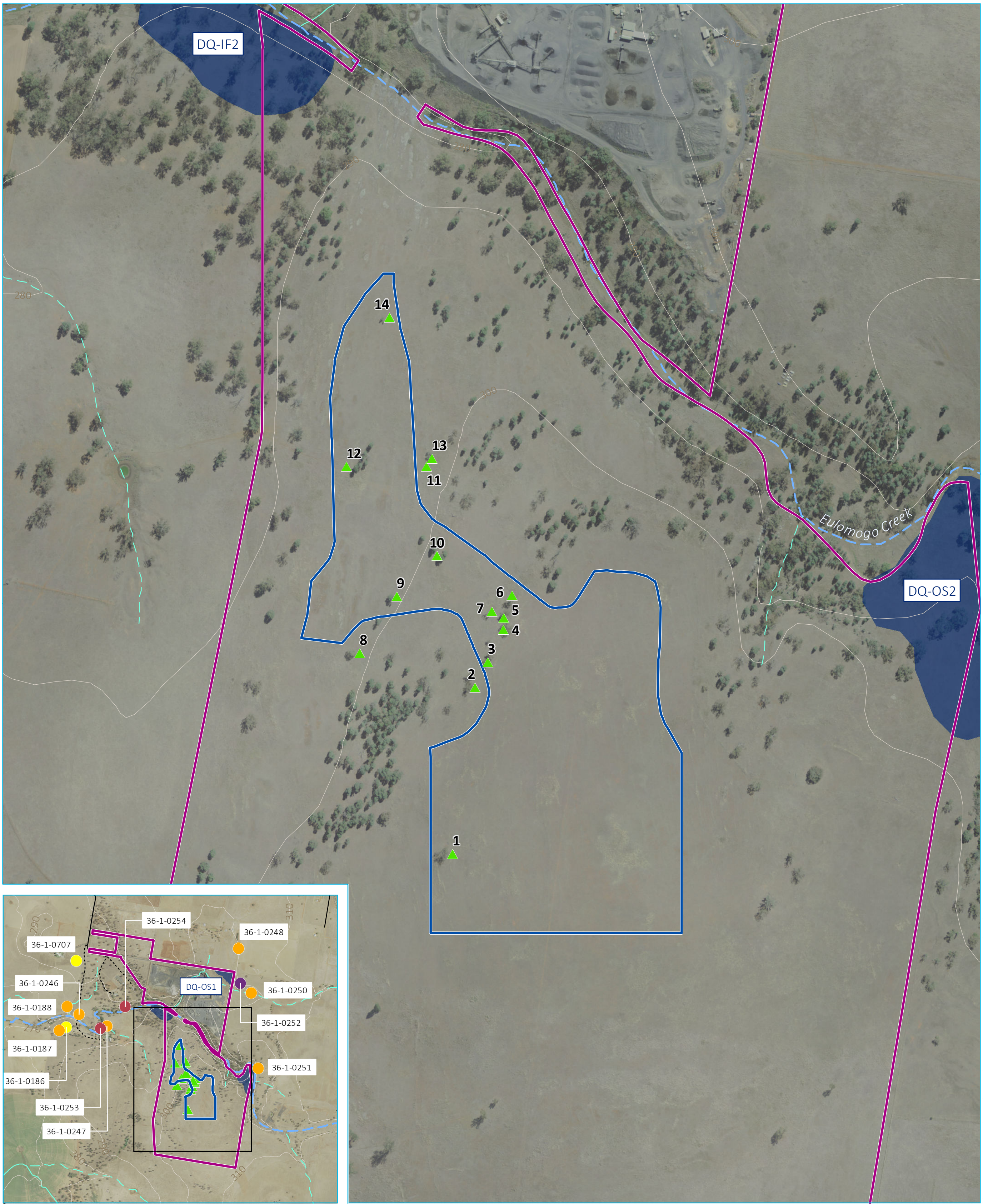
This report will form an addendum to the ACHA prepared for the project and will be provided to the Department of Planning with the Submissions Report for the project.

2 Inspection

Supervision of rock removal and inspection of trees located within the SEA disturbance footprint was undertaken by EMM Senior Archaeologist Morgan Wilcox on 11 – 12 February 2021.

Approximately 26 trees were present across 14 locations within the SEA disturbance footprint including both mature and juvenile, living and dead specimens of primarily Yellow Box eucalypts and White Cypress Pine species (refer to Figure 2.1; Plate 1 to Plate 14).

No evidence of cultural scarring was observed on any of the trees located within the SEA disturbance footprint.



\\Emmsvr1\EMM\Jobs\2018\J180313 - Dubbo Quarry EIS\GIS\02_Maps\AddendumLetterReport\G001_SEAtreeInspectionResults_20210416_02.mxd 16/04/2021

Source: EMM (2021); DFSI (2020); OEH (2019)

KEY

▲ Tree inspection location
▭ Project area
▭ Southern extension area (SEA)
— Minor road
······ Vehicular track

— Contour (10 m)
Strahler stream order
- - 1st order
— 2nd order
- - 3rd order

▬ Aboriginal site
AHIMS site type
● Artefact scatter
● Axe grinding groove
● Isolated find
● Scarred tree

SEA tee inspection results

Dubbo Quarry Continuation Project
ACHA addendum - southern extension area tree inspection
Figure 2.1

Plate 1 Area 1 – Yellow Box Eucalypts

Plate 2 Area 2 – Yellow Box Eucalypts

Plate 3 Area ID 3 – Yellow Box Eucalypt

Plate 4 Area 4 – Yellow Box Eucalypt

Plate 5 Area 5 – Yellow Box Eucalypts

Plate 6 Area 6 – Yellow Box Eucalypt

Plate 7 Area 7– Yellow Box Eucalypt

Plate 8 Location 8 - Yellow Box Eucalypt or Blakely's Red Gum

Plate 9 Location 9 – White Cypress Pine

Plate 10 Location 10 – White Cypress Pine

Plate 11 Location 11 – White Cypress Pine

Plate 12 Location 12 – White Cypress Pine

Plate 13 Location 13 – White Cypress Pine

Plate 14 Location 14 – White Cypress Pine

3 Aboriginal consultation

A copy of this addendum letter report was provided to RAPs on 16 April 2021. RAPs were invited to provide comment on the draft report, with responses were requested by 30 April 2021. A reminder email was sent to all RAPs on 29 April 2021. No responses were received as of 11 May 2021.

Consultation documentation is provided in Appendix A.

4 Close

Results of the inspection have not identified any additional Aboriginal heritage constraints to be considered by the project.

The ACHA recommendation for additional assessment has been satisfied, and no further archaeological assessment of the project area is required.

Management measures as outlined in the ACHA continue to apply to the project including, but not limited to, development of an Aboriginal Heritage Management Plan (AHMP) in consultation with RAPs and Heritage NSW.

Yours sincerely

MWilcox

Morgan Wilcox
Senior Archaeologist
mwilcox@emmconsulting.com.au

Appendix A: Consultation Documentation

Morgan Wilcox

From:	Morgan Wilcox
Sent:	Thursday, 29 April 2021 5:57 PM
To:	carrs.brocky@gmail.com; suellyn@dlalc.com.au; Grace.Toomey@dubbo.nsw.gov.au
Cc:	ceo@dlalc.com.au; admin@dlac.com.au
Subject:	RE: Dubbo Quarry Continuation Project - Tree Inspection Report
Attachments:	J180313_ACHA Addendum_Tree Inspection_1.0.pdf

Good evening Suellyn and Paul,

Just following up on the below email. Comments on the attached letter report have been requested by COB tomorrow (Friday 30 April 2021). If you have any comments please feel free to call or email, or if you need more time please just let me know.

Kind regards
Morgan

Morgan Wilcox
Senior Archaeologist
Bushfire, Ecology, Heritage and Spatial Solutions (EHSS) Division
T 02 4907 4800 **M** 0436 443 205 **D** 02 4907 4821
www.emmconsulting.com.au

From: Morgan Wilcox
Sent: Friday, 16 April 2021 4:04 PM
To: carrs.brocky@gmail.com; suellyn@dlalc.com.au; Grace.Toomey@dubbo.nsw.gov.au
Cc: ceo@dlalc.com.au; admin@dlac.com.au
Subject: Dubbo Quarry Continuation Project - Tree Inspection Report

Dear Suellyn (Dubbo LALC) and Paul (Dubbo Aboriginal Community Working Party),

Thank you for your continued involvement as an Aboriginal stakeholder for the Dubbo Quarry Continuation Project.

The Project Environmental Impact Statement (EIS), and accompanying technical studies including Aboriginal Heritage assessment, have been through public exhibition which was completed March 2021. Heritage NSW reviewed the ACHA and were satisfied with the assessment and raised no issues.

As you may recall, a limitation of the ACHA was that large quantities of rock mounded around some trees within the southern portion of the project area prevented us from being able to inspect those trees for any evidence of cultural scarring. As such, the ACHA included a recommendation that the rock be removed to allow inspection by a suitably qualified archaeologist.

On 11-12 February 2021 I supervised the removal of the rock from around trees located within the SEA and completed an inspection. The attached is a short letter report presenting the results of this inspection for your review and comment. If you could please provide any comments by **COB Friday 30 April 2021**.

As always, if you have any questions please feel free to give me a call.

Kind regards
Morgan

Morgan Wilcox
Senior Archaeologist
Ecology, Heritage and Spatial Solutions (EHSS) Division

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Connect with us

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