Appendix T

Traffic impact assessment

Traffic Impact Assessment

Woodlawn Advanced Energy Recovery Centre

Prepared for Veolia Environmental Services (Australia) Pty Ltd

July 2022

Traffic Impact Assessment

Woodlawn Advanced Energy Recovery Centre

Veolia Environmental Services (Australia) Pty Ltd

J200931 RP3

July 2022

Version	Date	Prepared by	Approved by	Comments
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8 July 2022

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Executive Summary

ES1 Introduction

Veolia Environmental Services (Australia) Pty Ltd (Veolia) owns and operates the Woodlawn Eco Precinct (the Eco Precinct), located on Collector Road, Tarago, NSW. The Eco Precinct is approximately 6 kilometres (km) west of the township of Tarago in the Goulburn Mulwaree local government area (LGA).

The Eco Precinct is a major waste treatment and disposal complex incorporating the Bioreactor, a landfill, the BioEnergy Power Station which operates on landfill gas, a mechanical and biological treatment facility (MBT), a wind farm and a range of other facilities. The Eco Precinct is critical waste management infrastructure for NSW, as it accepts approximately 40% of Sydney's residual putrescible waste. The Eco Precinct is the end point for an integrated waste management logistics chain which also includes two transfer terminals in Sydney (Clyde and Banksmeadow) and the Crisps Creek intermodal facility near Tarago.

Veolia proposes to develop and operate the Woodlawn Advanced Energy Recovery Centre (ARC) (the project), an energy recovery facility (ERF), at the Eco Precinct. Development of the ARC will bring an additional waste management technology to the Eco Precinct. Of the 1.18 mtpa of waste currently approved for transport by rail from Sydney to the Eco Precinct, up to 380,000 tpa will be diverted from landfill to the ARC. This project is not proposing any additional waste transport to the Eco Precinct.

Veolia's Eco Precinct is over 6,000 hectares (ha) in size, with main area of waste management operations comprising 300 ha in the centre. Most of the remainder is buffer lands used for agricultural purposes. The ARC is proposed within the area of waste operations,

This traffic impact assessment (TIA) has been prepared by EMM Consulting Pty Ltd.

ES2 Existing environment

The Woodlawn Eco Precinct is serviced by a network of roads used by vehicles accessing the Eco Precinct. These roads are:

- Braidwood Road – a north-south aligned state road between the township of Goulburn and Tarago. It is a sealed road and provides one lane each way and is approximately 3.5 m wide with 1 m shoulders on each side.
- Bungendore Road – a north-south aligned regional road between Tarago (Goulburn Street) and Tarago Road (south), its continuation which connects to Bungendore. It is a sealed road and provides one lane each way and is approximately 3.5 m wide with 1 m shoulders on each side.
- Collector Road – a local road between Bungendore Road (east) and Federal Highway (west) and is 650 m north-east of the site. At the intersection with the site access road, it is give-way controlled and provides one full lane and one deceleration lane on approach and one lane on departure.

Key intersections relevant to the project include Collector Road and the existing site access, Bungendore Road/Collector Road, and Braidwood Road/Wallace Street. The intersections were surveyed between 6 am and 9 am, as well as between 3pm and 6 pm on Thursday 12 August 2021. The result of the survey indicate that the network peak hours are 6:15 am to 7:15 am and 4:15 pm to 5:15 pm.

A program of tube counts was undertaken on Collector Road (location 1), Bungendore Road (locations 2 and 3) and Braidwood Road (location 4), for a 14-day period between 12 August 2021 and 25 August 2021. The program recorded the annual average daily traffic, weekly 85th percentile speed, and heavy vehicle percentages. The following findings were noted:

- Traffic volumes were highest at the survey locations 3 and 4. This is primarily because these points were located on regional and state roads respectively, and generally carry higher volumes of traffic between regional areas including between Goulburn, Canberra and Tarago.
- 85% percentile speeds were consistently under the road posted speed limits of 100 km/h. Speeds were comparatively lower at locations 3 and 4 as these included the uphill section of Bungendore Road south-west of Crisps Creek and Braidwood Road on the approach to the Tarago urban area.
- Heavy vehicle percentages were higher at location 1. This section of the road predominantly carries heavy vehicle traffic transporting waste between Crisps Creek IMF and the Eco Precinct.

Veolia is currently in discussion with Goulburn Mulwaree Council about a program of works in relation to the uphill section of Bungendore Road discussed above.

ES2.1 Existing traffic generation

Within the Eco Precinct, the MBT facility and the Bioreactor are approved to receive waste. Waste is transported either from the Crisps Creek IMF by road or from regional areas by road. The Eco Precinct is approved to receive up to 1,180,000 tpa of waste for transport to the Eco Precinct from Sydney by rail via the Crisps Creek IMF and is approved to receive up to 130,000 tpa of waste (with written consent) from the regional area by road. The Eco Precinct is also approved to receive up to a total of 120 trucks per day from the Crisps Creek IMF. The only other significant generator of heavy vehicle movements relating to waste activities at the Eco Precinct is the transport of cover material for use in the Bioreactor.

Waste is approved to be received at the Eco Precinct six days per week, however the majority of truck movements occur Monday to Friday. Therefore, average daily truck movements have been estimated using a five day week (250 days per year) which provides a conservative basis for existing daily trucks movements. The existing typical hourly profile distribution of incoming and outgoing heavy vehicles from the site weighbridge data is presented in Figure 3.5 of the TIA.

The Eco Precinct currently operates below approved limits for waste by rail from Sydney. During the peak AM and PM periods, the site currently experiences an average of 30 heavy vehicle movements respectively. When factoring in the approved limits of the facility, there will typically be an increase of four heavy vehicles arriving in the peak hour (eight two-way movements). The Eco Precinct is approved to receive a total of 120 trucks per day from the Crisps Creek IMF.

ES2.2 Haulage routes

On average, 75% of the incoming trucks carry waste from the Crisps Creek IMF. The remaining 25% of trucks, which includes trucks transporting daily cover material for the Bioreactor, originate from various regions in NSW and arrive by the regional road network.

Feedstock arriving by rail is transported by trucks from Crisps Creek IMF and travels only via Bungendore Road and Collector Road. Other feedstock arrives by road transport travelling via four approved haulage routes. These routes include:

- via Tarago Road/Bungendore Road and Collector Road for deliveries from Australian Capital Territory (ACT), Queanbeyan and Palerang;
- via Kings Highway, Goulburn Road, Goulburn Street, Bungendore Road, and Collector Road for deliveries from Eurobodalla;
- via Braidwood Road, Goulburn Street, Bungendore Road, and Collector Road for deliveries from Upper Lachlan and Yass Valley; and
- via Hume Highway, Braidwood Road, Goulburn Street, Bungendore Road, and Collector Road for deliveries from Goulburn-Mulwaree.

ES2.3 Crash analysis

Between 2016 and 2020, there were 34 crashes on Braidwood Road and Bungendore Road (including at intersections) within Goulburn-Mulwaree LGA. There were no crashes recorded on Collector Road. Most of the crashes occurred on undivided sections of two-way road and there were no crashes recorded on the Bungendore Road route between Crisps Creek IMF and the Eco Precinct.

ES2.4 Public and active transport

There are no public bus services running in the vicinity of the site. School bus service S557 operates between Tarago and Braidwood schools via Braidwood Road and Kings Highway.

The closest train station is located in Tarago which is approximately 8.5 km from the site entrance by road. The train service is not a viable mode of transport to the Eco Precinct.

There is currently no pedestrian or cycling infrastructure in the vicinity of the site due to the rural nature of the locality.

ES2.5 Parking

There are two parking areas available at the Eco Precinct. The main car park has a capacity of approximately 75 parking spaces. The parking area towards the western side of the Eco Precinct serves the MBT and has a capacity of approximately 20 parking spaces.

ES3 Potential impacts

ES3.1 Construction

Construction traffic would include the construction workforce and construction heavy vehicle movements. The majority of construction workers (275) are expected to commute in private mini-buses to the Eco Precinct. The peak daily and peak hourly construction traffic for the project is presented in Table ES1. There may be periods during construction, where movements exceed the peak daily and/or hourly construction traffic numbers presented. However, these are likely to be 'one-off' events which will not be typically representative of the overall construction program.

Table ES1 Peak daily and hourly construction traffic

Construction stage	Peak Daily		Peak Hourly	
	Trips	Movements	Trips	Movements
Light vehicles	25	50	25	25
Heavy vehicles	20	40	2	4
Buses	50	100	25	50
Total	**95**	**190**	**52**	**79**

A 'vehicle trip' is defined as a vehicle entering the site once (1 movement) and a vehicle exiting the site once (1 movement)

The construction workforce is expected to be primarily sourced and accommodated in Goulburn and therefore would travel to/from the site from Goulburn. Construction heavy vehicles are assumed to arrive 50% from south of Bungendore/Collector Road intersection (from Canberra via Bungendore) and 50% from north (from Goulburn via Tarago). Over mass vehicles may be required to construct the project. Relevant permits from the National Heavy Vehicle Regulator will be acquired if needed.

ES3.2 Intersection performance

The key intersections were modelled to assess how construction of the project would impact on network performance. The modelling provided key performance indicators, including level of service (LOS), which is a categorisation of the average delay in seconds encountered by all vehicles passing through the intersection. LOS A to C are good to satisfactory, D is nearing capacity, E is at capacity an F is unsatisfactory. LOS results are expressed in the form morning peak hour/afternoon peak hour, such as C/B.

When current baseline traffic volumes are combined with the proposed peak hour construction traffic, the following is noted:

- the Collector Road/ARC site access would operate at LOS A on all approaches and experience the longest delay (10.5 seconds) during the PM peak;
- the Bungendore Road/Collector Road intersection would continue to operate at LOS A on all approaches and experience the longest delay (13.3 seconds) during the AM peak; and
- the Braidwood Street/Wallace Street/Lumley Road would continue to operate at LOS B or better on all approaches and experience the longest delay (14.9 seconds) during the PM peak.

The Collector Road/existing site access intersection was not modelled because construction traffic is expected to use the new site access.

ES3.3 Mid-block-capacity

A mid-block capacity analysis was undertaken for Collector Road and Bungendore Road during project construction. The analysis is based on a vehicle's average travel speed and is a measurement of traffic condition. The posted speed-limits for Collector Road and Bungendore Road are 100 km/h.
For mid-block capacity LOS A-C are good-satisfactory, D is nearing capacity, E is at Capacity and F is unsatisfactory. Collector Road presently operates at LOS A or B under existing conditions. During construction, the project will add to peak hour traffic and is expected to operate at LOS B or C. The percentage of heavy vehicles during the PM peak period is expected to notably increase to 42%, from 7% under existing conditions.

Bungendore Road presently operates at LOS D/C under existing conditions. During construction, the project will add to peak hour traffic and is expected to operate at LOS E/D. This indicates that the project construction may contribute to some additional delays during peak hour on some days during the peak construction period.

Upon completion of project construction work, the LOS for Collector Road and Bungendore Road will return to the existing traffic conditions.

ES3.4 Operation

The ARC is anticipated to process up to 380,000 tpa of residual waste feedstock. The feedstock will be within existing approved volumes that can be transported to the Eco Precinct, and hence this project does not propose any increase in approved waste volumes transported to the Eco Precinct for processing in the ARC. There will be other traffic movements associated with the project, including heavy vehicles delivering clay for the ongoing development of encapsulation cell, delivery of consumables (eg ammonia and activated carbon), transport of incinerator bottom ash aggregates (IBAA) material offsite, other incidental traffic movements (eg visitor site tours), and workforce light vehicles.

The majority of the operational workforce (75%) is expected to primarily arrive from the east, by the ARC access road (from Tarago/Goulburn and Bungendore/Canberra). The remaining 25% of traffic is expected from the west (from Collector Road and other western areas). Movements associated with the construction of the encapsulation cell and the delivery of consumables is assumed to occur 100% to and from the east via Collector Road (50% from Goulburn and 50% from Canberra). During operation, all trucks transporting feedstock to the Eco Precinct will continue to use the approved haulage routes.

The project will include a car parking area of 60 parking spaces. A separate area is reserved for visitor bus drop-off.

ES3.4.1 Intersection performance

Key intersections were modelled to assess how operation of the project would impact on network performance. When current baseline traffic volumes are combined with the proposed peak hour operational traffic, the following is noted:

- the Collector Road/existing site access would continue to operate at LOS A on all approaches and experience the longest delay (8.8 seconds) during the AM peak;
- the Collector Road/ARC site access would operate at LOS A on all approaches and experience the longest delay (10.5 seconds) during the PM peak;
- the Bungendore Road/Collector Road intersection would continue to operate at LOS A on all approaches and experience the longest delay (13.5 seconds) during the AM peak;
- the Braidwood Street/Wallace Street/Lumley Road would continue to operate at LOS A on all approaches and experience the longest delay (13.3 seconds) during the PM peak.

ES3.4.2 Mid-block-capacity

A mid-block capacity analysis was undertaken for Collector Road and Bungendore Road during project operation.

Collector Road presently operates at LOS /A under existing conditions. During operation, the project will add to peak hour traffic, however the road would continue to operate at LOS B/A.

Bungendore Road presently operates at LOS D/C under existing conditions. During operation, the project will add to peak hour traffic, however the road would continue to operate at LOS D/C.

ES3.4.3 ARC site access

The proposed ARC site access has been assessed in accordance with the *Austroads Guide to Road Design Part 4A (Unsignalised and Signalised Intersections)* (Austroads 2017a). The assessment finds that sight distances to the right (500m) and left (300m) would meet the minimum requirement (248m) as stipulated in the Austroads Guide to Road Design.

The need for additional intersection turn lanes (eg basic, auxiliary lane and channelised) was assessed in accordance with the current intersection design standards (Austroads 2017b) *Guide to Road Design Part 4, Intersections and Crossings General*. The assessment finds that under the peak hour traffic volumes during construction and operation scenarios, the proposed Type BAR and Type BAL intersection turn treatments will be sufficient as per the Austroads Warrant Chart requirement.

Truck queuing at the ARC facility was also analysed. The facility will be serviced by a new incoming weighbridge on the site access road. The typical service time per vehicle on weighbridge for trucks bringing waste material will not exceed 1 minute and the truck arrival rate during the operation phase of the project will be 10 vehicles per hour. Required queue lengths were calculated in accordance with the *Austroads Guide to Traffic Management Part 2: Traffic Theory Concepts* (Austroads 2020). This analysis determined that the facility would require a maximum of 23 m queuing length from the weighbridge to the site access on Collector Road. The project would provide a distance of approximately 500 m between the proposed weighbridge and new site access which would be able to accommodate peak hour queuing.

ES3.4.4 Bungendore Road climbing lane

It is recognised that the community has raised concerns about traffic delays on the hill climbing out of Crisps Creek due to the slower moving heavy haulage vehicles transporting waste from the IMF to the Eco Precinct. The assessment indicates that, during construction, these delays are expected to increase slightly, with the peak hour LOS dropping from D/C to E/D.

The level of service during construction indicates that traffic flow is close to the limit of stable flow and is approaching an unstable flow situation where drivers may be restricted in their freedom to select their desired speeds and to manoeuvre within the traffic stream. After the peak construction period this section of road should return to its current level of service at D/C.

ES4 Management measures

No material traffic impacts are expected during operation of the project. Accordingly, only construction mitigation measures have been proposed.

The management and mitigation measures are summarised in Table 6.1 of this TIA.

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1 Introduction

1.1 Background

Veolia Environmental Services (Australia) Pty Ltd (Veolia) owns and operates the Woodlawn Eco Precinct (the Eco Precinct), located on Collector Road, approximately 6 kilometres (km) west of Tarago, approximately 50 km south of Goulburn and 70 km north of Canberra. The Eco Precinct is located in the Goulburn Mulwaree local government area (LGA). The Eco Precinct has provided sustainable and innovative waste management services since 2004.

Veolia proposes to develop and operate the Woodlawn Advanced Energy Recovery Centre (ARC) (the project), an energy recovery facility (ERF), at the Eco Precinct. This involves the development of an additional waste management technology at the Eco Precinct, processing a portion of the residual waste feedstock received at the site, and generating electricity from the energy recovery process.

The Eco Precinct comprises the following integrated waste management operations, energy recovery technologies and energy generation, and other sustainable land uses:

- Woodlawn Bioreactor (the Bioreactor) – a general solid waste landfill in which leachate is recirculated to help bacteria break down the waste, enhancing the early generation of gas, enabling more efficient capture and extraction of landfill gas, including leachate and landfill gas management systems.
- Woodlawn BioEnergy Power Station – utilises landfill gas from the Bioreactor to generate electricity.
- Woodlawn Mechanical Biological Treatment (MBT) Facility – processes municipal solid waste (MSW) to extract the organic content for use in tailings dam remediation.
- Agriculture – a working farm (sheep and cattle) that applies sustainable management practices.
- Aquaculture and horticulture – operation which uses captured waste heat from the BioEnergy Power Station for use in sustainable fish farming and hydroponic horticulture at the Eco Precinct.
- Renewable energy generation – the Woodlawn Wind Farm (operated by Iberdrola) which has an installed capacity of 48.3 MW, and a solar farm (operated by Veolia) with an installed capacity of 2.3 MW.

The Eco Precinct is served by the Crisps Creek Intermodal Facility (IMF) near the village of Tarago. Crisps Creek IMF is approximately 6 km to the east of the Eco Precinct (8.5 km by road), shown in Figure 1.1. Eco Precinct operations are augmented by two waste transfer terminals located in Sydney: the Clyde Transfer Terminal, which commenced operation in 2004 with the Bioreactor and Crisps Creek IMF, and the Banksmeadow Transfer Terminal, which commenced operation in 2016.

Waste is transported from the Sydney waste transfer terminals in purpose-built shipping containers by rail via the Goulburn-Bombala Railway line to the Crisps Creek IMF. The Crisps Creek IMF has an approved throughput of 1.18 million tonnes per annum (tpa). On receipt at the Crisps Creek IMF, containers are loaded on to trucks for delivery to the Eco Precinct. Waste from the regional area is also approved to be transported to the Eco Precinct by road, up to 130,000 tpa (with written consent).

The Eco Precinct also includes two other primary operations leased to other operators, the Woodlawn Wind Farm and the Woodlawn Mine.

1.2 The Eco Precinct

The Eco Precinct includes operational areas used for waste management, energy generation and mining, as well as primary production including sustainable agriculture, aquaculture and horticulture.

The land use zoning of the Eco Precinct under the Goulburn Mulwaree LEP is predominantly IN3 Heavy Industrial, which includes the majority of the waste management, energy generation and mining activities, with the balance zoned RU2 Rural Landscape. Land immediately to the north and south is zoned RU2 Rural Landscape, land to the west is zoned RU1 Primary Production, and land to east, which incorporates the village of Tarago, is zoned a combination of RU5 Village, RU6 Transitional, RU1 Primary Production and E3 Environmental Management.

Land immediately surrounding the operational areas of the Eco Precinct is owned by Veolia, providing a buffer between operations and surrounding private properties.

Access to the Eco Precinct is from Collector Road about 6 km north-west from the Bungendore Road/Collector Road intersection. The existing access is used by both light and heavy vehicles.

1.3 Purpose of this report

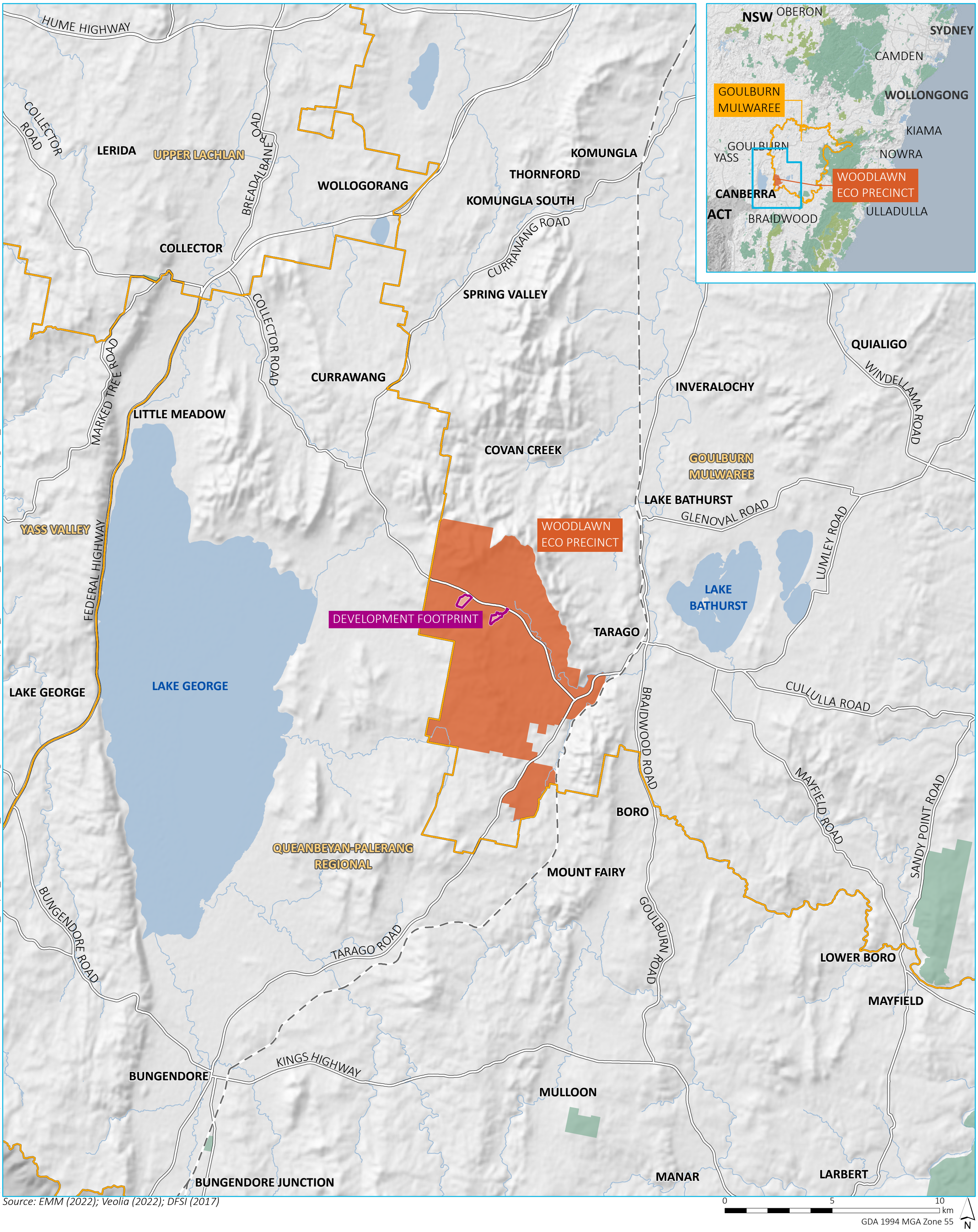
This Traffic Impact Assessment (TIA) supports the environmental impact statement (EIS) for the project. It documents the assessment methods and results, the initiatives built into the project design to avoid and minimise associated impacts to traffic and transport, and the mitigation and management measures proposed to address any residual impacts not able to be avoided.

The specific objectives of this assessment are to:

- describe the existing traffic and transport environment including baseline performance of the network;
- describe the initiatives built into the project design to avoid and minimise associated traffic and transport impacts;
- describe the proposed construction and operational activities and the forecast performance of the network as a result of the proposed construction and operational activities; and
- identify any mitigation and management measures proposed to address any residual impacts not able to be avoided.

This TIA has been prepared generally in accordance with the requirements of the New South Wales Government's *Guide to Traffic Generating Developments* (RTA, 2002) and incorporated the following investigations and analysis:

- review of previous approvals and background traffic data;
- site inspection and traffic surveys;
- consultation with Transport for New South Wales (TfNSW) and Goulburn Mulwaree Council;
- swept path intersection analysis;
- SIDRA intersection analysis; and
- consideration of future intersection and road upgrade requirements and maintenance impacts.



Source: EMM (2022); Veolia (2022); DFSI (2017)

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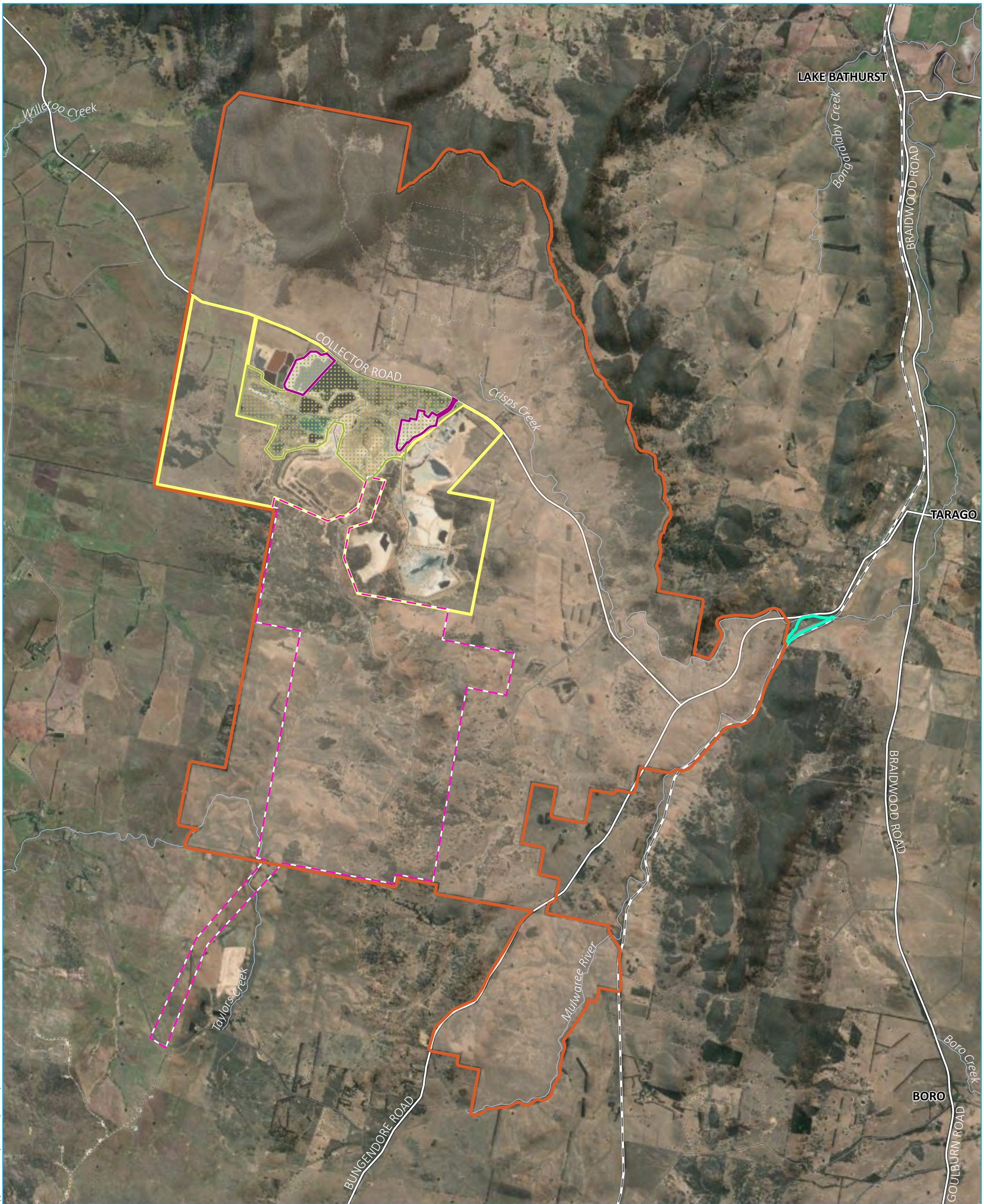
KEY
- Development footprint
- Woodlawn Eco Precinct
- Rail line
- Major road
- Watercourse
- Named waterbody
- NPWS reserve
- Local government area

Regional setting

Woodlawn Advanced Energy Recovery Centre
Traffic impact assessment
Figure 1.1

creating opportunities



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Source: EMM (2022); Veolia (2022); DFSI (2017)

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KEY

- Development footprint
- Veolia integrated waste management operations
- Woodlawn Eco Precinct
- Crisps Creek Intermodal Facility (IMF)
- Woodlawn Mine operations area
- Woodlawn Wind Farm
- Rail line
- Major road
- Minor road
- Vehicular track
- Watercourse

Local setting

Woodlawn Advanced Energy Recovery Centre
Traffic impact assessment
Figure 1.2

EMM
creating opportunities

2 Assessment requirements and criteria

2.1 Secretary's Environmental Assessment Requirements (SEARs)

The SEARs for the project were issued on 2 July 2021. The SEARs relate to traffic and transport are provided in Table 2.1.

Table 2.1 Traffic related SEARs and EMM responses

Item no.	SEARs	EMM responses/information location
1	details of all daily and peak traffic volumes likely to be generated during all key stages of construction and operation, including a description of key access / haul routes, distribution of movements, duration of impacts, vehicle types and queuing impacts	Sections 3.6, 4.4, 4.7.1, 4.7.3, 4.7 and 5.6
2	an assessment of the predicted impacts of this traffic on road safety and the capacity of the road network, including a review of crash data and consideration of cumulative traffic impacts at key intersections using SIDRA or similar traffic model	Sections 3.7, 5.1
3	plans demonstrating how all vehicles likely to be generated during construction and operation and awaiting loading, unloading or servicing can be accommodated on the site to avoid queuing in the street network	Figure 4.1, section 5.6
4	details and plans of the internal road network, loading dock servicing and provisions and on-site parking provisions in accordance with the relevant Australian Standards	Sections 3.9,4.8,
5	swept path diagrams depicting vehicles entering, exiting and maneuvering throughout the site	Appendix D
6	details of road and intersection upgrades, infrastructure works or new roads or access points required for the development, if necessary	Section 5
7	identification of the truck routes between waste source locations and the site for fuel deliveries, and between the site and potential disposal sites for waste generated	Sections 3.6, 4.7
8	details of the types of material being transported and whether the material would be classified as dangerous goods under the Australian Dangerous Goods Code	Addressed in the EIS.
9	a draft construction and operational traffic management plan	A draft Construction Traffic Management Plan has been provided in Annexure E. Recommended mitigation methods are provided in Section 6

2.2 TfNSW

In addition to the SEARs, TfNSW in its letter dated 15 June 2021 included additional comments. TfNSW comments and EMM's response is provided in Table 2.2.

Table 2.2 TfNSW comments and EMM responses

No.	TfNSW comments	EMM responses/information location
1	A traffic impact study (TIS) is required. As a guide Table 2.1 of the RTA Guide to Traffic Generating Developments outlines the key issues that may be considered in preparing a TIS	The TIA has been prepared
2	The TIS needs to include the type of vehicles accessing the site, the likely daily and peak hour movements in and out of the site (including staff movements), the likely distribution of these movements (i.e. which direction they are coming from/going to) and the expected duration of the construction/operation (and associated traffic movements)	Sections 3.6, 4.4, 4.6.1, 4.6.2, 4.6.3, and 4.7
3	The TIS also needs to outline predicted haulage routes, including over size over mass vehicles, and consider any impacts to the state road network (i.e. where the haulage route meets the state road)	Sections 3.4.1, 4.6.2
4	An assessment of the predicted impacts of this traffic on road safety and the capacity of the road network, including consideration of cumulative traffic impacts at key intersections using SIDRA or similar traffic model. This is to include the identification and consideration of approved and proposed developments/planning proposals/road upgrades in the vicinity	Sections 5.1, 5.3
5	Detailed plans of the site access and proposed layout to demonstrate vehicles loading, unloading or servicing can be accommodated on the site to avoid queuing on the road network, and to depict the internal road and pedestrian network and parking on site is in accordance with the relevant Australian Standards and Council's DCP	Figure 4.1, Sections 4.9, 4.10 and 5.2
6	Provide a swept path analysis in accordance with Austroads turning templates to demonstrate that the largest vehicle likely to utilise the access can enter and exit the driveway in a forward direction and manoeuvring throughout the site; and	Swept path presented in Appendix D
7	Where the development has an impact on the performance of an intersection on the state road network an appropriate junction upgrade needs to be provided	Section 5.1, There are no significant impacts on the performance of any intersection

2.3 Goulburn Mulwaree Council

In addition to the SEARs, Goulburn Mulwaree Council (GMC) in its letter dated 18 June 2021 raised additional comments regarding traffic and transport. Traffic related comments and EMM's response is provided in Table 2.3.

Table 2.3 Goulburn Mulwaree Council comments and EMM responses

No.	Council comments	EMM responses/ Information location
1	While there is no change proposed to the quantity of material or means of conveyance to the site, the construction activities will generate significant additional traffic volumes to the site via the local road network. A detailed understanding and assessment of these impacts should be provided within the EIS. This may include the need to consider pavement life, intersection details and climbing lanes along with any required upgrading works.	Section 4.6.1, 5.1, 5.3, 5.4, 5.5
2	Further to the above, Council requires that a full assessment of the haul route between Crisps Creek Intermodal Facility and the site be reassessed, with specific emphasis on the provision of a climbing lane on Bungendore Road. We understand this issue is under discussion between Veolia and Council.	Section 5.6

3 Existing environment

3.1 Site location and footprint

The Eco Precinct is located on Collector Road, approximately 6 km west of the village of Tarago, and 50 km south of Goulburn, NSW. The Eco Precinct includes operational areas used for waste management, energy generation and mining, as well as primary production including sustainable agriculture, aquaculture and horticulture. The proposed ARC is within the Eco Precinct. The project development footprint along with other facilities is shown in Figure 3.1.

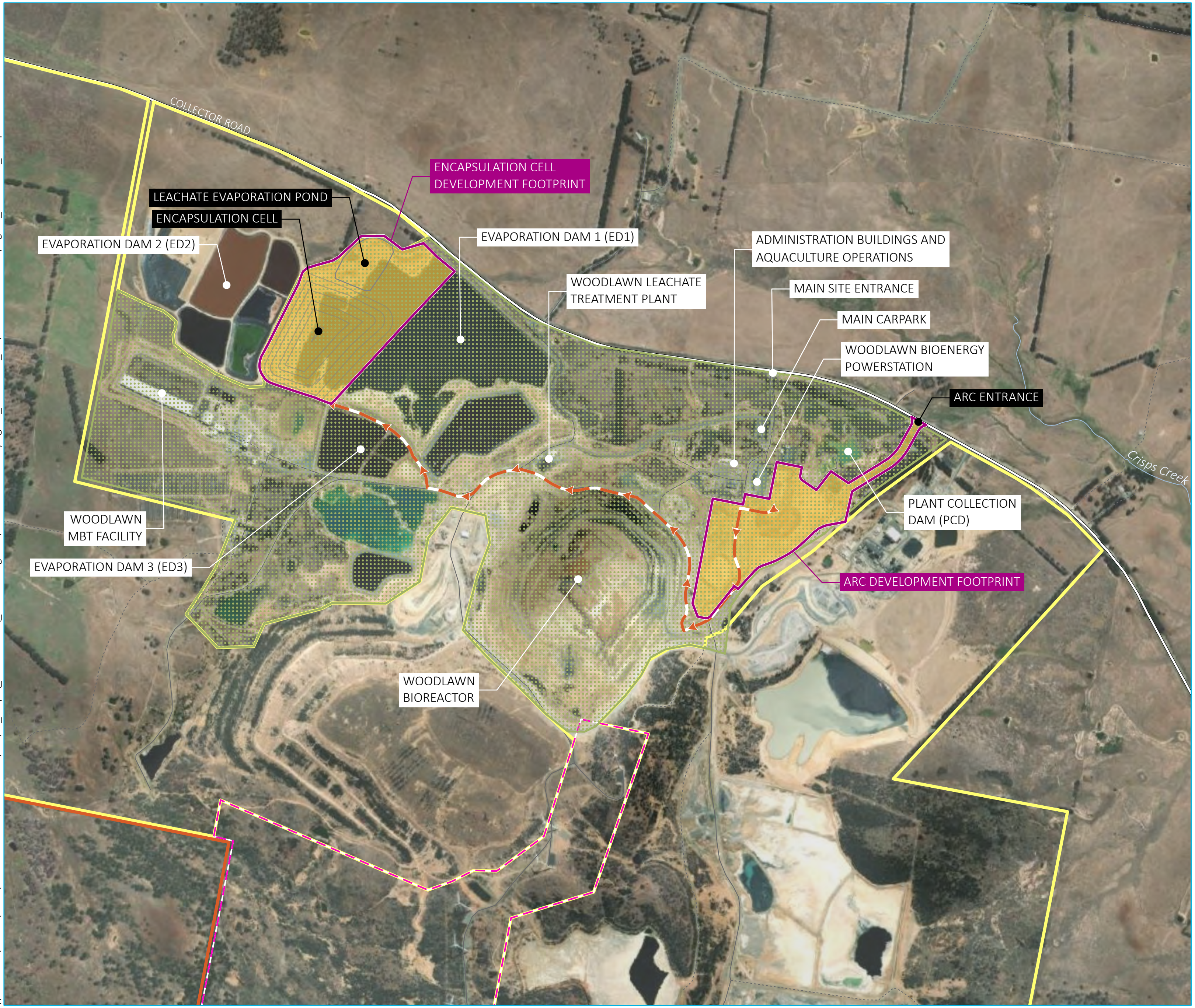
3.2 Road network

The NSW administrative road hierarchy comprises the following road classifications, which align with the generic road hierarchy as follows:

- state roads – freeways and primary arterials (TfNSW managed);
- regional roads – secondary or sub arterials (council managed and part funded by the State); and
- local roads – collector and local access roads (council managed).

The key roads in the vicinity of the Eco Precinct are Collector Road (local), Bungendore Road (regional) and Braidwood Road (state). A visual inspection of roads in the locality used by vehicles accessing the Eco Precinct was undertaken as part of the TIA to confirm the general road widths and traffic conditions for these routes and photographs have been taken at the key project access intersections.

The NSW administrative road hierarchy of roads in vicinity of the site is presented in Figure 3.2. An overview of each of the key roads is provided in Table 3.1 to Table 3.3.



KEY

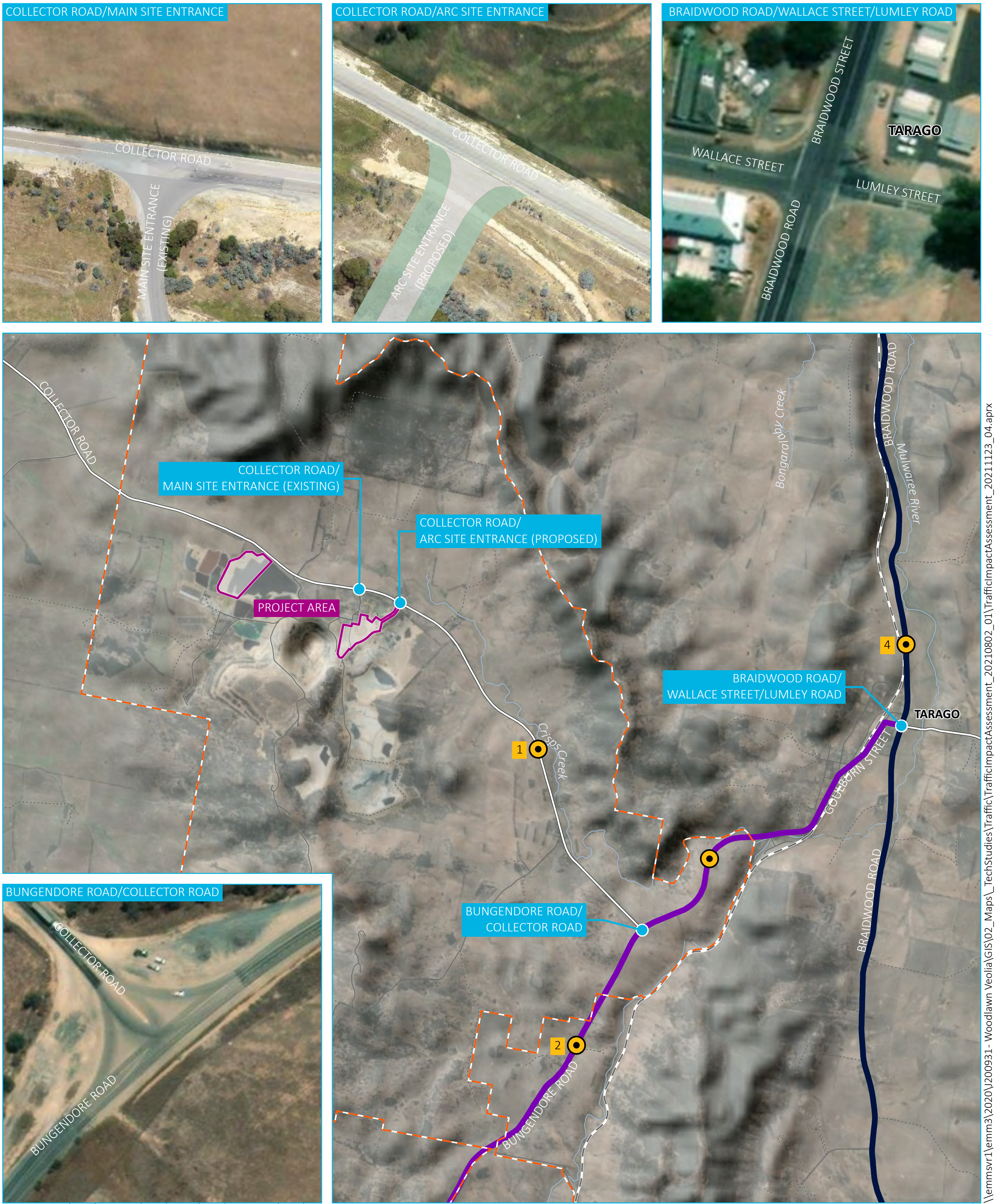
- Development footprint
- Veolia integrated waste management operations
- Woodlawn Eco Precinct
- Woodlawn Mine operations area
- Woodlawn Wind Farm
- APCr transport route
- Major road
- Minor road
- Vehicular track
- Watercourse

Source: EMM (2022); Veolia (2022); DFSI (2017)

Project study area

Woodlawn Advanced Energy Recovery Centre
Traffic impact assessment
Figure 3.1

EMM creating opportunities



Source: EMM (2022); VEOLIA (2022); DFSI (2017); SIXMAPS (2021)

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GDA 1994 MGA Zone 55
N

KEY

- Development footprint
- Woodlawn Eco Precinct
- Key intersection
- Tube count location
- State road
- Regional road
- Rail line
- Main road
- Local road
- Track
- Watercourse

Road hierarchy, key intersections & tube count locations

Woodlawn Advanced Energy Recovery Centre
Traffic impact assessment
Figure 3.2

EMM
creating opportunities

Table 3.1 Collector Road

Aspect	Description
Road classification and connectivity	Local road between Bungendore Road (east) and Federal Highway (west)
Alignment	East-west
Number of lanes	Two lanes, one lane each way
Carriageway type	Sealed road with shoulders
Carriageway width	Approximately 11 m with 3.5 m travel lane each way and 2 m shoulder on each side
Posted speed limit	100 km per hour (km/h)
Heavy vehicle access	Yes, between Eco Precinct site access and Bungendore/Collector Road intersection
Traffic function	Carries regional and local traffic

Plate 3.2 Collector Road (westbound)

Table 3.2 Bungendore Road

Aspect	Description
Road classification and connectivity	Regional road between Goulburn Street (north) and Tarago Road (south)
Alignment	North-south
Number of lanes	Two lanes, one lane each way
Carriageway type	Sealed road with shoulders
Carriageway width	Approximately 9 m with 3.5 m travel lane each way and 1 m shoulder on each side
Posted speed limit	100 km/h, 60 km/h north of Crisps Creek Intermodal Facility access
Heavy vehicle access	Yes, between Goulburn St (north) and Bungendore/Collector Road intersection
Traffic function	Carries regional traffic

Plate 3.2 Bungendore Road (southbound)

Table 3.3 Braidwood Road

Aspect	Description
Road classification and connectivity	State road between Goulburn (north) and Goulburn Road (south)
Alignment	North-south
Number of lanes	Two lanes, one lane each way
Carriageway type	Sealed road with shoulders
Carriageway width	Approximately 9 m with 3.5 m travel lane each way and 1 m shoulder on each side
Posted speed limit	100 km/h, 60 km/h through Tarago
Heavy vehicle access	Yes
Traffic function	Carries regional traffic

Plate 3.2 Braidwood Road (northbound)

3.3 Key intersections

The key intersections which have been assessed for their project related traffic impacts are presented in Figure 3.2 and described in Table 3.4 to Table 3.6.

Table 3.4 Collector Road/Site access road (existing)

Aspect	Description
Location from the site	650 m north-east of the site
Intersection control	Give-way intersection
Major Road	Collector Road
South Approach	One lane each on approach and departure
East Approach	One full lane and one deceleration lane on approach and one lane on departure
West Approach	One lane each on approach and departure
Pedestrian Connectivity	No pedestrian connectivity on all approaches
Traffic function	Predominantly carries regional and local traffic
Speed limit	100 km/hour on Collector Road approaches, 20 km/hour on site access approaches

Photograph 3.1 Collector Road/Site access road intersection

Table 3.5 Bungendore Road/Collector Road

Aspect	Description
Location from the site	4.8 km south-east of the site
Intersection control	Give-way intersection
Major Road	Bungendore Road
South-West Approach	One lane each on approach and departure
North-East Approach	One lane each on approach and departure
North-West Approach	One lane each on approach and departure
Pedestrian Connectivity	No pedestrian connectivity on all approaches
Traffic function	Predominantly carries regional traffic
Speed limit	100 km/hour on all approaches
Additional comments	Wide flaring on Collector Road approach and departure

Photograph 3.2 Bungendore Road/Collector Road intersection

Table 3.6 Braidwood Road/Wallace Street/Lumley Road

Aspect	Description
Location from the site	7.3 km east of the site
Intersection control	Give-way intersection
Major Road	Braidwood Road
South Approach	One lane each on approach and departure
North Approach	One lane each on approach and departure
East Approach	One lane each on approach and departure
West Approach	One lane each on approach and departure, on-street parking on both sides
Pedestrian Connectivity	No pedestrian connectivity on all approaches
Traffic function	Predominantly carries regional and local traffic
Speed limit	60 km/hour on north and south approaches, 50 km/hour on east and west approaches
Additional comments	The intersection is located in an urban area

Photograph 3.3 Braidwood Road/Wallace Street/Lumley Road Intersection

3.4 Existing traffic volumes

3.4.1 Intersection counts

The key intersections described in Section 3.3 were surveyed on Thursday 12 August 2021 between 6 am and 9 am and 3 pm and 6 pm. The traffic count data is provided in Annexure A.

The survey results indicate that the network peak hours for these intersections are:

- AM peak hour: 6:15 am to 7:15 am; and
- PM peak hour: 4:15 pm to 5:15 pm.

The surveyed traffic volumes during the AM and PM peak hours are summarised in Figure 3.3. The Collector Road/ARC Site Access intersection is a proposed intersection which does not exist yet, hence there are no surveyed traffic volumes for this intersection.

The intersection counts were conducted during a period where COVID 19 ‘stay at home’/lockdown restrictions were in place in both NSW and the Australian Capital Territory (ACT), which is likely to have reduced traffic on the road network during the survey period compared to typical conditions. Stay at home provisions in NSW had been in place since June 2021, while a lockdown commenced from 5 pm on 12 August 2021 for the ACT. To understand the potential implications of these conditions, a comparison with traffic counts conducted by the Australian Road Research Board (ARRB) on behalf of Veolia in 2020 (Annexure B) was completed. The 2020 traffic surveys included tube counts conducted in July and August 2020. The traffic surveys were conducted as part of investigations related to Veolia’s existing development consents and heavy vehicle volumes on local roads used by traffic transporting waste to the Eco Precinct.

The surveyed daily and peak hourly traffic volumes in August 2021 are lower than those observed in 2020 and as a result a growth factor has been used to estimate current intersection traffic volumes reflective of typical conditions that would otherwise occur.

A growth correction factor of x 1.93 for light vehicles and x 1.73 for heavy vehicles was applied to the 2021 survey results. The estimated current baseline intersection traffic volumes on a normal weekday, using these growth factors during the AM and PM peak hours, are summarised in Figure 3.4.

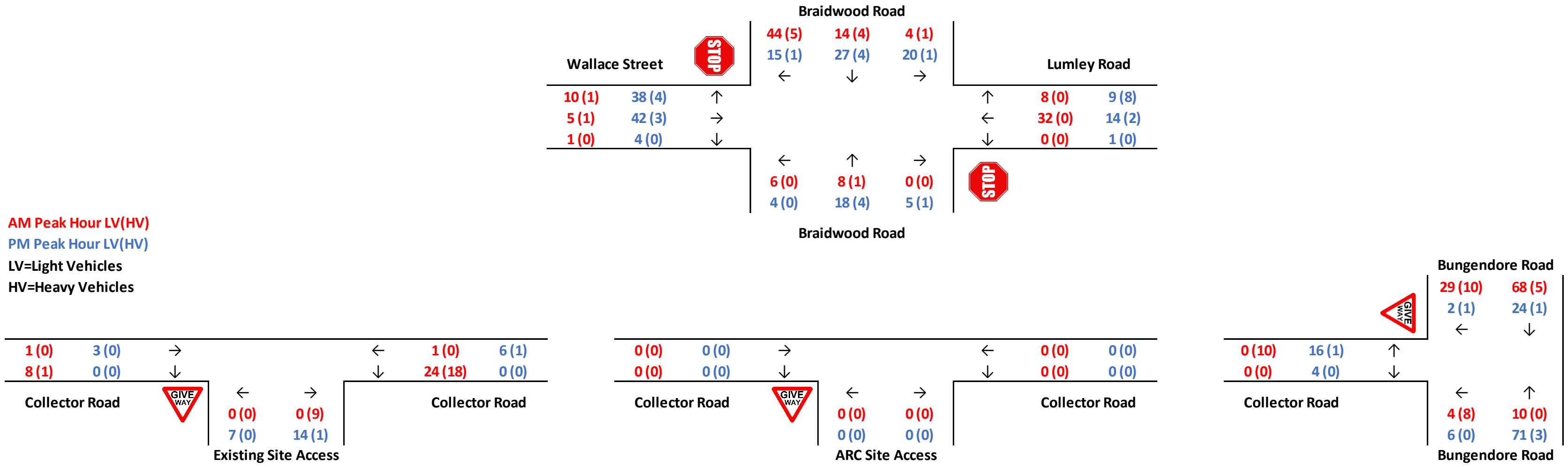


Figure 3.3 Surveyed AM and PM peak hour traffic volumes

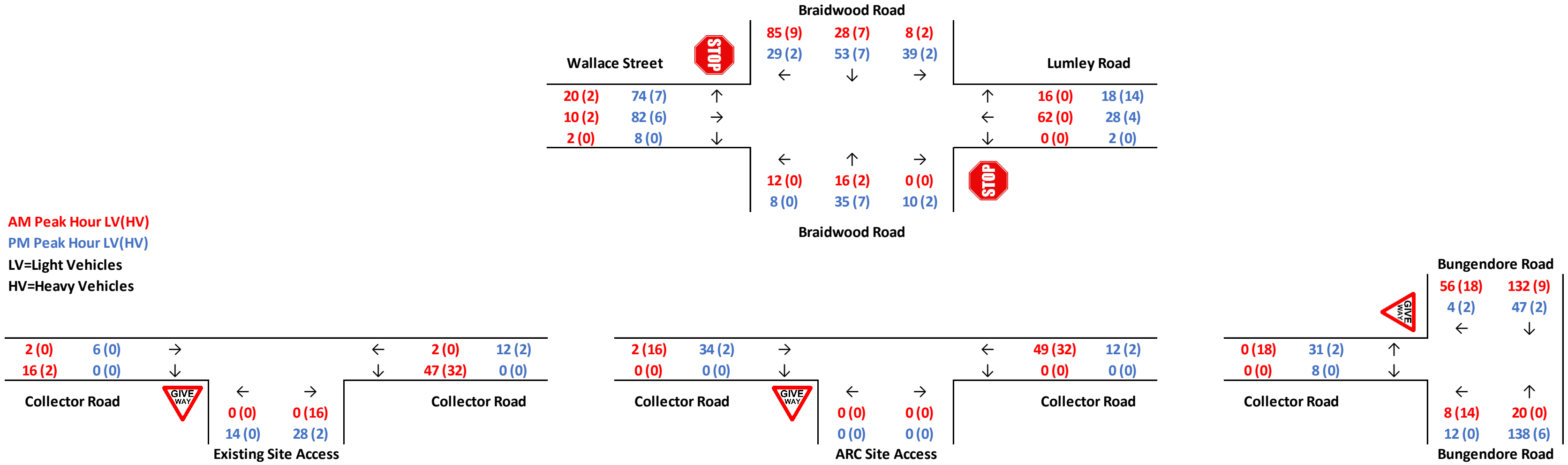


Figure 3.4 Estimated current baseline AM and PM peak hour traffic volumes

3.4.2 Tube counts

A program of tube traffic count surveys was undertaken on Collector Road, Bungendore Road and Braidwood Road for a 14-day period between 12 August 2021 and 25 August 2021. The annual average daily traffic (AADT), weekly 85th percentile speed and heavy vehicle percentage were recorded. The tube count locations are shown in Figure 3.2. A summary of the tube count results is presented in Table 3.7. Results are presented as a five day average daily traffic volume for week one and week two of the survey period.

Table 3.7 Tube count results summary

Tube Count Location		1. Collector Rd		2. Bungendore Rd		3. Bungendore Rd		4. Braidwood Rd	
Week		**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**
5day-ADT[1]	Bi-directional	505	430	772	551	1,072	859	1,127	957
	Eastbound/Northbound	260	218	385	276	557	442	586	485
	Westbound/Southbound	245	212	387	275	515	417	541	472
85%ile Speed (km/h)	Eastbound/Northbound	87.9	89.5	99.6	100.4	84.3	83.6	76.5	75.3
	Westbound/Southbound	94.5	94.2	95.2	95.4	92.7	92.7	80.1	80.1
Heavy Vehicle % (5-day)	Eastbound/Northbound	57	51	19	18	26	26	19	18
	Westbound/Southbound	59	52	17	15	26	25	18	17

The tube count results in Table 3.7 show that traffic volumes were higher for week 1 as compared to week 2. This is assumed to be primarily because of the of commencement of the COVID 19 lockdown in the ACT which commenced at 5 pm on 12 August 2021.

The traffic volumes were observed to be highest at survey locations 3 and 4. This is primarily because survey locations 3 and 4 are present on regional and state roads respectively, and generally carry higher volumes of traffic between regional areas, including between Goulburn, Canberra and Tarago.

The 85%ile speeds were consistently under the road posted speed limits of 100 km/h. Speeds were comparatively lower at locations 3 and 4 as these sections included the uphill section of Bungendore Road south-west of Crisps Creek and Braidwood Road on the approach to the Tarago urban area.

Heavy vehicle percentages were higher for tube count location 1. This section of Collector Road carries heavy vehicle traffic transporting waste between Crisps Creek IMF and the Woodlawn Eco Precinct.

3.5 Existing traffic generation

To understand the existing heavy vehicle traffic movements at the Eco Precinct, existing approved traffic generation was reviewed from the EIS for the Woodlawn Waste Expansion Project (MP 10_0012), approved in 2012, as well as actual weighbridge data from the site for the past three years (2018-2020).

[1] Average Daily Traffic

The two main facilities within the Eco Precinct that receive waste are the Woodlawn Mechanical Biological Treatment (MBT) facility and the Woodlawn Bioreactor (the Bioreactor). The incoming waste material can be categorised based on the origins as follows:

- waste from Crisps Creek IMF to the Eco Precinct via road;
- waste from regional areas in NSW via road.

The Crisps Creek IMF is approved to receive up to 1,180,000 tpa of waste for transport to the Eco Precinct. Up to 130,000 tpa of waste is approved (with written consent) to be received directly via road from areas regional to the Eco Precinct. Waste receival at the Eco Precinct is approved Monday-Saturday from 6 am to 10 pm.

Average hourly heavy vehicle movements were assessed as part of approvals for the Woodlawn Waste Expansion Project (MP 10_0012), approved in 2012. Crisps Creek IMF receives up to two trains per day, with up to 60 containers per train. An average hourly heavy vehicle estimate of 21 vehicles (42 movements) for rail based heavy vehicle movements from Crisps Creek IMF to the Eco Precinct was predicted (Barrett, 2010). Daily heavy vehicle movements for transport of waste from regional areas to the Eco Precinct were also assessed. A daily heavy vehicle estimate of 15 vehicles (30 movements) for heavy vehicle movements from regional LGAs to the Eco Precinct was predicted (Barrett, 2010).

Table 3.8 presents the annual number of heavy vehicles for road and rail based waste transport to the Eco Precinct. Other significant daily heavy vehicle traffic includes the trucks for cover material brought in to cover waste in the Bioreactor. There is also some transfer of residual waste from the MBT facility to the Bioreactor which are internal traffic movements only, but still included in the weighbridge data. It is noted that waste is approved to be received at the Eco Precinct six days per week, however the majority of truck movements currently occur Monday to Friday. Therefore, average daily truck movements have been estimated using a five day week (250 days per year) which provides a conservative basis for existing daily trucks movements.

Table 3.8 Summary of annual heavy vehicles – all incoming waste sources

Description	Annual heavy vehicles		
	2018	2019	2020
MBT facility weighbridge			
From Crisps Creek IMF	4,291	3,987	3,888
Other from regional areas	7	4	17
Sub-total	**4,298**	**3,991**	**3,905**
Bioreactor weighbridge			
From Crisps Creek IMF	20,533	20,414	19,327
Other from regional areas	10,224	15,868[1]	16,963[2]
Sub-total	**30,757**	**36,282**	**36,290**

1 Higher number of heavy vehicles due to import of additional cover.
2 Higher number of heavy vehicles due to intake of bushfire impacted waste.

Table 3.9 Summary of existing annual and daily heavy vehicle movements (one way) to the Eco Precinct

Origin	Annual			Average daily
	2018	2019	2020	
Crisps Creek IMF	24,824	24,401	23,215	97*
Other (including regional waste sources and Bioreactor daily cover)	10,231	15,872	16,980	46
Total	**35,055**	**40,273**	**40,195**	**143**

Notes: * A total of 120 daily trucks is approved from Crisps Creek IMF (URS 2010), with an hourly estimate of 21 trucks from the IMF to the Eco Precinct.

The two existing weighbridges capture at least 99% of the overall incoming heavy vehicle traffic to the Eco Precinct. Weighbridge data for a typical week was used to generate the hourly profile of incoming and outgoing heavy vehicles from Crisps Creek IMF to the Eco Precinct. The heavy vehicle movements were averaged over the weekdays and converted to percentages. The existing typical hourly profile distribution of incoming and outgoing heavy vehicles from the site weighbridge data is presented in Figure 3.5.

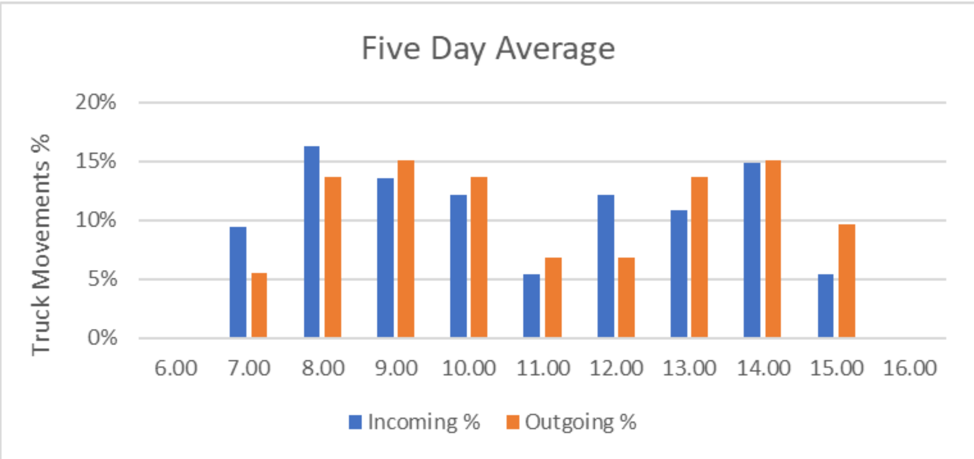


Figure 3.5 Weekday hourly profile of incoming and outgoing heavy vehicles from Crisps Creek IMF

The existing daily and hourly heavy vehicle movements from vehicles arriving from Crisps Creek IMF at the Eco Precinct site are summarised in Table 3.8 and Figure 3.5. It is noted that the Eco Precinct is operating below approved limits for waste volumes received via Crisps Creek IMF. To account for this as part of the traffic baseline, the approved number of truck movements have been factored into the baseline conditions. Traffic movements have been adjusted for the maximum future heavy vehicles arriving from Crisps Creek IMF, presented in Table 3.10. The Eco Precinct is approved to receive a total of 120 trucks per day from the IMF.

As per Table 3.10 there would typically be a further increase of four heavy vehicles arriving in the peak hour (eight two-way movements) when the Eco Precinct is operating at the maximum approved waste volumes being received at the IMF and transported to the Eco Precinct.

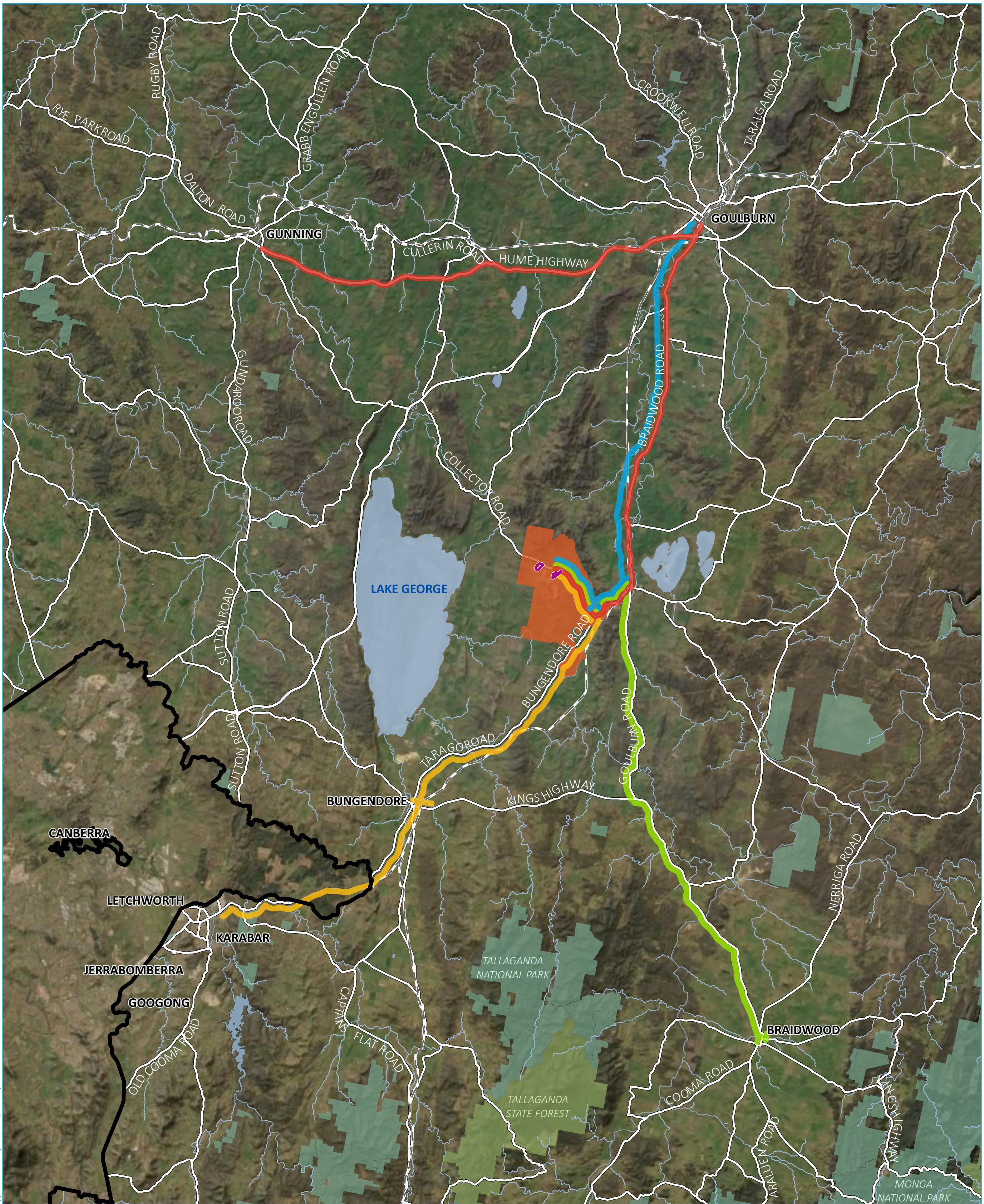
Table 3.10 Approved peak hour heavy vehicle movements from Crisps Creek IMF to the Eco Precinct

Description	Incoming AM	Outgoing AM	Incoming PM	Outgoing PM
Existing peak hour percentages (from Figure 3.5)	16	14	15	15
Existing peak hour heavy vehicles from IMF (average daily value of 97 trucks from Table 3.9 multiplied by peak hour percentages in the first row)	16	14	15	15
Approved peak hour heavy vehicles from IMF (approved daily value of 120 trucks multiplied by peak hour percentages in the first row)	20	17	18	18
Maximum increase in peak hour movements to account for approved traffic movements from the IMF	+4			

3.6 Approved waste haul routes

The analysis of weighbridge data for the years 2018 to 2020 identified that, on average, 75% of the incoming waste arrives from Crisps Creek IMF. The remaining 25% of incoming material, which includes daily cover material for the Bioreactor, is sourced from various regions in NSW and arrives via the regional road network.

Trucks transporting waste from Crisps Creek IMF travel only via Bungendore Road and Collector Road. Other waste material by road transport arrives via the four approved haulage routes which are presented in Figure 3.6.



\\emmsvr1\emm3\2020\200931 - Woodlawn

Source: EMM (2022); VEOLIA (2022); DFSI (2017)

0 10 20 km
GDA 1994 MGA Zone 55
N

KEY

- Development footprint
- Woodlawn Eco Precinct

Truck haulage routes

- ACT, Queanbeyan and Palerang
- Eurobodalla and Bega Way
- Goulburn- Mulwarree
- Upper Lachlan and Yass Valley

- Rail line
- Major road
- Watercourse
- NPWS reserve
- State forest

Truck haulage routes for regional waste

Woodlawn Advanced Energy Recovery Centre
Traffic impact assessment
Figure 3.6

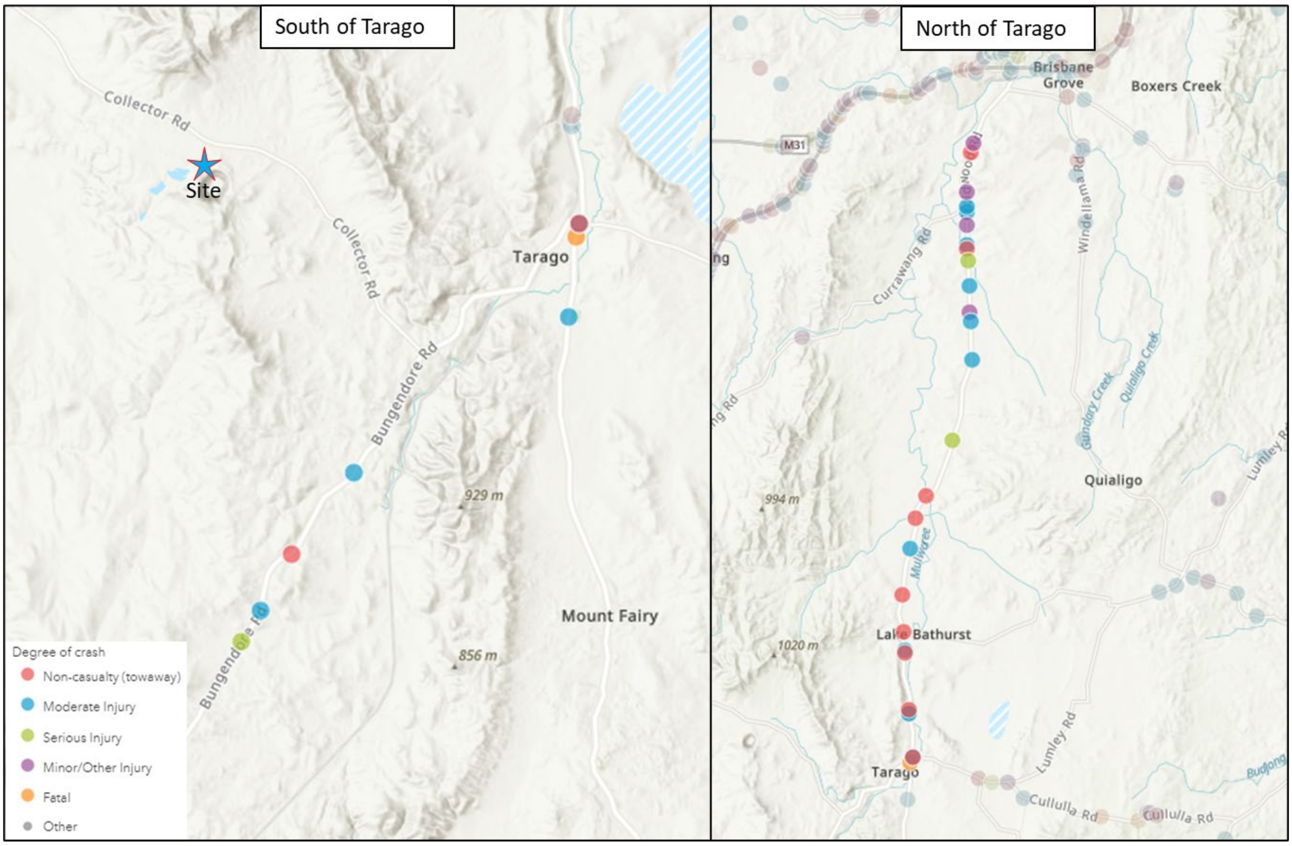
EMM
creating opportunities

3.7 Crash analysis

Crash data publicly available from the TfNSW Centre for Road Safety interactive history database for the last five years between 2016 and 2020 has been studied in the vicinity of the site and is presented in Figure 3.7.

The crashes are categorised based on the severity of the crashes as follows:

- fatal;
- serious injury;
- moderate injury;
- minor/other injury; or
- non-casualty (towaway).



Source: TfNSW Centre for Road Safety

Figure 3.7 Crash data between 2016 and 2020

Overall, there were 34 crashes on Braidwood Road and Bungendore Road (including at intersections) within Goulburn-Mulwaree LGA. The summary of crashes is presented in Table 3.11 and is illustrated in Figure 3.7. There were no crashes recorded on Collector Road.

Table 3.11 Summary of crashes on surrounding road network within Goulburn-Mulwaree LGA

Road section	Year	Total number of crashes	Degree of crashes	Number of persons injured
Braidwood Road north of Tarago	2016	1	Serious Injury	1
		2	Moderate Injury	5
		1	Non-casualty (towaway)	-
		1	Minor/ Other Injury	1
	2017	1	Moderate Injury	1
		3	Non-casualty (towaway)	-
		1	Serious Injury	1
	2018	3	Moderate Injury	3
		1	Serious Injury	1
	2019	3	Non-casualty (towaway)	-
		2	Minor/ Other Injury	2
		3	Moderate Injury	5
	2020	1	Non-casualty (towaway)	-
		1	Minor/ Other Injury	1
		1	Moderate Injury	1
Braidwood Road south of Tarago	2017	1	Fatal	1
		1	Moderate Injury	1
	2018	1	Moderate Injury	2
	2019	2	Non-casualty (towaway)	-
Bungendore Road between Collector Road and Tarago	2016-2020	Nil	-	-
Bungendore Road south of Collector Road	2016	1	Moderate Injury	1
	2017	1	Moderate Injury	1
		1	Non-casualty (towaway)	-
	2019	1	Serious Injury	3
Collector Road	2016-2020	Nil	-	-

There was one fatal crash (rear-end) on Braidwood Road, just south of Tarago and three crashes involving serious injury (north of Tarago).

Most of the crashes occurred on undivided sections of two-way road. No crashes were recorded on the Bungendore Road route between Crisps Creek IMF and the Eco Precinct and Collector Road section of the route used by heavy vehicles transporting waste to the Eco Precinct.

The crash data reviewed indicates that the most significant part of the transport haulage route for waste transport to the Eco Precinct (Bungendore Road between Collector Road and Crisps Creek and Collector Road between Bungendore Road and the Eco-Precinct) has a very good traffic safety record for the period of data reviewed (2016-2020).

3.8 Public and active transport

There are no public bus services running in the vicinity of the site. School bus service S557 operates between Tarago to Braidwood schools via Braidwood Road and Kings Highway.

The closest train station is located in Tarago which is approximately 15 km from the site. It is serviced by the Southern NSW regional train line. The Tarago train stop falls on the Sydney to Canberra route. The train service is not a viable mode of transport to the Eco Precinct.

There is currently no pedestrian or cycling infrastructure at the vicinity of the site due to the rural nature of the locality.

3.9 Parking

There are two parking areas available at the Eco Precinct. The parking area close to the site entry is the main parking area serving the Bioreactor and administration facilities. The main car park has a capacity of approximately 75 parking spaces. The parking area towards the western side of the Eco Precinct serves the MBT. This car park has a capacity of approximately 20 parking spaces.

4 The project

4.1 Description

Veolia is proposing to develop and operate the ARC at the Eco Precinct in Tarago, NSW. The project will recover energy from waste that will otherwise be disposed to landfill.

The project will involve construction and operation of the following key ARC components:

- construction of the ARC, comprising an ERF for the thermal treatment of residual municipal solid waste (MSW) and commercial and industrial (C&I) waste (referred to as waste feedstock) that would otherwise be disposed to landfill;
- thermal treatment in the ARC of up to 380,000 tonnes per annum (tpa) of residual waste feedstock;
- installed capacity of up to 30 megawatts (MW) of electricity (generation of up to 240,000 megawatt hours (MWh) of electricity per annum);
- on-site management of residual by-products generated by the ARC, including construction of an encapsulation cell; and
- construction of ancillary infrastructure to facilitate construction and operation of the project, including a new access road.

Construction and operational hours for the project will be 24 hours per day, seven days a week. The proposed ARC is shown in Figure 4.1.

4.2 Access and internal road network

Waste feedstock will be transported to the ARC in accordance with current approvals. Waste containers will be transported from the Crisps Creek IMF to the ARC and will access the ARC building via a new access road and intersection with Collector Road. The location of the access road and intersection are shown in Figure 4.1. The new access road will enable the project-related traffic to access the Eco Precinct separately to existing operations, keeping vehicles accessing the ARC separate to vehicles accessing the Bioreactor and MBT facility which will aid in managing traffic movements within Veolia's integrated waste operations area.

Trucks will make a left turn into the access road from Collector Road and travel via an inbound weighbridge to the container marshalling area where containers will either be directly unloaded to the tipping hall as described in Section 4.3.1, or temporarily stored on the container marshalling hardstand area until required. Trucks will be reloaded with empty containers (if required) and will move around the ARC building and exit the Eco Precinct via the outbound weighbridge and via the access road to Collector Road.

In relation to transport of waste feedstock to the ARC, the project will rely on development consents DA31-02-99 and MP 10_0012 (as modified) to enable:

- transport of waste from Greater Sydney to Crisps Creek IMF and transport to the Eco Precinct; and
- use of the internal road network within Veolia's integrated waste operations area to access the encapsulation cell.

4.3 Hours of operation

The ARC will operate 24 hours per day, seven days per week. The ARC would receive waste in accordance with existing operations at the Eco Precinct, from 6am – 10pm Monday to Saturday.

4.4 Construction activities

The construction of the project is expected to be undertaken over a period of three years and will include the stages shown in Table 4.1.

Table 4.1 Overview of construction stages and activities

Stage	Typical activities
Site establishment	The first stage of construction will be site establishment works to prepare the project for construction. Site establishment will follow well-established practices with the following indictive steps carried out: • site boundary delineation and establishment of survey • site fencing will be erected to provide security and safety; • erection of a temporary site compound to support pre-construction activities; • erosion and sediment control measures will be installed on site. This includes mitigation around stockpile areas. Topsoil and general fill material will be stockpiles in clearly separated areas; and • vegetation clearing and grubbing.
Civil works	Civil works required to prepare the project for construction will include: • delivery of heavy machinery including plant and equipment; • earthworks will be required after the site has been established and prepared including compaction and stabilisation of the ground surface for foundations and pads for proposed structures; • after the ground surface has been prepared, footings will be excavated/piled and filled with concrete in areas where structures will require stabilisation, and concrete building pads will be poured. • fire protection systems will be constructed; • drainage establishment including construction of stormwater management structures; • construct water and wastewater treatment facilities; • lines will be marked on internal roads and speed limit and other signs will be erected; and • establishment and construction of the new access road.
Substation construction	Substation construction will include feeder line augmentation, substation construction, electrical cabling works, switching equipment and connection tests.
ARC building construction	Construction of the ARC and associated infrastructure will include: • structure/building construction; • boiler and equipment installation; • flue gas equipment installation, as well as stack construction; • fire protection equipment installation; and • auxiliary equipment and balance of plant installation including steam turbine.
IBA area	Construction of the IBA area including: • the IBA processing building (semi-enclosed structure); • IBA aggregate (IBAA) maturation pad (hardstand area for stockpiling of IBAA); and • infrastructure for wastewater and leachate management.

Table 4.1 Overview of construction stages and activities

Stage	Typical activities
Encapsulation cell	Construction of the encapsulation area including: • initial construction and establishment; • lining and leachate management preparation; and • progressive staging and filling.
Commissioning and testing	Commissioning and completion will involve the following activities: • commissioning preparation; • landscaping; • high voltage power available; and • commissioning and certification.
Operational licensing	Operational licensing will involve preparing and lodging the operational environmental management plan; preparing and submitting the operational licence application; and receiving the operational licence from the EPA.
Operation	Operation will involve the commencement of export of electricity, and availability testing.

4.5 Construction duration

Key project durations are as follows:

- 2021-2023: environmental assessment and approval.
- 2024-2026: project construction (approximately three years).
- 2027: commencement of project operation.

4.6 Workforce

4.6.1 Construction

Construction activities are proposed 24 hours per day seven days per week. During 24 hour operations, the workforce is assumed to operate across three shifts, starting at 6 am.

The construction phase of the project is expected to generate up to 300 construction personnel during the peak construction period, the majority of which are expected to be generated in the Goulburn region.

KEY

Development footprint

Site layout detail

Mezzanine level 1

Mezzanine level 2

Proposed operations

1 Existing Woodlawn substation
2 Existing plant collection dam (PCD)
3 HV connection point
4 Existing Woodlawn bioenergy power station
5 ARC substation
6 Existing hub 2 power station expansion
7 ARC stormwater retention dam
8 Outbound weighbridge
9 Sub-contractors area
10 Air cooled condenser (ACC)
11 Store
12 Fire water tanks
13 Turbine hall
14 APCr stabilisation plant
15 IBA stormwater settling pond
16 Waste water irrigation
17 Flue gas treatment (FGT)
18 Maintenance access corridor
19 Workshop
20 Boiler hall
21 Incoming weighbridge
22 Waste bunker
23 Entry and reception
24 IBA conveyor
25 Tipping hall
26 Bus drop-off
27 IBA area
28 Carpark
29 Container marshalling area
30 IBA processing building
31 Diesel tanks
32 Raw water feed tank
33 Office and administration (Mezzanine level 1)
34 Central control room (CCR) (Mezzanine level 2)
35 Administration and education area (Mezzanine level 2)

ARC building, IBA area and ancillary infrastructure

Woodlawn Advanced Energy Recovery Centre
Traffic impact assessment
Figure 4.1

EMM creating opportunities

Source: EMM (2022); Veolia (2022); DFSI (2017)

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4.6.2 Operation

The following hours of operation will occur at the project:

- Operating hours for ARC: 24 hours per day, seven days per week.
- Annual shutdowns: shutdowns for maintenance will be undertaken annually for a period of up to three weeks.
- Receival of waste to site: 6 am–10 pm Monday to Saturday as per existing consent.

A total of 40 full-time equivalent site based operational roles are expected to be required for the project.

4.7 Traffic generation

The traffic generation for the project has been divided into two traffic streams:

1. Construction traffic associated with construction of the project.
2. Operational traffic, which largely includes existing traffic to the Eco Precinct that will be redirected to the ARC from the existing Eco Precinct site entrance, as well other minor additional traffic for operation of the ARC.

4.7.1 Construction traffic

The construction traffic includes construction workforce and construction heavy vehicle movements.

The majority of the construction workforce is expected to be sourced from Goulburn and surrounding areas. The traffic assessment for peak construction has been based on the following assumptions:

- The majority of construction workers (275) are expected to commute in private mini-buses to the Eco Precinct. For the purposes of the assessment 22 seat buses are assumed. Bus occupancy is assumed to be 50%.
- Approximately 25 workers would travel by light vehicle (construction managers, senior staff). Light vehicle occupancy is assumed at one worker per vehicle.
- The typical construction working day would be between 6:00 am – 6:00 pm, however approval is sought for construction 24 hours per day as there will be some stages (for example, concrete works and erection and assembly phases) where work will be required to occur to continuously over 24 hours. During 24 hour construction, work would be typically divided into three shifts.

The construction of the project will require a variety of construction heavy vehicles such as crawler cranes (up to 600t), franna cranes, knuckle booms, excavators, rollers, front end loaders, water trucks, concrete trucks etc. It is expected that there would be approximately 20 daily heavy vehicle trips during the peak construction stage.

The peak daily and peak hourly construction traffic for the project is presented in Table 4.2. The corresponding peak hourly construction traffic volumes at the key intersections are presented in Figure 4.2.

Table 4.2 Peak daily and hourly construction traffic

Construction Stage	Peak Daily		Peak Hourly	
	Trips	Movements	Trips	Movements
Light vehicles	25	50	25	25
Heavy vehicles	20	40	2	4
Buses	50	100	25	50
Total	**95**	**190**	**52**	**79**

Notes: 1. Movements are the same trips, as light vehicles comprise workers arriving at, or departing from the site, which would occur in two separate peak hours during the day.

2. A 'vehicle trip' is defined as a vehicle entering the site once (1 movement) and a vehicle exiting the site once (1 movement)

There may be periods during construction, such as concrete truck deliveries during particular phases, where movements may exceed the peak daily and/or hourly construction traffic numbers presented in Table 4.2. However, these will be 'one-off' events which will not be typically representative of the overall construction program.

4.7.2 Oversize or overmass vehicles

Oversize vehicles are those over 19 m in length, 2.5 m in width and 4.3 m high which may require one or more escort vehicles to accompany them.

Overmass vehicles are those with a gross mass in excess of 42.5 tonnes and will require a permit to use public roads.

If oversize overmass vehicles are required, relevant permits from the National Heavy Vehicle Regulator will be acquired for the project prior to mobilisation.

4.7.3 Operational traffic

The ARC is anticipated to process up to 380,000 tpa of residual waste feedstock. The waste feedstock will be within the existing approved waste that can be transported to the Eco Precinct, and hence this project does not propose any increase in approved waste volumes transported to the Eco Precinct for processing in the ARC. There will be other traffic movements associated with operation of the ARC, described below.

Operational traffic will include workforce vehicles and heavy vehicles, described in Table 4.3.

Table 4.3 Operational traffic sources

Source	Description
H1 – Heavy vehicles delivering waste feedstock from the Crisps Creek IMF	These are existing approved traffic movements to the Eco Precinct, however a portion will enter the ARC access road to access the ARC, instead of the existing Eco Precinct site access road. These trips will consist of a portion of existing trucks delivering waste from Crisps Creek intermodal facility being redirected to the project via the proposed new access intersection. Currently, this traffic is already part of the road network and therefore should not be considered as additional traffic generated for the project.
H2 – Ongoing filling of the encapsulation cell	Heavy vehicles delivering material for daily cover at the encapsulation cell. The H2 trips will occur over the life of the ARC (estimated to be at least 25 years).
H3 – Delivery of consumables	Heavy vehicles delivering consumable materials to the ARC. The H3 trips will consist of heavy vehicles delivering urea, powder activated carbon and hydrated lime, fuel and other consumables to the project and transporting ferrous and non-ferrous metals offsite for recycling.
H4 – Offsite transport of IBAA material	Heavy vehicles transporting IBAA material offsite – it is noted that an allowance has been made for the offsite transport of IBAA, however the EIS assumes that this is unlikely to occur in the short term, and IBAA will be managed on site as described in the EIS. The H4 trips will consist of the future potential transport of IBAA material offsite to potential customers (this is yet to be determined). If the offsite transport is deemed feasible in the future, there will be offsite movement of 76,000 tpa of matured IBAA, six days per week, 312 days per year with an average 25t truck payload. This calculates to 10 trips per day.
Other incidental traffic movements	Other incidental traffic movements such as buses transporting visitors for site tours. The assessment has assumed two tours of up to 50 people per week in 25-seater buses.
Workforce light vehicles	There would be 40 FTE positions during operational stage. A vehicle occupancy rate of 1.08 is assumed for the additional operations workforce trips.

The proposed peak daily and hourly operational traffic is presented in Table 4.4, according to the following assumptions:

- The H1 daily trips are calculated by ratioing the approved waste truck numbers per day for the Eco-Precinct to the waste volume capacity of the ARC which will be 380,000 tpa.
- H2 and H3 truck and daily bus trip numbers have been estimated by Veolia.
- The H1 peak hour trips have been calculated from Figure 3.5 by taking the peak hour percentage and multiplying it by the H1 daily trips in Table 4.4.
- The H3 and H4 peak hour trips are assumed to be 10% of the respective daily trips.
- It is assumed that 80% of all daily light vehicle trips will take place within the respective morning and afternoon peak hours.

Table 4.4 Proposed peak daily and hourly operational traffic

Operational Stage	Peak Daily		Peak Hourly	
	Trips	Movements	Trips	Movements
Light vehicles	40	80	32	32[1]
H1 – Heavy vehicles delivering waste feedstock from the Crisps Creek IMF	50	100	8	16
H2 – Daily cover for the encapsulation cell	3	6	-	-
H3 – Delivery of consumables	5	10	1	2
H4 – Offsite transport of IBAA material	10	20	1	2
Buses	1	2	-	-
Total	**109**	**218**	**42**	**52**

Notes: 1. Movements are the same trips, as light vehicles comprise workers arriving at, or departing from the site, which would occur in two separate peak hours during the day.

The intersection traffic adjustments for the proposed peak hourly operational traffic volumes for the ARC, for the Eco Precinct operating at its maximum approved capacity, in comparison to the existing intersection operations, are presented in Figure 4.3.

4.8 Traffic distribution

As per section 4.7.1, construction traffic consists of construction workforce and construction heavy vehicles. The construction workforce is expected to be sourced from Goulburn and therefore would travel to/from the site from Goulburn. Construction heavy vehicles are assumed to arrive 50% from south of Bungendore/Collector Road intersection (from Canberra via Bungendore) and 50% from north (from Goulburn via Tarago).

In terms of operational traffic, it is assumed that 75% of operational workforce arrives from the east of the ARC access road (from Tarago/Goulburn and Bungendore/Canberra) and 25% of traffic from west (from Collector and other western areas).

Additional operational heavy vehicle traffic in the categories H2 and H3 is assumed to occur 100% to and from east via Collector Road (50% from Goulburn and 50% from Canberra). During operation, all trucks transporting waste feedstock entering the Eco Precinct will maintain their movements as per the approved haulage routes.

4.9 Car parking

The project will include a car parking area of 60 parking spaces. A separate area is reserved for visitor bus drop-off. The location of the car parking and visitor bus drop-off areas are presented in Figure 4.1.

All car parking areas will be designed as per Australian Standards 2890 1-2004 Parking Facilities - Off-street car parking. Swept paths of various vehicles have been conducted to demonstrate manoeuvring within the internal areas of the site. Swept paths are presented in Appendix D.

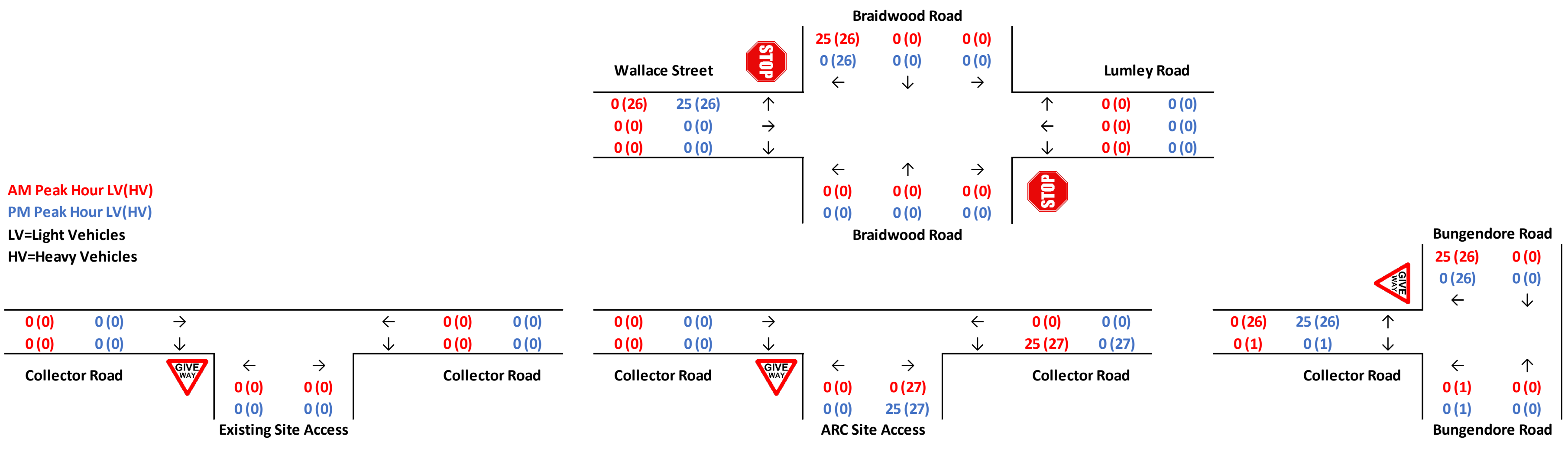


Figure 4.2 Peak hourly construction traffic

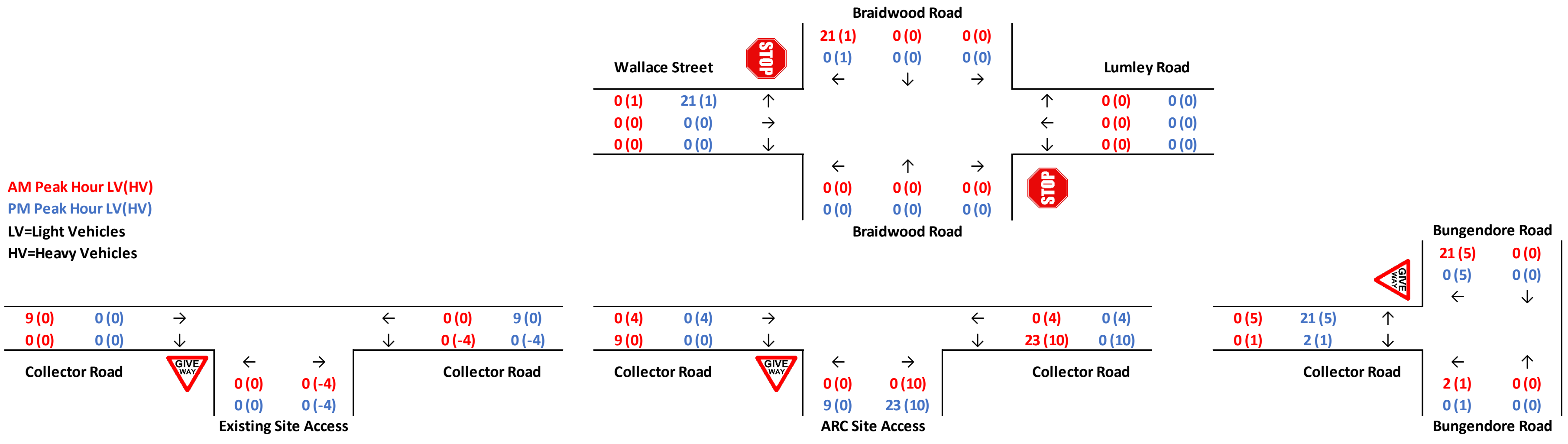


Figure 4.3 Peak hourly operational traffic

4.10 Combined existing, construction and development traffic

The existing estimated intersection traffic from Figure 3.4 combined with the proposed construction or operational traffic is presented in Figure 4.4 and Figure 4.5.

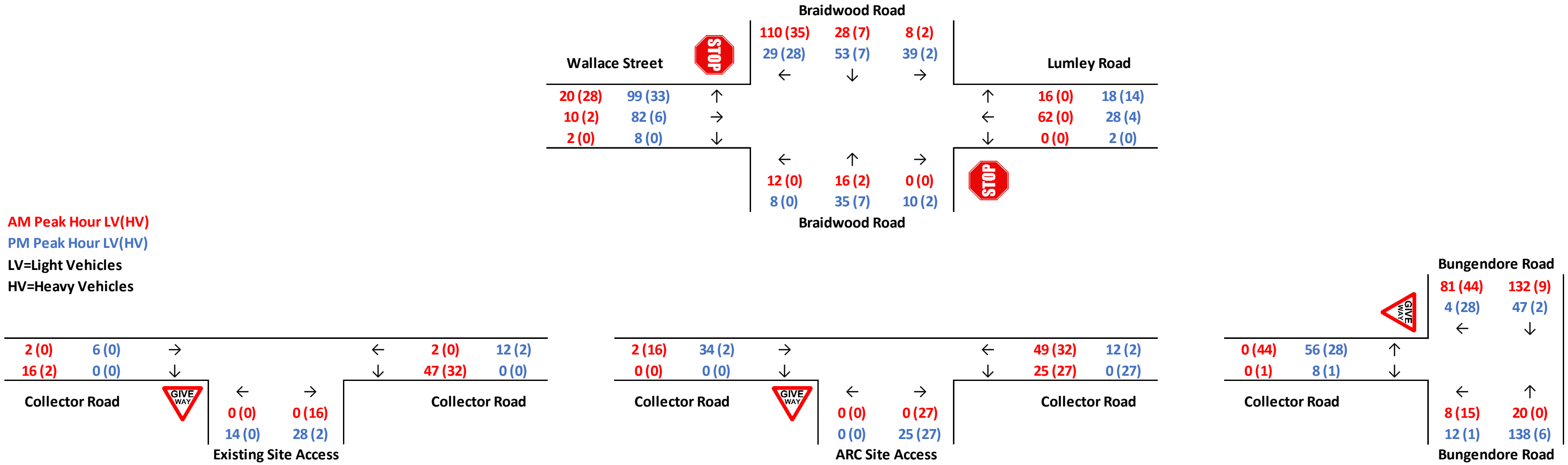


Figure 4.4 Existing traffic with proposed construction traffic

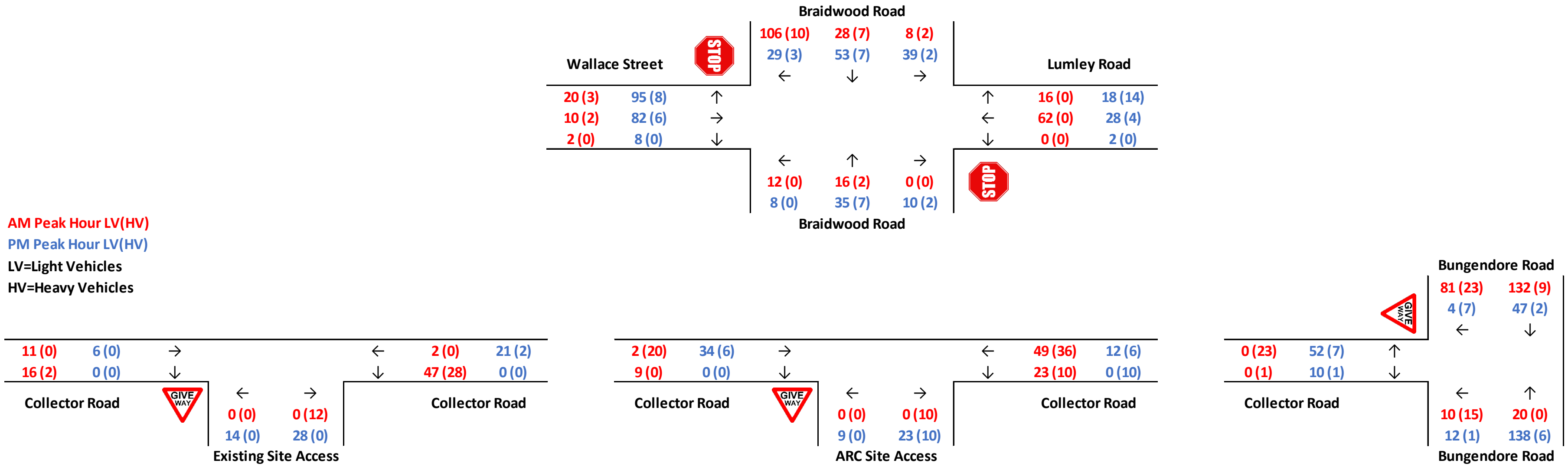


Figure 4.5 Existing traffic with proposed operational traffic

4.11 Road maintenance contributions

Road maintenance contributions are part of the project approval of the Woodlawn Waste Expansion Project (MP 10_0012). Conditions 10 and 11 of Schedule 6 – Traffic and Road Upgrades present the road maintenance contributions and are as follows:

10. *From the date of this approval, the Proponent shall pay a minimum quarterly contribution of 4.1 cents per kilometre per tonne to:*

    a) *Queanbeyan-Palerang Council for waste hauled to the Landfill along Palerang Council maintained roads; and*

    b) *Goulburn Mulwaree Council for waste hauled to the Landfill along Goulburn Mulwaree Council maintained roads.*

The contribution rate shall be adjusted every year from the date of this approval to account for the effects of inflation (RMS Road Cost Index).

11. *The Proponent shall receive a reduction in road maintenance contributions paid to Queanbeyan-Palerang Council (in cents per kilometre per tonne of waste hauled) as required by condition 10 of this schedule based on the difference between the full cost of undertaking any mandatory road upgrades along Main Road 268 (Bungendore/Tarago Road) and what the Proponent's proportional contribution should be (as determined by the audit required by condition 5 (d) of this schedule) unless other arrangements are made with Queanbeyan-Palerang Council, to the satisfaction of the Planning Secretary.*

Note: at any time either party may refer the matter to the Planning Secretary for dispute resolution.

Road maintenance contributions paid to the two respective Councils are adequate and will continue to be adequate to fund the additional road maintenance cost for the proposed project truck traffic which will be using the affected roads in each Council area.

A dilapidation survey will be undertaken for all the affected road surfaces in Queanbeyan-Palerang Regional Council and the Goulburn-Mulwaree Council LGAs, prior to the commencement of the project construction. Any new road pavement damage which occurs to these roads during the project construction period from construction activities, which represent a potential traffic safety risk to the travelling public, will be immediately repaired by the relevant Council and Veolia will directly reimburse the relevant Council for the full cost of the emergency repairs.

5 Impact assessment

5.1 Intersection performance

The key intersections have been modelled with the SIDRA Intersection 9.0 software, a micro-analytical tool for individual intersections and linked intersection-network modelling. The modelling is based on the traffic survey data detailed in sections 3.4.1 and 4.10. SIDRA provides the following performance indicators:

- Degree of saturation (DOS) – the total usage of the intersection expressed as a factor of 1 with 1 representing 100% use/saturation (eg 0.8 = 80% saturation);
- Average delay (DEL) – the average delay in seconds encountered by all vehicles passing through the intersection. It is often important to review the average delay of each approach, as a side road could have a long delay time, while the large free flowing major traffic will provide an overall low average delay;
- Level of service (LOS) – this is a categorisation of average delay, intended for simple reference; and
- 95% queue lengths (Q95) – is defined to be the queue length in metres that has only a 5% probability of being exceeded during the analysed time period. It transforms the average delay into measurable distance units.

The LOS is an indicator of overall performance for individual intersections defined in the *RTA Guide to Traffic Generating Developments* (RTA 2002), with each level summarised in Table 6.1.

Table 5.1 Intersection LOS standards

Level of service	Average delay (seconds per vehicle)	Traffic signals, roundabout	Priority intersection ('Stop' and 'Give Way')
A	<14	Good operation	Good operations
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity. At traffic signals, incidents will cause extensive delays. Roundabouts require other control mode.	At capacity; required other control mode
F	>71	Unsatisfactory with excessive queuing	Unsatisfactory with excessive queuing; required other control mode

Source: RTA Guide to Traffic Generating Development (RTA 2002)

SIDRA modelling has been conducted for the following scenarios:

1. Existing: This scenario is modelled with the estimated approved baseline traffic volumes from Figure 3.4. This scenario presents the baseline condition of traffic without any proposed construction or operational traffic of the project.
2. Existing with ARC construction: This scenario is modelled with the estimated approved baseline traffic volumes from Figure 3.4 combined with the peak hour construction traffic of the development from Figure 4.2.
3. Existing with ARC operation: This scenario is modelled with the estimated approved baseline traffic volumes from Figure 3.4 combined with the peak hour operational traffic of the development from Figure 4.3.

The SIDRA results for the key intersections are presented in Table 5.2 to Table 5.5. The detailed SIDRA intersection modelling results are attached in Annexure B.

5.1.2 Collector Road and existing site access

The SIDRA modelling results are in Table 5.2. In summary:

- during all the scenarios, the intersection continues to operate at LOS A on all approaches;
- the longest delay (8.9 seconds) occurs in existing scenarios during the AM peak;
- the “existing with ARC construction” scenario has not been modelled for the existing site access intersection because construction traffic is expected to use the new site access (once constructed); and
- overall, the intersection is being utilised at maximum of 8% capacity and has capacity to accommodate additional traffic.

Table 5.2 SIDRA modelling results for Collector Rd/Site Access (existing)

Control/ Scenarios	AM Peak					PM Peak				
Priority controlled (giveway)	Intersection volume	DEL (s)	LOS	DOS	Max Q in m (approach)	Intersection volume	DEL(s)	LOS	DOS	Max Q in m (approach)
1. Existing	118	8.9	A	0.079	1.3 (south)	66	7.9	A	0.031	0.7 (south)
2. Existing with construction	-	-	-	-	-	-	-	-	-	-
3. Existing with operations	119	8.8	A	0.074	0.9 (south)	73	7.9	A	0.028	0.6 (south)

5.1.3 Collector Road and ARC site access

The SIDRA modelling results are in Table 5.3. In summary:

- there is no "existing" traffic scenario for this intersection as it is a new intersection;
- during all the scenarios modelled, the intersection continues to operate at LOS A on all approaches;
- the longest delay (10.5 seconds) occurs in the "existing with ARC construction" and "existing with ARC operations" scenarios during the PM peak; and
- overall, the intersection is being utilised at a maximum of 10% capacity and has capacity to accommodate additional traffic.

Table 5.3 SIDRA modelling results for Collector Rd/Site Access (new)

Control/ Scenarios	AM Peak					PM Peak				
Priority controlled (giveway)	Intersection volume	DEL (s)	LOS	DOS	Max Q in m (approach)	Intersection volume	DEL(s)	LOS	DOS	Max Q in m (approach)
2. Existing with construction	180	9.2	A	0.094	1.7 (south)	131	10.5	A	0.058	1.9 (south)
3. Existing with operation	160	8.7	A	0.080	0.6 (south)	111	10.5	A	0.033	0.9 (south)

5.1.4 Bungendore Road and Collector Road

The SIDRA modelling results are in Table 5.4. In summary:

- during all the modelled scenarios, the intersection continues to operate at LOS A on all approaches;
- the longest delay (13.5 seconds) occurs in the "existing with ARC operations" scenario during the AM peak;
- overall, the intersection is being utilised at a maximum of 19% capacity and has capacity to accommodate additional traffic.

Table 5.4 SIDRA modelling results for Bungendore Rd/Collector Road

Control/ Scenarios	AM Peak					PM Peak				
Priority controlled (giveway)	Intersection volume	DEL (s)	LOS	DOS	Max Q in m (approach)	Intersection volume	DEL(s)	LOS	DOS	Max Q in m (approach)
1. Existing	276	10.9	A	0.161	4.9 (north-east)	252	9.2	A	0.089	0.8 (north-west)
2. Existing with construction	354	13.3	A	0.186	7.3 (north-east)	331	11.2	A	0.090	3.0 (north-east)
3. Existing with operation	314	13.5	A	0.186	6.5 (north-east)	287	10.3	A	0.090	1.5 (north-west)

5.1.5 Braidwood Street/Wallace Street/Lumley Road

The SIDRA modelling results are in Table 5.5. In summary:

- during all the modelled scenarios, the intersection continues to operate at LOS B or better on all approaches;
- the longest delay (14.9 seconds) occurs in the "existing with ARC construction" scenario during the PM peak;
- overall, the intersection is being utilised at a maximum of 25% capacity and has capacity to accommodate additional traffic.

Table 5.5 SIDRA modelling results for Braidwood Rd/Wallace Street/Lumley Road

Control/ Scenarios	AM Peak					PM Peak				
Priority controlled (giveway)	Intersection volume	DEL (s)	LOS	DOS	Max Q in m (approach)	Intersection volume	DEL(s)	LOS	DOS	Max Q in m (approach)
1. Existing	285	9.0	A	0.093	3.4 (north)	437	12.9	A	0.187	5.8 (west)
2. Existing with construction	362	9.8	A	0.135	5.7 (north)	514	14.9	B	0.245	8.8 (west)
3. Existing with operation	308	9.2	A	0.106	4.0 north)	460	13.3	A	0.205	6.5 (west)

5.2 Mid-block capacity analysis

The mid-block level of service on rural and urban roads is assessed based on a vehicle's average travel speed. At low traffic volumes and under ideal conditions, drivers are able to travel at their desired speed without interference. As traffic volumes increase, and as roadway, terrain and traffic conditions become less than ideal, drivers are affected by the presence of other vehicles on the road and this forms bunches in the traffic stream.

There are six levels of service, as described below in Table 5.6, from *Guide to Traffic Generating Developments* (RTA, 2002).

Table 5.6 Mid-block level of service descriptions

Level of service	Level of service description
Level of Service A	This, the top level is a condition of free flow in which individual drivers are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high, and the general level of comfort and convenience provided is excellent.
Level of Service B	This level is in the zone of stable flow and drivers still have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream, although the general level of comfort and convenience is little less than that of the level of Service A.
Level of Service C	This service level is also in the zone of stable flow, but most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience declines noticeably at this level.
Level of Service D	This level is close to the limit of stable flow but is approaching unstable flow. All drivers are severely restricted in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience is poor, and small increases in traffic flow will generally cause operational problems.
Level of Service E	This occurs when traffic volumes are at or close to capacity and there is virtually no freedom to select desired speeds or to manoeuvre within the traffic stream. Flow is unstable and minor disturbances within the traffic stream will cause a traffic-jam.
Level of Service F	This service level is in the zone of forced flow. With it, the amount of traffic approaching the point under consideration exceeds that which can pass it. Flow break-down occurs and queuing and delays result.

For this project the mid-block capacity analysis has been done for Collector Road and Bungendore Road. The posted speed limit along Collector Road and Bungendore Road are 100 km/h.

5.2.1 Rural road capacity

Table 4.5 of *Guide to Traffic Generating Developments* (RTA, 2002) provides the two-way hourly traffic capacities (ie number of vehicles per hour) for two-lane roads for different LOS with a design speed of 100 km/h based on different terrain types. The capacities assume 60% of traffic is travelling in one direction and 40% is travelling in the other direction.

The capacities for each LOS transition (ie the combined number of vehicles travelling in both directions at where the LOS decreases) are provided in Table 5.7. Collector Road has been assessed for rolling terrain whereas the steep section of Bungendore Road between Crisps Creek IMF and Bungendore/ Collector Road intersection has been assessed for mountainous terrain.

Table 5.7 Roadway hourly capacity for a two-lane two-way rural road (100 km/h speed limit)

Terrain	Level of service transition	Effect of percentage of heavy vehicles (in traffic flow)						
		0%	5%	10%	15%	20%	25%	30%
Rolling	A/B*	250	210	180	155	135	120	110
	B/C	500	420	360	310	270	240	220
	C/D	920	760	650	570	510	470	450
	D/E	1370	1140	970	700	630	580	550
	E/F	2420	2000	1720	1510	1,360	1,260	1,210
Mountainous	A/B*	170	115	90	75	65	60	55
	B/C	340	230	180	150	130	115	105
	C/D	600	410	320	260	220	190	160
	D/E	1050	680	500	400	330	280	250
	E/F	2160	1400	1040	820	650	510	390

Notes: *Assumed to be 50% of upper limit of B/C LOS.

Columns 20% to 30% have been extrapolated from the preceding columns

5.2.2 Rural road compliance

The mid-block capacity (LOS) assessments for Collector Road and Bungendore Road are provided in Table 5.8 and Table 5.9 for the existing, construction and operations traffic scenarios. The existing traffic volumes are extracted from Figure 3.4 and the construction and operations volumes are extracted from Figure 4.4 and Figure 4.5.

Table 5.8 Collector Road mid-block capacity

Scenario	Peak hour volume	Heavy vehicle percentage	Level of Service
Existing	114 (AM) / 59 (PM)	44% (AM) / 7% (PM)	B/A
Existing + Construction	193 (AM) / 138 (PM)	54% (AM) / 42% (PM)	C/B
Existing + Operation	153 (AM) / 94 (PM)	41% (AM) / 17% (PM)	B/A

The Collector Road LOS has been determined from further extrapolations of the values presented in Table 5.7. Collector Road is expected to operate at LOS A or B in the existing and existing + operations traffic scenarios and at LOS B or C in the existing + construction traffic scenario.

Table 5.9 Bungendore Road mid-block capacity

Scenario	Peak hour volume	Heavy vehicle percentage	Level of Service
Existing	253 (AM) / 232 (PM)	18% (AM) / 5% (PM)	D/C
Existing + Construction	330 (AM) / 309 (PM)	29% (AM) / 21% (PM)	E/D
Existing + Operation	288 (AM) / 263 (PM)	19% (AM) / 8% (PM)	D/C

Bungendore Road is expected to operate at LOS C or D in the existing and existing + operations traffic scenarios and at LOS D or E in the existing + construction traffic scenario.

For both Collector Road and Bungendore Road, there will be a reduction in the LOS (by one category) for each road for the duration of the assessed period which corresponds to the period of peak construction activity. During peak construction, the LOS for the morning peak hour could reach LOS E which infers that the road is at or close to capacity.

When the project construction work has been completed and the ARC is fully operational, the LOS for both Collector Road and Bungendore Road will return to the previously assessed "existing" traffic conditions.

5.3 Road safety assessment at the ARC site access

In accordance with *Austroads Guide to Road Design Part 4A (Unsignalised and Signalised Intersections)* (Austroads, 2017), for a 100 km/h road, the minimum safe intersection sight distance (SISD) required for a general minimum 2 second driver reaction time is 248 m.

The sight distances on Collector Road at the proposed site access road have been estimated based on the line of sight and observation, as shown in Plate 5.1. Based on the sight distance analysis, the sight distances to the right (500 m) and left (300 m) meets the minimum requirement (248 m) as stipulated in the Austroads Guide to Road Design.

Sight distance to the left (356 m)

Sight distance to the right (500 m)

Plate 5.1 Sight distance from proposed ARC site access

5.4 Warrants for turn movements

Intersection operations are assessed from a combination of the peak hourly through and turning traffic movements that occur at each intersection. This determines the need for additional intersection turning lanes (eg basic, auxiliary lane and channelised) in accordance with the current intersection design standards (Austroads 2017b) *Guide to Road Design Part 4, Intersections and Crossings General* (Figure A 10), where:

- Curve 1 (red line) represents the boundary between a basic right turn (BAR) and a channelised short right turn (CHR(S)) turn treatment and between a basic left turn (BAL) and an auxiliary short left turn (AUL(S)) turn treatment; and
- Curve 2 (blue line) represents the boundary between a CHR(S) and a full length CHR treatment and between an AUL(S) and a full length AUL or CHL treatment. The choice of CHL over an AUL will depend on factors such as the need to change the give way rule in favour of other manoeuvres at the intersection and the need to define more appropriately the driving path by reducing the area of bitumen surfacing.

Figure 5.1 below contains two graphs for the selection of turn treatments on roads with a design speed greater than or equal to 100 km/h appropriate for high-speed rural roads and less than 100 km/h which is appropriate for urban roads, including those on the urban fringe and lower speed rural roads.

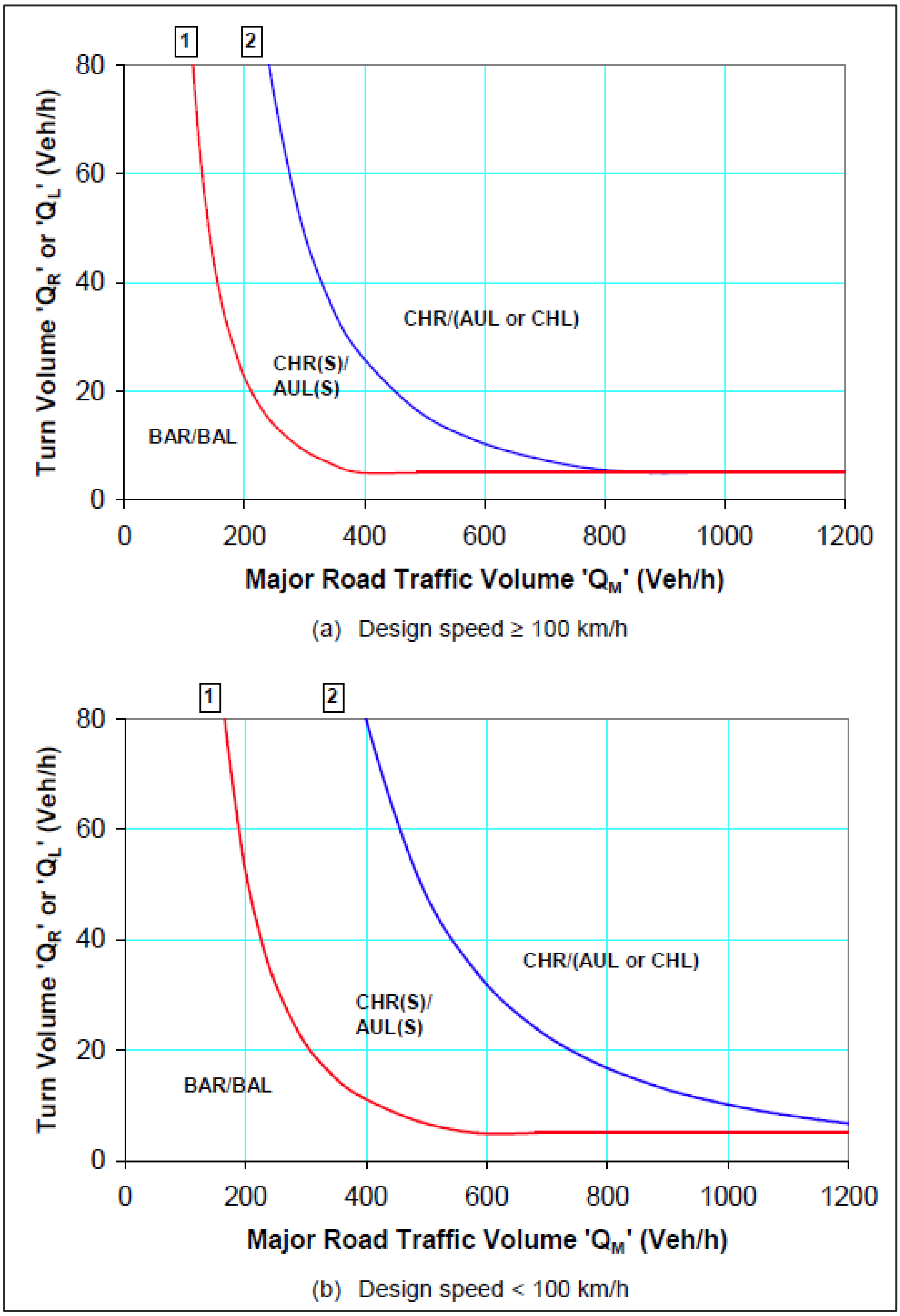


Figure 5.1 Austroads warrant design charts for rural intersection turning lanes

TfNSW recommends that intersections should be designed for a travel speed 10 km/h greater than the posted speed limit. As Collector Road has posted speed limit of 100 km/h, the intersection (including any requirements for turning bays at the new accesses road) should be designed for 110 km/h.
For a design speed of 100 km/h or greater, the requirements for additional left or right turn traffic lanes are measured from Figure 5.1.

The configuration of the Collector Road/New Access intersection once designed will be a 100 km/hr speed limit (110 km/hr design speed) T-junction with rural basic Type BAR and Type BAL right turning and left turning treatment. The intersection peak hourly turning traffic volumes for the warrant assessment for the existing + construction and existing + operation scenarios for the new site access are summarised in Table 5.10 and Table 5.11.

Table 5.10 Intersection turn treatment warrant for Collector Road/Site Access (new) during construction

Movement	Peak hour	Major road traffic volume	Turning traffic volume	Turn treatment required
Left turn from major road	AM	81	52	BAL
	PM	14	27	BAL
Right turn from major road	AM	151	0	BAR
	PM	77	0	BAR

Table 5.11 Intersection turn treatment warrant for Collector Road/Site Access (new) during operation

Movement	Peak hour	Major road traffic volume	Turning traffic volume	Turn treatment required
Left turn from major road	AM	85	33	BAL
	PM	18	10	BAL
Right turn from major road	AM	140	9	BAR
	PM	68	0	BAR

Based on the peak hour traffic volumes during construction and operation scenarios, the proposed BAR and BAL intersection turn treatment will be sufficient as per Austroads Warrant Chart requirement (Figure 5.2).

5.5 Queuing assessment

Heavy vehicles arriving at the ARC will be serviced by the new incoming weighbridge on the site access road shown in Figure 4.1. The typical service time per vehicle on weighbridge for trucks bringing waste material will not exceed 1 minute. The truck arrival rate during the operation phase of the project will be 10 vehicles per hour (from Table 4.4).

Using steady state queuing equation 4.5 of *Austroads. 2020. Guide to Traffic Management Part 2: Traffic Theory Concepts* (Austroads, 2020), the queuing analysis results calculated a 95th percentile queue of a maximum of one truck in the queue. This would require a maximum of 23 m queuing length from the weighbridge to the site access on Collector Road. A safe distance of approximately 500 m is present from the weighbridge to Collector Road which would be able to accommodate peak hour queuing.

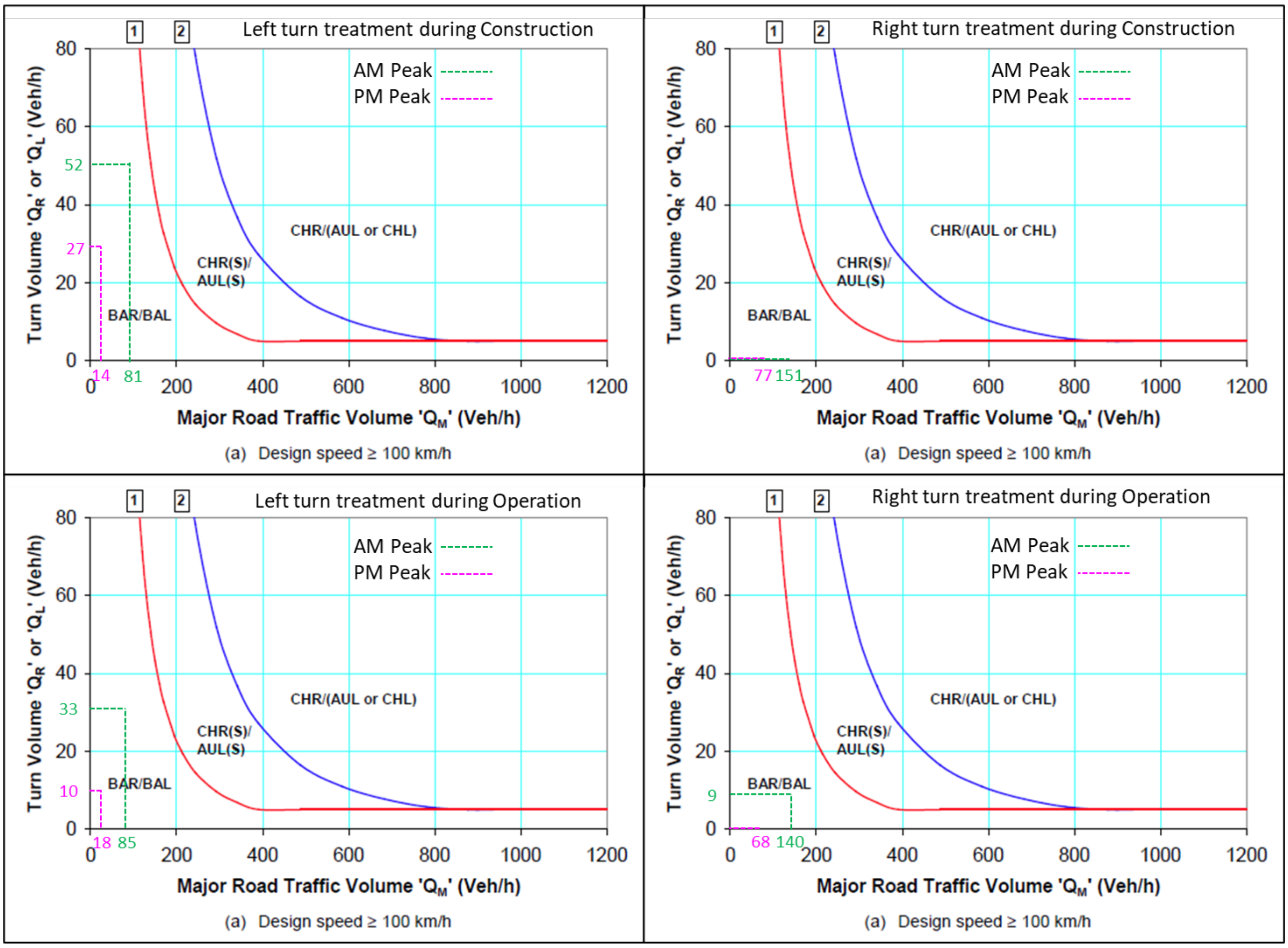


Figure 5.2 **Austroads turn treatment warrant assessment for Collector Road/Site Access (new) intersection during construction and operation scenarios**

5.6 Bungendore Road climbing lane

It is recognised that the community has raised concerns about traffic delays on the hill climbing out of Crisps Creek due to the slower moving heavy haulage vehicles transporting waste from the IMF to the Eco Precinct. The assessment indicates that, during the peak construction period, these delays are expected to increase slightly, with the peak hour LOS dropping from D/C to E/D.

The level of service during construction indicates that traffic flow is close to the limit of stable flow and is approaching an unstable flow situation where drivers may be restricted in their freedom to select their desired speeds and to manoeuvre within the traffic stream. After the construction period this section of road should return to its current level of service at D/C.

Veolia is currently in discussion with Goulburn Mulwaree Council with respect to the climbing lane and has agreed to undertake further investigations. Whilst separate to this proposal, should a climbing lane be built, it would overcome any capacity or speed issues on this section of road.

6 Recommended mitigation measures

6.1 Construction

The proposed traffic management mitigation measures for the construction phase are outlined in Table 6.1.

Table 6.1 Proposed mitigation measures during construction phase

Requirement	Mitigation measure	Responsibility	Timing
Need for intersection upgrades	A new site access intersection is proposed for the ARC construction and operations access. The intersection will be constructed to 100 km/hr speed limit (110 km/hr design speed) Austroads standards and will incorporate Type BAR and Type BAL right and left turn treatments.	Veolia	Pre-construction
Worksite traffic control and confirmation of other management measures	A draft Construction Traffic Management Plan (CTMP) has been prepared and attached in Annexure E. A detailed CTMP will be developed by the construction contractor in consultation with GMC prior to the commencement of works.	Contractor	Pre-construction
Access by oversize or overmass vehicles	Any access which may be required to allow oversize or overmass vehicles to deliver any specific construction components to the site will require the vehicle operator to obtain a permit (from NHVR). This access (if required) will be assessed and confirmed in the CTMP.	Contractor	Pre-construction
Road pavement dilapidation survey	A dilapidation survey will be undertaken for all the affected road surfaces in Queanbeyan-Palerang Regional Council and the Goulburn-Mulwaree Council LGAs, prior to the commencement of the project construction.	Contractor	Pre-construction
Emergency road repairs	Veolia will directly reimburse the relevant Council for the full cost of any emergency road repairs during the project construction period.	Veolia	During construction
Dust control	Road surfaces for any unsealed roads used for construction access should be adequately watered to mitigate dust generation impacts.	Contractor	During construction
Local community liaison with residents during the construction period	Regular notifications will be provided to the local community (local residents in Tarago and the surrounding areas) to advise of the current stage of the project construction work and associated daily and peak hourly construction traffic movements to allow local residents to be made aware of typical construction traffic movements throughout the project construction phase It is also recognised that additional notifications may be required for 24/7 working hours.	Veolia/Contractor	During construction

6.2 Operation phase

No material traffic impacts are expected during the operations phase. The current codes of conduct applying to Veolia drivers are attached in Appendix F. These may be revised and applied to the operational phase, however given traffic levels change little from the current situation it is not envisaged that significant changes will be required.

7 Conclusion

Veolia proposes to develop and operate the ARC as the next phase of development at the Eco Precinct. The ARC will be designed to accept up to 380,000 tpa of waste feedstock.

The 380,000 tpa of waste feedstock for the ARC will be sourced from existing approved waste transported to the Eco Precinct under development consents DA31-02-99 and MP 10_0012 (as modified). Waste feedstock for the ARC will be transported to the Eco Precinct via the new ARC site access rather than the existing site access road for the Bioreactor and MBT facility. Hence, trucks delivering waste feedstock to the ARC are already part of the surrounding road network traffic. There will be minor additional operational daily and peak hourly truck traffic using the road network in the future which have been assessed in addition to existing approved traffic movements to and from the Eco Precinct.

The new ARC site access intersection turn lane requirements (Type BAR, Type BAL) and visibility (SISD) will comply with the current Austroads Road Design Guide requirements.

Four key intersections assessed all operate at a good level of service (LOS A) for modelled existing operations scenarios, which has been used as the indicator for overall performance. The key intersections will continue to operate at LOS A in all the assessed scenarios and traffic peak hours, with marginal increases in average traffic delays and queue lengths. Additional intersection turning lanes will not be required at any locality intersection as a result of the project related light and heavy vehicle traffic movements.

Construction of the project is expected to be undertaken over a period of three years. Construction traffic has been assessed for the peak stage of construction. It is estimated that construction traffic will temporarily reduce the existing road network traffic capacity along Collector Road and Bungendore Road. A reduction in the mid block capacity LOS is predicted on both these roads during the peak construction stage. The mid block capacity will reduce by one LOS category during construction. As this will be a temporary impact, no additional road widening measures are currently recommended. A detailed CTMP will be developed by the construction contractor in consultation with GMC prior to the commencement of works.

Operation of the ARC will not adversely affect the existing road network traffic capacity along either Collector Road and Bungendore Road. Hence, no longer term traffic capacity related road improvements will be required during operation.

The proposed car parking areas to be provided for the site construction and operation stage workforces will be adequate and meet the forecast workforce parking demand.

Overall, the proposed development is not expected to significantly impact the existing regional or local traffic conditions in the locality or the respective road networks.

8 References

Austroads. (2016). *Guide to Traffic Management Part 3: Traffic Studies and Analysis.*

Austroads. (2017). *Guide to Road Design Part 4A: Unsignalised & Signalised Intersections.*

Austroads. (2020). *Guide to Traffic Management Part 2:Traffic Theory Concepts.*

Barrett, W. (2010). *Environmental Assessment Woodlawn Expansion Project.*

RTA. (2002). *Guide to Traffic Generating Developments.*

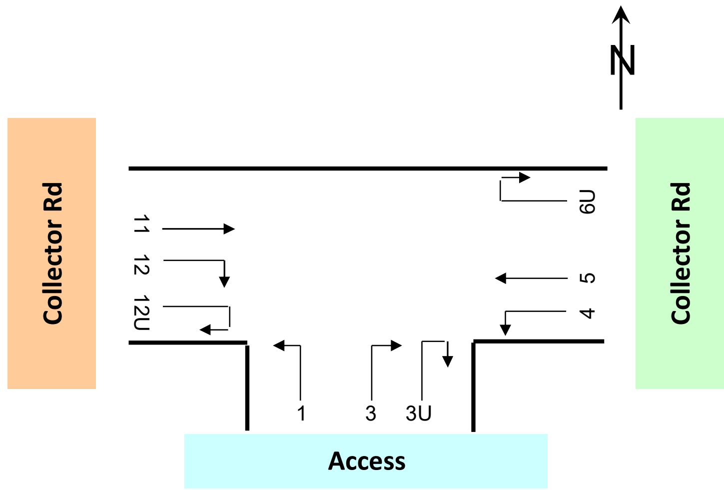
Annexure A

Veolia traffic survey data

EMM
creating opportunities

Job No. : AUNSW1543
Client : EMM Consulting Pty Ltd
Suburb : Woodlawn Precinct
Location : 1. Collector Rd / Woodlawn Precinct Access

Day/Date : Thu, 12th Aug 2021
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary

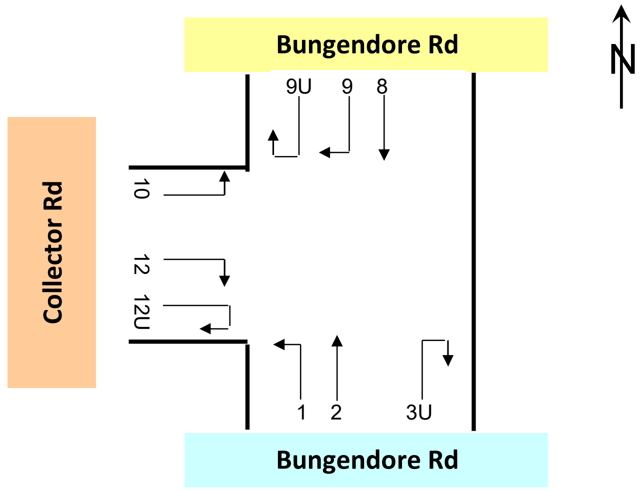


Approach			Access			Collector Rd			Collector Rd			Grand Total
Time Period			Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM 6:15	to	7:15	0	9	**9**	25	18	**43**	9	1	**10**	**62**
PM 16:15	to	17:15	21	1	**22**	6	1	**7**	3	0	**3**	**32**

Approach			Access			Collector Rd			Collector Rd			Grand Total
Time Period			Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
6:00	to	7:00	0	8	**8**	30	8	**38**	9	0	**9**	**55**
6:15	to	7:15	0	9	**9**	25	18	**43**	9	1	**10**	**62**
6:30	to	7:30	1	10	**11**	22	18	**40**	6	1	**7**	**58**
6:45	to	7:45	2	11	**13**	14	15	**29**	2	1	**3**	**45**
7:00	to	8:00	4	15	**19**	12	15	**27**	1	1	**2**	**48**
7:15	to	8:15	4	21	**25**	14	8	**22**	2	0	**2**	**49**
7:30	to	8:30	4	23	**27**	10	11	**21**	2	0	**2**	**50**
7:45	to	8:45	3	20	**23**	10	18	**28**	1	0	**1**	**52**
8:00	to	9:00	2	20	**22**	7	16	**23**	2	0	**2**	**47**
AM Totals			**6**	**43**	**49**	**49**	**39**	**88**	**12**	**1**	**13**	**150**
15:00	to	16:00	19	4	**23**	1	0	**1**	2	0	**2**	**26**
15:15	to	16:15	11	1	**12**	1	0	**1**	3	0	**3**	**16**
15:30	to	16:30	12	2	**14**	2	0	**2**	2	0	**2**	**18**
15:45	to	16:45	14	2	**16**	3	1	**4**	3	0	**3**	**23**
16:00	to	17:00	18	2	**20**	2	1	**3**	4	0	**4**	**27**
16:15	to	17:15	21	1	**22**	6	1	**7**	3	0	**3**	**32**
16:30	to	17:30	18	0	**18**	6	1	**7**	5	0	**5**	**30**
16:45	to	17:45	15	0	**15**	5	0	**5**	6	0	**6**	**26**
17:00	to	18:00	8	0	**8**	5	0	**5**	6	0	**6**	**19**
PM Totals			**45**	**6**	**51**	**8**	**1**	**9**	**12**	**0**	**12**	**72**

Job No. : AUNSW1543
Client : EMM Consulting Pty Ltd
Suburb : Woodlawn Precinct
Location : 2. Collector Rd / Bungendore Rd

Day/Date : Thu, 12th Aug 2021
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



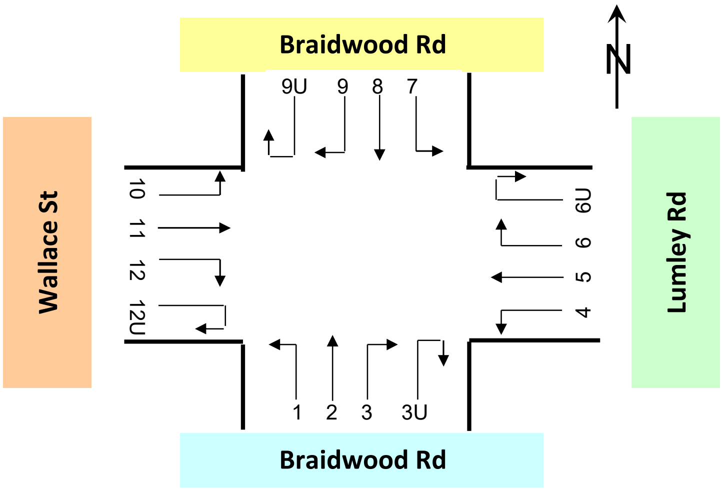
MATRIX Traffic and Transport Data

	Approach		Bungendore Rd			Bungendore Rd			Collector Rd			Grand Total
	Time Period		Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM	6:15	to 7:15	14	8	22	97	15	112	0	10	10	144
PM	16:45	to 17:45	84	2	86	23	2	25	18	1	19	130

Approach			Bungendore Rd			Bungendore Rd			Collector Rd			Grand Total
Time Period			Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
6:00	to	7:00	14	6	20	95	12	107	0	9	9	136
6:15	to	7:15	14	8	22	97	15	112	0	10	10	144
6:30	to	7:30	16	12	28	88	12	100	2	12	14	142
6:45	to	7:45	13	11	24	81	15	96	3	11	14	134
7:00	to	8:00	13	9	22	71	12	83	5	15	20	125
7:15	to	8:15	22	8	30	61	12	73	6	21	27	130
7:30	to	8:30	28	5	33	51	18	69	4	23	27	129
7:45	to	8:45	27	5	32	42	19	61	3	20	23	116
8:00	to	9:00	24	7	31	35	21	56	2	19	21	108
AM Totals			51	22	73	201	45	246	7	43	50	369
15:00	to	16:00	60	3	63	20	1	21	18	4	22	106
15:15	to	16:15	65	3	68	19	3	22	14	2	16	106
15:30	to	16:30	68	4	72	23	3	26	14	3	17	115
15:45	to	16:45	78	3	81	25	3	28	17	1	18	127
16:00	to	17:00	74	3	77	27	3	30	18	1	19	126
16:15	to	17:15	77	3	80	26	2	28	20	1	21	129
16:30	to	17:30	83	2	85	22	2	24	19	0	19	128
16:45	to	17:45	84	2	86	23	2	25	18	1	19	130
17:00	to	18:00	82	1	83	21	2	23	14	1	15	121
PM Totals			216	7	223	68	6	74	50	6	56	353

Job No. : AUNSW1543
Client : EMM Consulting Pty Ltd
Suburb : Woodlawn Precinct
Location : 3. Braidwood Rd / Lumley Rd / Wallace St

Day/Date : Thu, 12th Aug 2021
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



Traffic and Transport Data

	Approach	Braidwood Rd			Lumley Rd			Braidwood Rd			Wallace St			Grand Total
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM	7:00 to 8:00	14	2	16	41	3	44	59	8	67	22	11	33	160
PM	16:00 to 17:00	28	5	33	22	12	34	65	9	74	79	8	87	228

Approach	Braidwood Rd			Lumley Rd			Braidwood Rd			Wallace St			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
6:00 to 7:00	14	2	16	38	0	38	64	11	75	13	2	15	144
6:15 to 7:15	14	1	15	40	0	40	62	10	72	16	2	18	145
6:30 to 7:30	12	1	13	39	1	40	59	6	65	20	3	23	141
6:45 to 7:45	12	2	14	43	2	45	54	9	63	22	8	30	152
7:00 to 8:00	14	2	16	41	3	44	59	8	67	22	11	33	160
7:15 to 8:15	15	2	17	38	5	43	50	10	60	24	13	37	157
7:30 to 8:30	16	2	18	35	5	40	44	13	57	31	13	44	159
7:45 to 8:45	15	2	17	27	6	33	39	11	50	28	7	35	135
8:00 to 9:00	16	3	19	28	8	36	30	10	40	24	4	28	123
AM Totals	44	7	51	107	11	118	153	29	182	59	17	76	427
15:00 to 16:00	23	7	30	26	2	28	59	8	67	71	6	77	202
15:15 to 16:15	19	7	26	20	4	24	64	8	72	64	5	69	191
15:30 to 16:30	20	6	26	20	11	31	65	7	72	70	7	77	206
15:45 to 16:45	24	7	31	24	11	35	60	9	69	72	7	79	214
16:00 to 17:00	28	5	33	22	12	34	65	9	74	79	8	87	228
16:15 to 17:15	27	5	32	24	10	34	62	6	68	84	7	91	225
16:30 to 17:30	21	4	25	26	3	29	59	4	63	80	4	84	201
16:45 to 17:45	16	3	19	21	2	23	62	2	64	87	3	90	196
17:00 to 18:00	11	3	14	25	3	28	56	1	57	76	2	78	177
PM Totals	62	15	77	73	17	90	180	18	198	226	16	242	607

Job No	AUNSW1543
Client	EMM
Site	Collector Road
Location	north of Bungendore Road
Site No	1
Start Date	12-Aug-21
Day	Weekday Ave
Description	Class Summary
Classification	AustRoads94

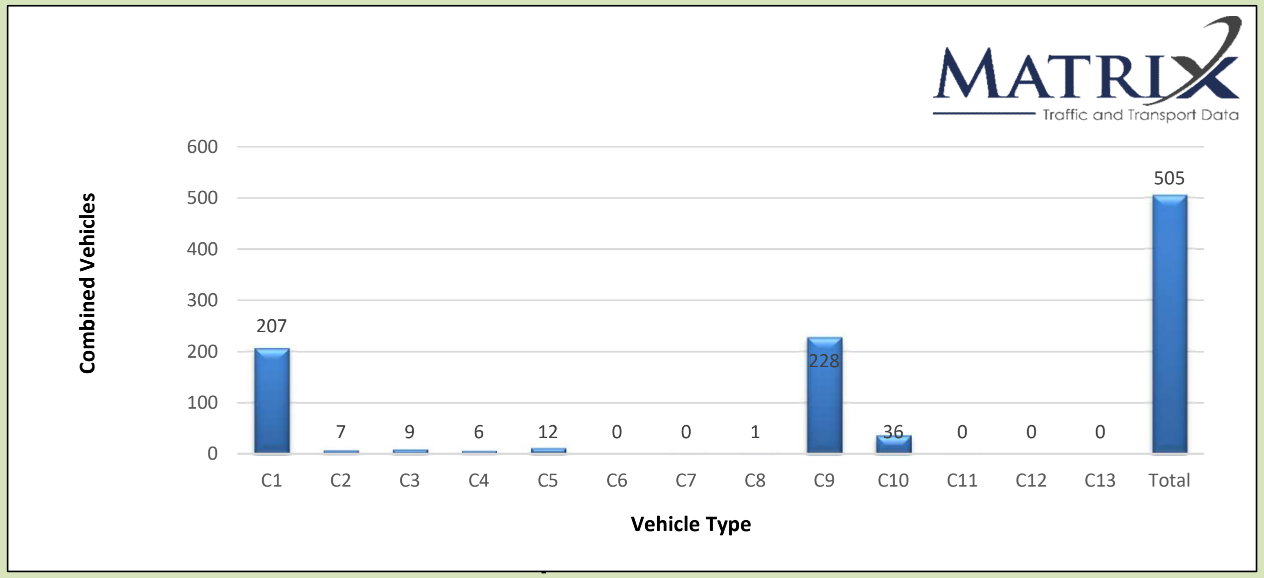
Select Site

1. Collector Road

Select Day

Weekday Ave

Class Summary		C	NB	SB
Light	C1	**41%**	40%	42%
	C2	**1%**	1%	1%
Medium	C3	**2%**	2%	2%
	C4	**1%**	1%	1%
	C5	**2%**	2%	2%
Heavy	C6	**0%**	0%	0%
	C7	**0%**	0%	0%
	C8	**0%**	0%	0%
	C9	**45%**	46%	44%
	C10	**7%**	7%	7%
	C11	**0%**	0%	0%
	C12	**0%**	0%	0%
Unclassified	C13	**0%**	0%	0%



NB

Hour Starting	C1 Short	C2 Short Towing	C3 2 axle Truck or bus	C4 3 Axle Truck or Bus	C5 4 or 5 Axle Truck	C6 3 axle Articulated	C7 4 Axle Articulated	C8 5 Axle Articulated	C9 6 Axle Articulated	C10 B Double	C11 Double Road Train	C12 Triple Road Train	C13 Unclassifiable	**Total**
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:00	2	0	0	0	0	0	0	0	0	0	0	0	0	**2**
6:00	1	0	0	0	0	0	0	0	8	0	0	0	0	**9**
7:00	3	0	0	0	0	0	0	0	12	2	0	0	0	**18**
8:00	5	0	0	0	0	0	0	0	17	2	0	0	0	**25**
9:00	4	0	2	0	1	0	0	0	18	2	0	0	0	**27**
10:00	6	0	0	1	2	0	0	0	16	2	0	0	0	**26**
11:00	4	0	1	0	1	0	0	1	8	3	0	0	0	**20**
12:00	7	0	0	1	1	0	0	0	14	2	0	0	0	**24**
13:00	6	0	0	0	0	0	0	0	15	2	0	0	0	**23**
14:00	10	1	0	0	0	0	0	0	2	1	0	0	0	**15**
15:00	12	1	0	0	0	0	0	0	3	1	0	0	0	**17**
16:00	13	1	0	0	0	0	0	0	0	0	0	0	0	**15**
17:00	13	0	0	0	0	0	0	0	0	0	0	0	0	**14**
18:00	4	0	0	0	0	0	0	0	0	0	0	0	0	**4**
19:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
20:00	2	0	0	0	0	0	0	0	0	0	0	0	0	**2**
21:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
23:00	3	0	0	0	0	0	0	0	0	0	0	0	0	**3**
Total	97	3	4	3	6	0	0	1	113	18	0	0	0	**245**

SB

Hour Starting	C1 Short	C2 Short Towing	C3 2 axle Truck or bus	C4 3 Axle Truck or Bus	C5 4 or 5 Axle Truck	C6 3 axle Articulated	C7 4 Axle Articulated	C8 5 Axle Articulated	C9 6 Axle Articulated	C10 B Double	C11 Double Road Train	C12 Triple Road Train	C13 Unclassifiable	**Total**
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:00	7	0	0	0	0	0	0	0	0	0	0	0	0	**7**
5:00	8	0	0	0	0	0	0	0	0	0	0	0	0	**8**
6:00	36	1	0	0	0	0	0	0	5	1	0	0	0	**43**
7:00	13	0	1	0	0	0	0	0	15	1	0	0	0	**32**
8:00	8	0	1	1	0	0	0	0	16	2	0	0	0	**28**
9:00	4	0	0	0	1	0	0	0	18	2	0	0	0	**26**
10:00	7	0	1	1	2	0	0	0	13	2	0	0	0	**26**
11:00	3	0	1	1	1	0	0	0	9	1	0	0	0	**17**
12:00	6	0	0	0	1	0	0	0	16	2	0	0	0	**26**
13:00	6	1	0	0	0	0	0	0	17	2	0	0	0	**26**
14:00	3	0	0	0	1	0	0	0	4	1	0	0	0	**9**
15:00	2	0	1	0	0	0	0	0	1	1	0	0	0	**5**
16:00	2	0	1	0	0	0	0	0	0	0	0	0	0	**3**
17:00	2	0	0	0	0	0	0	0	0	0	0	0	0	**2**
18:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
19:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total	109	3	5	3	6	0	0	0	115	18	0	0	0	**260**

COMBINED

Hour Starting	C1 Short	C2 Short Towing	C3 2 axle Truck or bus	C4 3 Axle Truck or Bus	C5 4 or 5 Axle Truck	C6 3 axle Articulated	C7 4 Axle Articulated	C8 5 Axle Articulated	C9 6 Axle Articulated	C10 B Double	C11 Double Road Train	C12 Triple Road Train	C13 Unclassifiable	**Total**
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:00	7	0	0	0	0	0	0	0	0	0	0	0	0	**7**
5:00	10	0	0	0	0	0	0	0	0	0	0	0	0	**10**
6:00	37	1	0	0	0	0	0	0	12	2	0	0	0	**52**
7:00	16	1	1	0	1	0	0	0	28	3	0	0	0	**50**
8:00	13	0	1	1	1	0	0	0	33	4	0	0	0	**53**
9:00	9	0	2	0	1	0	0	0	36	4	0	0	0	**53**
10:00	13	1	1	2	3	0	0	0	29	4	0	0	0	**53**
11:00	7	0	1	1	3	0	0	1	18	5	0	0	0	**36**
12:00	13	0	0	1	1	0	0	0	30	4	0	0	0	**50**
13:00	12	1	0	0	0	0	0	0	31	4	0	0	0	**49**
14:00	14	1	0	0	1	0	0	0	6	3	0	0	0	**24**
15:00	14	1	1	0	0	0	0	0	4	2	0	0	0	**22**
16:00	15	1	1	0	0	0	0	0	0	0	0	0	0	**18**
17:00	15	0	0	0	0	0	0	0	0	0	0	0	0	**16**
18:00	4	0	0	0	0	0	0	0	0	0	0	0	0	**5**
19:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
20:00	2	0	0	0	0	0	0	0	0	0	0	0	0	**2**
21:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
23:00	3	0	0	0	0	0	0	0	0	0	0	0	0	**3**
Total	207	7	9	6	12	0	0	1	228	36	0	0	0	**505**

Job No	AUNSW1543
Client	EMM
Site	Bungendore Road
Location	south of Collector Road
Site No	2
Start Date	12-Aug-21
Day	Weekday Ave
Description	Class Summary
Classification	AustRoads94

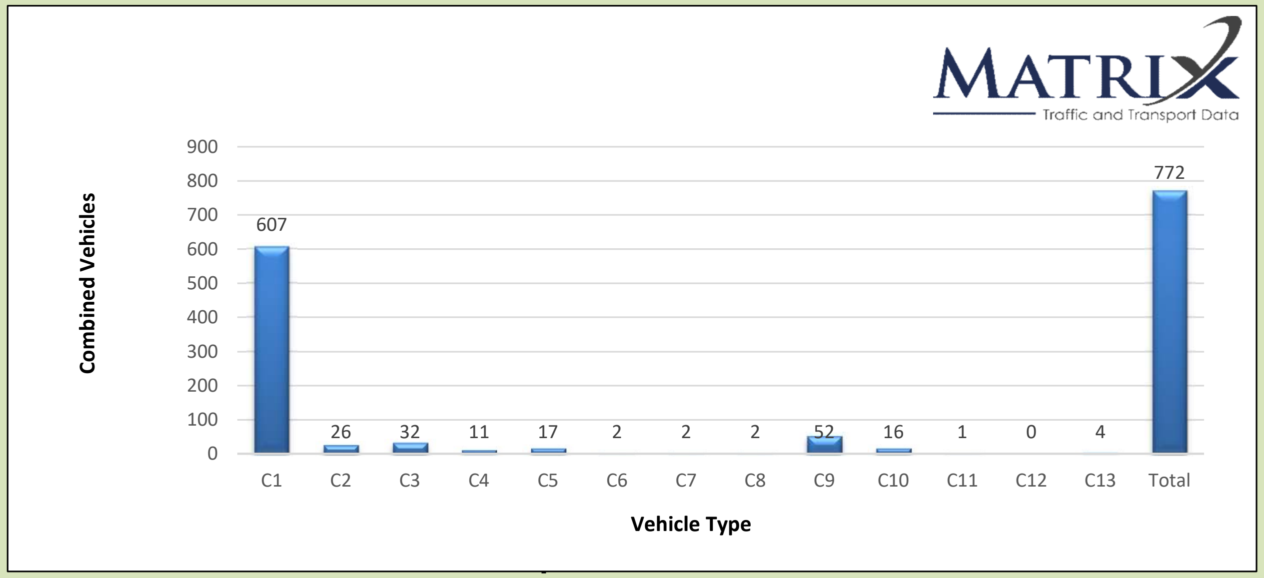
Select Site

2. Bungendore Road

Select Day

Weekday Ave

Class Summary		C	NB	SB
Light	C1	**79%**	78%	79%
	C2	**3%**	3%	3%
Medium	C3	**4%**	4%	4%
	C4	**1%**	2%	1%
	C5	**2%**	2%	2%
Heavy	C6	**0%**	0%	0%
	C7	**0%**	0%	0%
	C8	**0%**	0%	0%
	C9	**7%**	6%	8%
	C10	**2%**	3%	1%
	C11	**0%**	0%	0%
	C12	**0%**	0%	0%
Unclassified	C13	**1%**	1%	0%



NB

Hour Starting	C1 Short	C2 Short Towing	C3 2 axle Truck or bus	C4 3 Axle Truck or Bus	C5 4 or 5 Axle Truck	C6 3 axle Articulated	C7 4 Axle Articulated	C8 5 Axle Articulated	C9 6 Axle Articulated	C10 B Double	C11 Double Road Train	C12 Triple Road Train	C13 Unclassifiable	Total
0:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
4:00	5	0	0	0	0	0	0	0	0	0	0	0	0	**5**
5:00	17	0	0	2	0	0	0	0	0	0	0	0	0	**20**
6:00	31	1	2	1	0	1	0	0	1	0	0	0	1	**38**
7:00	37	1	1	1	0	0	0	0	2	1	0	0	0	**43**
8:00	26	1	2	0	1	0	0	0	2	0	0	0	0	**33**
9:00	20	1	2	0	1	0	0	0	2	2	0	0	0	**28**
10:00	14	1	1	1	1	0	0	0	3	2	0	0	1	**23**
11:00	16	1	1	0	2	0	0	0	2	2	0	0	1	**26**
12:00	16	1	1	0	1	0	0	0	3	2	0	0	0	**25**
13:00	19	1	1	0	1	0	0	0	2	1	0	0	0	**24**
14:00	22	1	0	0	1	0	0	0	2	0	0	0	0	**28**
15:00	18	1	2	1	0	0	0	0	2	1	0	0	0	**25**
16:00	21	1	1	0	0	0	0	0	0	0	0	0	0	**23**
17:00	16	0	1	0	0	0	0	0	0	0	0	0	0	**18**
18:00	10	1	0	0	0	0	0	0	0	0	0	0	0	**11**
19:00	4	1	1	0	0	0	0	0	0	0	0	0	0	**6**
20:00	2	0	0	0	0	0	0	0	0	0	0	0	0	**2**
21:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
22:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
23:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
Total	300	13	16	7	8	1	1	1	22	11	1	0	4	**385**

SB

Hour Starting	C1 Short	C2 Short Towing	C3 2 axle Truck or bus	C4 3 Axle Truck or Bus	C5 4 or 5 Axle Truck	C6 3 axle Articulated	C7 4 Axle Articulated	C8 5 Axle Articulated	C9 6 Axle Articulated	C10 B Double	C11 Double Road Train	C12 Triple Road Train	C13 Unclassifiable	Total
0:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
5:00	3	0	0	0	0	0	0	0	0	0	0	0	0	**4**
6:00	15	0	0	0	0	0	0	0	3	0	0	0	0	**19**
7:00	14	1	2	0	1	0	0	0	4	0	0	0	0	**23**
8:00	23	1	3	0	1	0	0	0	1	0	0	0	0	**29**
9:00	17	0	1	1	1	0	0	1	3	0	0	0	0	**25**
10:00	15	1	1	1	2	0	0	0	3	1	0	0	0	**24**
11:00	17	1	1	1	2	0	0	0	3	1	0	0	0	**25**
12:00	15	1	1	0	0	0	0	0	3	0	0	0	0	**20**
13:00	22	1	1	0	1	0	0	0	5	1	0	0	0	**30**
14:00	23	1	1	0	0	0	0	0	3	0	0	0	0	**29**
15:00	31	2	2	0	0	0	0	0	1	0	0	0	0	**37**
16:00	38	1	1	0	0	0	0	0	0	0	0	0	0	**42**
17:00	40	1	1	0	0	0	0	0	0	0	0	0	0	**42**
18:00	21	1	0	0	0	0	0	0	0	0	0	0	0	**22**
19:00	7	0	0	0	0	0	0	0	0	0	0	0	0	**7**
20:00	4	0	0	0	0	0	0	0	0	0	0	0	0	**4**
21:00	2	0	0	0	0	0	0	0	0	0	0	0	0	**2**
22:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total	307	13	16	4	8	1	1	1	30	5	0	0	0	**387**

COMBINED

Hour Starting	C1 Short	C2 Short Towing	C3 2 axle Truck or bus	C4 3 Axle Truck or Bus	C5 4 or 5 Axle Truck	C6 3 axle Articulated	C7 4 Axle Articulated	C8 5 Axle Articulated	C9 6 Axle Articulated	C10 B Double	C11 Double Road Train	C12 Triple Road Train	C13 Unclassifiable	Total
0:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
4:00	6	0	0	0	0	0	0	0	0	0	0	0	0	**6**
5:00	20	1	0	2	0	0	0	0	0	0	0	0	0	**23**
6:00	46	1	2	1	1	1	0	0	4	0	0	0	1	**57**
7:00	51	2	3	1	1	0	0	0	6	1	0	0	0	**66**
8:00	49	2	5	0	2	0	0	0	3	1	0	0	0	**62**
9:00	38	1	3	1	2	0	0	1	5	2	0	0	0	**53**
10:00	29	2	2	2	2	0	0	0	6	3	0	0	1	**47**
11:00	32	2	2	1	4	0	0	0	5	3	0	0	1	**51**
12:00	31	2	3	0	2	0	0	0	6	2	0	0	0	**45**
13:00	41	1	2	0	1	0	0	0	7	2	0	0	0	**55**
14:00	45	3	1	0	1	0	0	0	5	1	0	0	0	**57**
15:00	49	3	5	1	0	0	0	0	3	1	0	0	0	**62**
16:00	60	2	2	0	0	0	0	0	0	0	0	0	0	**65**
17:00	55	1	2	0	0	0	0	0	0	0	0	0	0	**59**
18:00	31	1	0	0	0	0	0	0	0	0	0	0	0	**33**
19:00	11	1	1	0	0	0	0	0	0	0	0	0	0	**13**
20:00	6	0	0	0	0	0	0	0	0	0	0	0	0	**6**
21:00	3	0	0	0	0	0	0	0	0	0	0	0	0	**3**
22:00	2	0	0	0	0	0	0	0	0	0	0	0	0	**2**
23:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
Total	607	26	32	11	17	2	2	2	52	16	1	0	4	**772**

Job No	AUNSW1543
Client	EMM
Site	Bungendore Road
Location	north of Collector Road
Site No	3
Start Date	12-Aug-21
Day	Weekday Ave
Description	Class Summary
Classification	AustRoads94

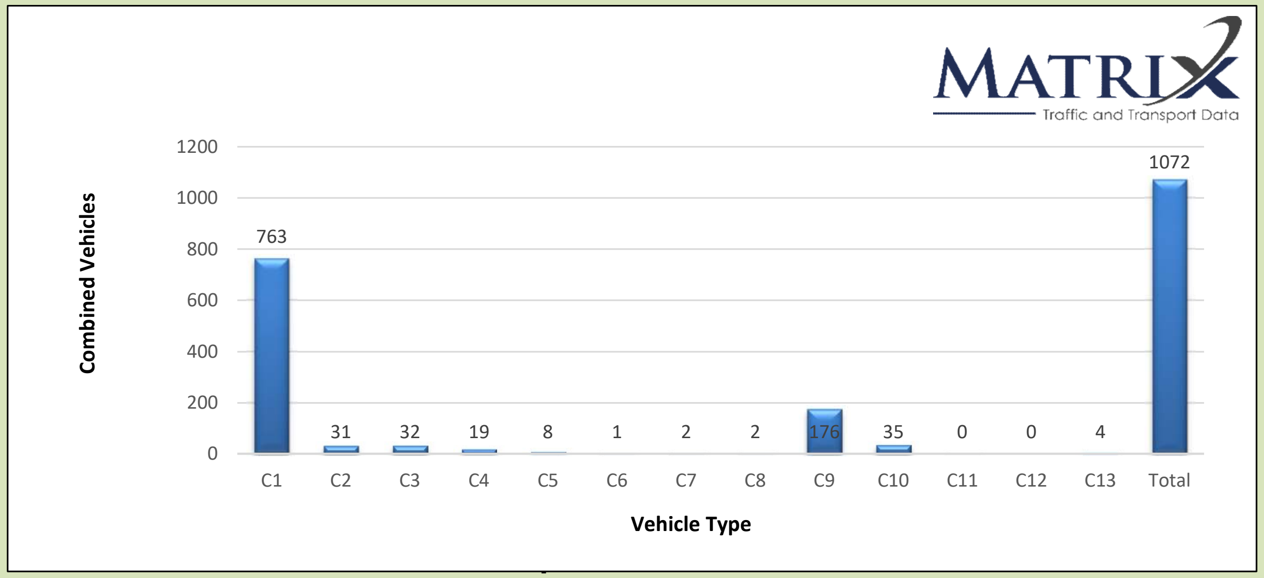
Select Site

3. Bungendore Road

Select Day

Weekday Ave

Class Summary		C	NB	SB
Light	C1	**71%**	71%	72%
	C2	**3%**	3%	3%
Medium	C3	**3%**	3%	3%
	C4	**2%**	1%	3%
	C5	**1%**	1%	1%
Heavy	C6	**0%**	0%	0%
	C7	**0%**	0%	0%
	C8	**0%**	0%	0%
	C9	**16%**	16%	16%
	C10	**3%**	4%	2%
	C11	**0%**	0%	0%
	C12	**0%**	0%	0%
Unclassified	C13	**0%**	0%	1%



NB

Hour Starting	C1 Short	C2 Short Towing	C3 2 axle Truck or bus	C4 3 Axle Truck or Bus	C5 4 or 5 Axle Truck	C6 3 axle Articulated	C7 4 Axle Articulated	C8 5 Axle Articulated	C9 6 Axle Articulated	C10 B Double	C11 Double Road Train	C12 Triple Road Train	C13 Unclassifiable	Total
0:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
4:00	9	0	0	0	0	0	0	0	0	0	0	0	0	**10**
5:00	25	0	0	0	0	0	0	0	1	0	0	0	0	**27**
6:00	70	1	3	0	0	1	0	0	4	2	0	0	0	**82**
7:00	46	2	1	0	0	0	0	0	11	2	0	0	0	**62**
8:00	28	1	2	1	1	0	0	0	15	3	0	0	0	**50**
9:00	28	1	1	0	1	0	0	0	14	3	0	0	1	**49**
10:00	23	2	1	1	0	0	0	0	10	4	0	0	0	**41**
11:00	21	1	1	0	0	0	0	0	4	3	0	0	0	**31**
12:00	23	2	0	0	1	0	0	0	13	3	0	0	0	**42**
13:00	28	1	0	0	1	0	0	0	11	1	0	0	0	**43**
14:00	21	2	0	0	0	0	0	0	6	3	0	0	0	**33**
15:00	16	1	3	0	0	0	0	0	1	1	0	0	0	**22**
16:00	20	1	1	0	0	0	0	0	1	0	0	0	0	**23**
17:00	14	0	1	0	0	0	0	0	0	0	0	0	0	**16**
18:00	9	1	0	0	0	0	0	0	0	0	0	0	0	**10**
19:00	5	1	1	0	0	0	0	0	0	0	0	0	0	**7**
20:00	2	0	0	0	0	0	0	0	0	0	0	0	0	**2**
21:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
22:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
23:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
Total	395	18	18	4	4	1	1	1	91	24	0	0	1	**557**

SB

Hour Starting	C1 Short	C2 Short Towing	C3 2 axle Truck or bus	C4 3 Axle Truck or Bus	C5 4 or 5 Axle Truck	C6 3 axle Articulated	C7 4 Axle Articulated	C8 5 Axle Articulated	C9 6 Axle Articulated	C10 B Double	C11 Double Road Train	C12 Triple Road Train	C13 Unclassifiable	Total
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:00	2	0	0	0	0	0	0	0	0	0	0	0	0	**2**
6:00	12	0	0	0	0	0	0	0	7	0	0	0	0	**20**
7:00	12	1	2	0	0	0	0	0	8	1	0	0	0	**25**
8:00	19	1	1	2	0	0	0	0	13	1	0	0	0	**38**
9:00	24	0	1	2	0	0	0	0	13	1	0	0	1	**42**
10:00	20	0	1	2	1	0	0	0	13	1	0	0	1	**38**
11:00	22	1	0	1	1	0	0	0	6	1	0	0	1	**33**
12:00	22	0	1	1	0	0	0	0	7	1	0	0	0	**33**
13:00	26	1	1	1	0	0	0	0	11	1	0	0	0	**42**
14:00	29	1	1	1	0	0	0	0	5	1	0	0	0	**39**
15:00	44	3	2	1	0	0	0	0	1	1	0	0	0	**53**
16:00	48	1	1	2	0	0	0	0	0	1	0	0	0	**54**
17:00	48	1	1	1	0	0	0	0	0	0	0	0	0	**52**
18:00	22	1	1	0	0	0	0	0	0	0	0	0	0	**24**
19:00	7	0	0	0	0	0	0	0	0	0	0	0	0	**8**
20:00	5	0	0	0	0	0	0	0	0	0	0	0	0	**6**
21:00	2	0	0	0	0	0	0	0	0	0	0	0	0	**2**
22:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
23:00	3	0	0	0	0	0	0	0	0	0	0	0	0	**3**
Total	368	13	14	15	4	1	1	1	85	10	0	0	3	**515**

COMBINED

Hour Starting	C1 Short	C2 Short Towing	C3 2 axle Truck or bus	C4 3 Axle Truck or Bus	C5 4 or 5 Axle Truck	C6 3 axle Articulated	C7 4 Axle Articulated	C8 5 Axle Articulated	C9 6 Axle Articulated	C10 B Double	C11 Double Road Train	C12 Triple Road Train	C13 Unclassifiable	Total
0:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**2**
4:00	10	0	0	0	0	0	0	0	0	0	0	0	0	**10**
5:00	27	1	0	0	0	0	0	0	1	0	0	0	0	**29**
6:00	82	2	3	1	0	1	0	0	11	2	0	0	0	**102**
7:00	58	3	3	1	0	0	0	0	19	3	0	0	0	**86**
8:00	47	2	3	2	1	0	0	0	28	4	0	0	0	**88**
9:00	52	1	2	2	1	0	0	0	27	3	0	0	1	**91**
10:00	44	2	2	2	1	0	0	0	23	5	0	0	1	**80**
11:00	43	2	2	1	1	0	0	0	10	4	0	0	1	**64**
12:00	45	2	1	1	1	0	0	0	21	4	0	0	0	**75**
13:00	54	2	2	1	1	0	0	0	22	2	0	0	0	**85**
14:00	51	3	2	1	0	0	0	0	11	4	0	0	0	**72**
15:00	60	4	5	1	1	0	0	0	2	2	0	0	0	**75**
16:00	68	2	2	2	1	0	0	0	1	1	0	0	0	**77**
17:00	63	2	2	1	0	0	0	0	0	0	0	0	0	**68**
18:00	31	1	1	0	0	0	0	0	0	0	0	0	0	**34**
19:00	12	1	1	0	0	0	0	0	0	0	0	0	0	**14**
20:00	7	1	0	0	0	0	0	0	0	0	0	0	0	**8**
21:00	4	0	0	0	0	0	0	0	0	0	0	0	0	**4**
22:00	2	0	0	0	0	0	0	0	0	0	0	0	0	**2**
23:00	3	0	0	0	0	0	0	0	0	0	0	0	0	**3**
Total	763	31	32	19	8	1	2	2	176	35	0	0	4	**1072**

Job No	AUNSW1543
Client	EMM
Site	Braidwood Road
Location	north of Lumley Road
Site No	4
Start Date	12-Aug-21
Day	Weekday Ave
Description	Class Summary
Classification	AustRoads94

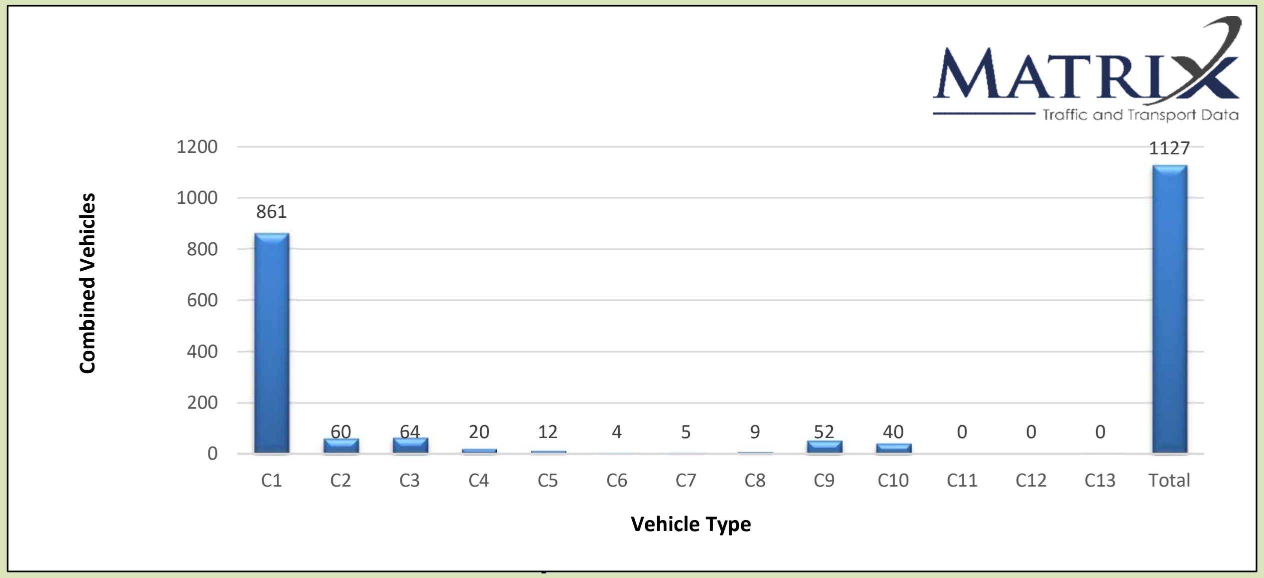
Select Site

4. Braidwood Road

Select Day

Weekday Ave

Class Summary		C	NB	SB
Light	C1	**76%**	75%	77%
	C2	**5%**	6%	5%
Medium	C3	**6%**	6%	6%
	C4	**2%**	2%	2%
	C5	**1%**	1%	1%
Heavy	C6	**0%**	0%	0%
	C7	**0%**	0%	0%
	C8	**1%**	1%	1%
	C9	**5%**	5%	4%
	C10	**4%**	3%	4%
	C11	**0%**	0%	0%
	C12	**0%**	0%	0%
Unclassified	C13	**0%**	0%	0%



NB

Hour Starting	C1 Short	C2 Short Towing	C3 2 axle Truck or bus	C4 3 Axle Truck or Bus	C5 4 or 5 Axle Truck	C6 3 axle Articulated	C7 4 Axle Articulated	C8 5 Axle Articulated	C9 6 Axle Articulated	C10 B Double	C11 Double Road Train	C12 Triple Road Train	C13 Unclassifiable	**Total**
0:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
1:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
4:00	6	0	0	0	0	0	0	0	0	0	0	0	0	**6**
5:00	18	0	0	0	0	0	0	0	2	2	0	0	0	**23**
6:00	46	1	4	2	0	1	0	0	2	1	0	0	0	**57**
7:00	28	3	5	2	1	0	0	1	3	1	0	0	0	**43**
8:00	27	2	2	1	1	0	0	0	3	2	0	0	0	**36**
9:00	23	1	3	1	1	0	0	0	2	2	0	0	0	**34**
10:00	29	4	2	1	1	0	0	1	2	2	0	0	0	**41**
11:00	26	3	3	1	1	0	0	0	2	3	0	0	0	**39**
12:00	31	3	1	0	0	0	0	0	3	2	0	0	0	**41**
13:00	34	4	2	1	1	0	0	0	1	1	0	0	0	**44**
14:00	34	3	3	0	0	0	0	0	1	1	0	0	0	**42**
15:00	34	2	3	0	0	0	0	0	2	1	0	0	0	**42**
16:00	34	3	3	0	0	0	1	0	2	1	0	0	0	**44**
17:00	31	2	2	0	0	0	0	0	1	1	0	0	0	**37**
18:00	16	1	0	0	0	0	0	0	1	1	0	0	0	**20**
19:00	8	2	0	0	0	0	0	0	1	0	0	0	0	**11**
20:00	5	0	0	0	0	0	0	0	0	0	0	0	0	**7**
21:00	5	0	0	0	0	0	0	0	1	0	0	0	0	**6**
22:00	4	0	0	0	0	0	0	1	0	0	0	0	0	**5**
23:00	2	0	0	0	0	0	0	0	0	0	0	0	0	**2**
Total	442	35	34	11	6	2	3	5	29	20	0	0	0	**586**

SB

Hour Starting	C1 Short	C2 Short Towing	C3 2 axle Truck or bus	C4 3 Axle Truck or Bus	C5 4 or 5 Axle Truck	C6 3 axle Articulated	C7 4 Axle Articulated	C8 5 Axle Articulated	C9 6 Axle Articulated	C10 B Double	C11 Double Road Train	C12 Triple Road Train	C13 Unclassifiable	**Total**
0:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
2:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**2**
3:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
4:00	4	0	0	0	0	0	0	0	0	0	0	0	0	**4**
5:00	7	1	0	0	0	0	0	0	0	0	0	0	0	**8**
6:00	16	1	0	0	0	0	0	0	1	0	0	0	0	**19**
7:00	22	3	5	0	1	0	0	0	1	1	0	0	0	**33**
8:00	26	2	2	1	1	0	0	0	2	1	0	0	0	**35**
9:00	36	1	1	1	1	0	0	0	2	1	0	0	0	**44**
10:00	30	1	2	1	0	0	0	1	2	3	0	0	0	**41**
11:00	30	3	3	1	1	0	0	1	3	2	0	0	0	**44**
12:00	27	2	3	1	1	0	0	0	1	2	0	0	0	**38**
13:00	28	2	3	0	0	0	0	0	2	3	0	0	0	**40**
14:00	32	2	3	0	0	0	0	0	2	3	0	0	0	**44**
15:00	43	3	3	2	0	0	0	0	2	2	0	0	0	**55**
16:00	45	2	2	1	0	0	0	0	1	2	0	0	0	**54**
17:00	36	1	1	0	0	0	0	0	1	1	0	0	0	**41**
18:00	18	1	1	0	0	0	0	0	1	0	0	0	0	**21**
19:00	6	0	0	0	0	0	0	0	1	0	0	0	0	**8**
20:00	5	1	0	0	0	0	0	0	0	0	0	0	0	**6**
21:00	2	0	0	0	0	0	0	0	0	0	0	0	0	**2**
22:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
23:00	2	0	0	0	0	0	0	0	0	0	0	0	0	**2**
Total	419	25	30	9	6	2	2	5	23	21	0	0	0	**541**

COMBINED

Hour Starting	C1 Short	C2 Short Towing	C3 2 axle Truck or bus	C4 3 Axle Truck or Bus	C5 4 or 5 Axle Truck	C6 3 axle Articulated	C7 4 Axle Articulated	C8 5 Axle Articulated	C9 6 Axle Articulated	C10 B Double	C11 Double Road Train	C12 Triple Road Train	C13 Unclassifiable	**Total**
0:00	2	0	0	0	0	0	0	0	0	0	0	0	0	**2**
1:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**2**
2:00	2	0	0	0	0	0	0	0	0	0	0	0	0	**2**
3:00	1	0	0	0	0	0	0	0	0	0	0	0	0	**2**
4:00	9	0	0	0	0	0	0	0	1	0	0	0	0	**11**
5:00	25	1	0	0	0	0	0	0	2	2	0	0	0	**31**
6:00	62	1	4	2	0	1	1	0	3	2	0	0	0	**76**
7:00	51	5	10	2	2	0	0	1	4	2	0	0	0	**76**
8:00	53	3	4	2	1	0	0	1	5	3	0	0	0	**71**
9:00	59	3	4	2	3	0	0	1	4	2	0	0	0	**78**
10:00	58	6	4	2	1	0	0	1	4	5	0	0	0	**81**
11:00	57	6	5	2	1	0	1	1	4	5	0	0	0	**83**
12:00	57	6	5	1	1	1	0	0	4	4	0	0	0	**79**
13:00	62	6	5	2	1	0	1	0	3	3	0	0	0	**84**
14:00	66	5	6	1	0	0	0	1	3	3	0	0	0	**86**
15:00	77	5	6	2	0	0	0	0	4	2	0	0	0	**97**
16:00	79	5	5	1	0	1	1	1	3	3	0	0	0	**98**
17:00	67	3	3	1	0	0	0	1	2	2	0	0	0	**78**
18:00	34	2	1	0	0	0	0	0	2	1	0	0	0	**41**
19:00	14	2	1	1	0	0	0	0	2	0	0	0	0	**19**
20:00	10	1	0	0	0	0	0	0	1	1	0	0	0	**13**
21:00	6	0	1	0	0	0	0	0	1	0	0	0	0	**8**
22:00	4	0	0	0	0	0	0	1	0	0	0	0	0	**6**
23:00	4	0	0	0	0	0	0	0	0	0	0	0	0	**5**
Total	861	60	64	20	12	4	5	9	52	40	0	0	0	**1127**

Annexure B

Traffic survey data (tube & intersection counts)

EMM
creating opportunities

Veolia Traffic Survey Data								
No.	**Survey location**	**Volume**			**Percentage**			**ADT**
		Light vehicles	**Heavy vehicles**	**Heavy vehicles Class 9 and above**	**Light vehicles**	**Heavy vehicles**	**Heavy vehicles Class 9 and above**	
1	Bungendore Rd at Crisps Creek Bridge	38,348	10,450	5,192	78.60%	21.40%	10.70%	1,479
2	Bungendore Rd at LGA boundary	38,198	6,813	1,966	84.90%	15.10%	4.40%	1,364
3	Collector Rd 950 m from Bungendore Rd	4,985	5,034	3,995	49.80%	50.20%	39.90%	716
4	Bungendore Rd on the incline between Crisps Creek Bridge and Collector Rd*	756	210	133	77.80%	22.20%	13.80%	966

Note: * Only southbound survey was available for this location, it is assumed that northbound volume equal southbound volume.

Annexure C
SIDRA results

creating opportunities

MOVEMENT SUMMARY

Site: 101 [Collector Road/Site Access (existing) (Site Folder: Existing PM Peak)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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: Site Access (existing)														
1	L2	14	0	18	0.0	0.011	0.0	LOS A	0.0	0.3	0.07	0.01	0.07	31.7
3	R2	30	2	38	6.7	0.031	0.7	LOS A	0.1	0.7	0.08	0.14	0.08	31.0
Approach		44	2	55	4.5	0.031	0.5	LOS A	0.1	0.7	0.08	0.10	0.08	31.2
East: Collector Road														
4	L2	1	0	1	0.0	0.010	7.9	LOS A	0.0	0.0	0.00	0.05	0.00	87.4
5	T1	14	2	18	14.3	0.010	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	98.4
Approach		15	2	19	13.3	0.010	0.5	NA	0.0	0.0	0.00	0.05	0.00	97.5
West: Collector Road														
11	T1	6	0	8	0.0	0.005	0.0	LOS A	0.0	0.0	0.02	0.10	0.02	96.8
12	R2	1	0	1	0.0	0.005	7.7	LOS A	0.0	0.0	0.02	0.10	0.02	34.0
Approach		7	0	9	0.0	0.005	1.1	NA	0.0	0.0	0.02	0.10	0.02	76.6
All Vehicles		66	4	83	6.1	0.031	0.5	NA	0.1	0.7	0.05	0.09	0.05	39.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
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 [Bungendore Road/Collector Road (Site Folder: Existing PM Peak)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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
NorthEast: Bungendore Road														
25	T1	49	2	53	4.1	0.034	0.1	LOS A	0.1	0.4	0.08	0.07	0.08	97.3
26	R2	6	2	7	33.3	0.034	9.2	LOS A	0.1	0.4	0.08	0.07	0.08	71.7
Approach		55	4	60	7.3	0.034	1.1	NA	0.1	0.4	0.08	0.07	0.08	93.6
NorthWest: Collector Road														
27	L2	33	2	36	6.1	0.026	9.0	LOS A	0.1	0.8	0.25	0.60	0.25	70.7
29	R2	8	0	9	0.0	0.008	8.2	LOS A	0.0	0.2	0.27	0.63	0.27	73.9
Approach		41	2	45	4.9	0.026	8.8	LOS A	0.1	0.8	0.26	0.60	0.26	71.3
SouthWest: Bungendore Road														
30	L2	12	0	13	0.0	0.089	7.8	LOS A	0.0	0.0	0.00	0.05	0.00	87.3
31	T1	144	6	157	4.2	0.089	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	98.3
Approach		156	6	170	3.8	0.089	0.6	NA	0.0	0.0	0.00	0.05	0.00	97.3
All Vehicles		252	12	274	4.8	0.089	2.1	NA	0.1	0.8	0.06	0.15	0.06	91.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
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 [Braidwood Road/Wallace Street (Site Folder: Existing PM Peak)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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: Braidwood Road														
1	L2	8	0	9	0.0	0.041	5.8	LOS A	0.1	0.8	0.12	0.18	0.12	52.2
2	T1	42	7	47	16.7	0.041	0.1	LOS A	0.1	0.8	0.12	0.18	0.12	57.8
3	R2	12	2	13	16.7	0.041	6.0	LOS A	0.1	0.8	0.12	0.18	0.12	51.3
Approach		62	9	69	14.5	0.041	2.0	NA	0.1	0.8	0.12	0.18	0.12	55.6
East: Wallace Street														
4	L2	2	0	2	0.0	0.114	7.7	LOS A	0.4	3.5	0.38	0.97	0.38	47.0
5	T1	32	4	36	12.5	0.114	8.9	LOS A	0.4	3.5	0.38	0.97	0.38	43.7
6	R2	32	14	36	43.8	0.114	12.9	LOS A	0.4	3.5	0.38	0.97	0.38	45.1
Approach		66	18	73	27.3	0.114	10.8	LOS A	0.4	3.5	0.38	0.97	0.38	44.5
North: Braidwood Road														
7	L2	41	2	46	4.9	0.083	5.7	LOS A	0.3	1.9	0.09	0.30	0.09	51.3
8	T1	60	7	67	11.7	0.083	0.1	LOS A	0.3	1.9	0.09	0.30	0.09	56.8
9	R2	31	2	34	6.5	0.083	5.7	LOS A	0.3	1.9	0.09	0.30	0.09	50.7
Approach		132	11	147	8.3	0.083	3.1	NA	0.3	1.9	0.09	0.30	0.09	53.5
West: Wallace Street														
10	L2	81	7	90	8.6	0.187	8.0	LOS A	0.8	5.8	0.18	0.97	0.18	47.5
11	T1	88	6	98	6.8	0.187	8.9	LOS A	0.8	5.8	0.18	0.97	0.18	44.5
12	R2	8	0	9	0.0	0.187	8.4	LOS A	0.8	5.8	0.18	0.97	0.18	47.3
Approach		177	13	197	7.3	0.187	8.4	LOS A	0.8	5.8	0.18	0.97	0.18	45.9
All Vehicles		437	51	486	11.7	0.187	6.3	NA	0.8	5.8	0.18	0.66	0.18	49.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
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 [Collector Road/Site Access (existing) (Site Folder: Existing AM Peak)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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: Site Access (existing)														
1	L2	1	0	1	0.0	0.001	0.0	LOS A	0.0	0.0	0.02	0.00	0.02	31.8
3	R2	16	16	23	100.0	0.030	1.4	LOS A	0.1	1.3	0.22	0.21	0.22	26.8
Approach		17	16	24	94.1	0.030	1.3	LOS A	0.1	1.3	0.21	0.19	0.21	27.0
East: Collector Road														
4	L2	79	32	113	40.5	0.079	8.9	LOS A	0.0	0.0	0.00	0.65	0.00	62.0
5	T1	2	0	3	0.0	0.079	0.0	LOS A	0.0	0.0	0.00	0.65	0.00	82.9
Approach		81	32	116	39.5	0.079	8.7	NA	0.0	0.0	0.00	0.65	0.00	62.4
West: Collector Road														
11	T1	2	0	3	0.0	0.019	0.4	LOS A	0.1	0.6	0.25	0.54	0.25	82.3
12	R2	18	2	26	11.1	0.019	8.4	LOS A	0.1	0.6	0.25	0.54	0.25	32.1
Approach		20	2	29	10.0	0.019	7.6	NA	0.1	0.6	0.25	0.54	0.25	34.1
All Vehicles		118	50	169	42.4	0.079	7.5	NA	0.1	1.3	0.07	0.57	0.07	47.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
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 [Bungendore Road/Collector Road (Site Folder: Existing AM Peak)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total	HV]	DEMAND 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	veh/h	%	v/c	sec		veh	m				km/h
NorthEast: Bungendore Road														
25	T1	141	9	176	6.4	0.161	0.1	LOS A	0.6	4.9	0.13	0.22	0.13	92.7
26	R2	74	18	93	24.3	0.161	8.6	LOS A	0.6	4.9	0.13	0.22	0.13	72.4
Approach		215	27	269	12.6	0.161	3.0	NA	0.6	4.9	0.13	0.22	0.13	84.5
NorthWest: Collector Road														
27	L2	18	18	23	100.0	0.021	10.9	LOS A	0.1	1.1	0.10	0.59	0.10	53.1
29	R2	1	0	1	0.0	0.001	8.5	LOS A	0.0	0.0	0.34	0.61	0.34	73.5
Approach		19	18	24	94.7	0.021	10.8	LOS A	0.1	1.1	0.12	0.59	0.12	53.9
SouthWest: Bungendore Road														
30	L2	22	14	28	63.6	0.034	9.5	LOS A	0.0	0.0	0.00	0.35	0.00	61.5
31	T1	20	0	25	0.0	0.034	0.0	LOS A	0.0	0.0	0.00	0.35	0.00	94.2
Approach		42	14	53	33.3	0.034	5.0	NA	0.0	0.0	0.00	0.35	0.00	73.7
All Vehicles		276	59	345	21.4	0.161	3.9	NA	0.6	4.9	0.11	0.27	0.11	79.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
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 [Braidwood Road/Wallace Street (Site Folder: Existing AM Peak)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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: Braidwood Road														
1	L2	12	0	13	0.0	0.019	5.6	LOS A	0.0	0.1	0.01	0.25	0.01	52.1
2	T1	18	2	20	11.1	0.019	0.0	LOS A	0.0	0.1	0.01	0.25	0.01	57.6
3	R2	1	0	1	0.0	0.019	5.6	LOS A	0.0	0.1	0.01	0.25	0.01	51.5
Approach		31	2	34	6.5	0.019	2.3	NA	0.0	0.1	0.01	0.25	0.01	55.1
East: Wallace Street														
4	L2	1	0	1	0.0	0.093	7.6	LOS A	0.3	2.4	0.30	0.94	0.30	47.9
5	T1	62	0	69	0.0	0.093	8.1	LOS A	0.3	2.4	0.30	0.94	0.30	44.7
6	R2	16	0	18	0.0	0.093	8.3	LOS A	0.3	2.4	0.30	0.94	0.30	47.5
Approach		79	0	88	0.0	0.093	8.2	LOS A	0.3	2.4	0.30	0.94	0.30	45.3
North: Braidwood Road														
7	L2	10	2	11	20.0	0.092	5.9	LOS A	0.4	3.4	0.11	0.42	0.11	50.2
8	T1	35	7	39	20.0	0.092	0.1	LOS A	0.4	3.4	0.11	0.42	0.11	55.8
9	R2	94	9	104	9.6	0.092	5.7	LOS A	0.4	3.4	0.11	0.42	0.11	49.9
Approach		139	18	154	12.9	0.092	4.3	NA	0.4	3.4	0.11	0.42	0.11	51.2
West: Wallace Street														
10	L2	22	2	24	9.1	0.036	7.9	LOS A	0.1	1.0	0.07	1.01	0.07	47.5
11	T1	12	2	13	16.7	0.036	9.0	LOS A	0.1	1.0	0.07	1.01	0.07	44.4
12	R2	2	0	2	0.0	0.036	8.4	LOS A	0.1	1.0	0.07	1.01	0.07	47.4
Approach		36	4	40	11.1	0.036	8.3	LOS A	0.1	1.0	0.07	1.01	0.07	46.4
All Vehicles		285	24	317	8.4	0.093	5.7	NA	0.4	3.4	0.15	0.62	0.15	49.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
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 [Collector Road/Site Access (new) (Site Folder: Existing + Construction AM Peak)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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: Site Access (existing)														
1	L2	1	0	1	0.0	0.001	0.3	LOS A	0.0	0.0	0.19	0.05	0.19	31.6
3	R2	27	27	28	100.0	0.041	2.0	LOS A	0.1	1.7	0.29	0.27	0.29	26.7
Approach		28	27	29	96.4	0.041	1.9	LOS A	0.1	1.7	0.29	0.26	0.29	26.9
East: Collector Road														
4	L2	52	27	55	51.9	0.094	9.2	LOS A	0.0	0.0	0.00	0.26	0.00	64.1
5	T1	81	32	85	39.5	0.094	0.0	LOS A	0.0	0.0	0.00	0.26	0.00	93.2
Approach		133	59	140	44.4	0.094	3.6	NA	0.0	0.0	0.00	0.26	0.00	79.2
West: Collector Road														
11	T1	18	16	19	88.9	0.016	0.0	LOS A	0.0	0.1	0.03	0.04	0.03	93.1
12	R2	1	0	1	0.0	0.016	8.2	LOS A	0.0	0.1	0.03	0.04	0.03	33.6
Approach		19	16	20	84.2	0.016	0.5	NA	0.0	0.1	0.03	0.04	0.03	85.1
All Vehicles		180	102	189	56.7	0.094	3.0	NA	0.1	1.7	0.05	0.24	0.05	61.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
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 [Bungendore Road/Collector Road (Site Folder: Existing + Construction AM Peak)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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
NorthEast: Bungendore Road														
25	T1	141	9	153	6.4	0.186	0.2	LOS A	0.9	7.3	0.15	0.29	0.15	91.0
26	R2	125	44	136	35.2	0.186	8.8	LOS A	0.9	7.3	0.15	0.29	0.15	67.6
Approach		266	53	289	19.9	0.186	4.3	NA	0.9	7.3	0.15	0.29	0.15	78.3
NorthWest: Collector Road														
27	L2	44	44	48	100.0	0.045	10.9	LOS A	0.2	2.4	0.10	0.59	0.10	53.2
29	R2	1	1	1	100.0	0.002	13.3	LOS A	0.0	0.1	0.44	0.66	0.44	49.0
Approach		45	45	49	100.0	0.045	10.9	LOS A	0.2	2.4	0.11	0.60	0.11	53.1
SouthWest: Bungendore Road														
30	L2	23	15	25	65.2	0.031	9.5	LOS A	0.0	0.0	0.00	0.36	0.00	61.1
31	T1	20	0	22	0.0	0.031	0.0	LOS A	0.0	0.0	0.00	0.36	0.00	94.2
Approach		43	15	47	34.9	0.031	5.1	NA	0.0	0.0	0.00	0.36	0.00	73.0
All Vehicles		354	113	385	31.9	0.186	5.2	NA	0.9	7.3	0.13	0.34	0.13	73.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
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 [Braidwood Road/Wallace Street (Site Folder: Existing + Construction AM Peak)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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: Braidwood Road														
1	L2	12	0	13	0.0	0.019	5.6	LOS A	0.0	0.1	0.01	0.25	0.01	52.1
2	T1	18	2	20	11.1	0.019	0.0	LOS A	0.0	0.1	0.01	0.25	0.01	57.6
3	R2	1	0	1	0.0	0.019	5.6	LOS A	0.0	0.1	0.01	0.25	0.01	51.5
Approach		31	2	34	6.5	0.019	2.3	NA	0.0	0.1	0.01	0.25	0.01	55.1
East: Wallace Street														
4	L2	1	0	1	0.0	0.102	7.6	LOS A	0.4	2.6	0.36	0.95	0.36	47.6
5	T1	62	0	69	0.0	0.102	8.6	LOS A	0.4	2.6	0.36	0.95	0.36	44.5
6	R2	16	0	18	0.0	0.102	9.3	LOS A	0.4	2.6	0.36	0.95	0.36	47.2
Approach		79	0	88	0.0	0.102	8.7	LOS A	0.4	2.6	0.36	0.95	0.36	45.0
North: Braidwood Road														
7	L2	10	2	11	20.0	0.135	5.9	LOS A	0.7	5.7	0.12	0.46	0.12	50.0
8	T1	35	7	39	20.0	0.135	0.1	LOS A	0.7	5.7	0.12	0.46	0.12	55.5
9	R2	145	35	161	24.1	0.135	5.9	LOS A	0.7	5.7	0.12	0.46	0.12	49.4
Approach		190	44	211	23.2	0.135	4.8	NA	0.7	5.7	0.12	0.46	0.12	50.5
West: Wallace Street														
10	L2	48	28	53	58.3	0.069	9.8	LOS A	0.3	2.7	0.07	1.05	0.07	45.9
11	T1	12	2	13	16.7	0.069	9.6	LOS A	0.3	2.7	0.07	1.05	0.07	44.4
12	R2	2	0	2	0.0	0.069	9.1	LOS A	0.3	2.7	0.07	1.05	0.07	47.4
Approach		62	30	69	48.4	0.069	9.7	LOS A	0.3	2.7	0.07	1.05	0.07	45.6
All Vehicles		362	76	402	21.0	0.135	6.3	NA	0.7	5.7	0.16	0.65	0.16	48.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
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 [Collector Road/Site Access (new) (Site Folder: Existing + Construction PM Peak)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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: Site Access (existing)														
1	L2	1	0	1	0.0	0.001	0.0	LOS A	0.0	0.0	0.06	0.01	0.06	31.7
3	R2	52	27	55	51.9	0.058	1.0	LOS A	0.2	1.9	0.17	0.18	0.17	28.0
Approach		53	27	56	50.9	0.058	1.0	LOS A	0.2	1.9	0.17	0.18	0.17	28.1
East: Collector Road														
4	L2	27	27	28	100.0	0.034	10.5	LOS A	0.0	0.0	0.00	0.44	0.00	54.7
5	T1	14	2	15	14.3	0.034	0.0	LOS A	0.0	0.0	0.00	0.44	0.00	83.4
Approach		41	29	43	70.7	0.034	6.9	NA	0.0	0.0	0.00	0.44	0.00	62.0
West: Collector Road														
11	T1	36	2	38	5.6	0.021	0.0	LOS A	0.0	0.0	0.01	0.02	0.01	99.3
12	R2	1	0	1	0.0	0.021	7.9	LOS A	0.0	0.0	0.01	0.02	0.01	34.3
Approach		37	2	39	5.4	0.021	0.2	NA	0.0	0.0	0.01	0.02	0.01	94.4
All Vehicles		131	58	138	44.3	0.058	2.6	NA	0.2	1.9	0.07	0.22	0.07	44.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
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 [Bungendore Road/Collector Road (Site Folder: Existing + Construction PM Peak)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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
NorthEast: Bungendore Road														
25	T1	49	2	53	4.1	0.070	0.8	LOS A	0.3	3.0	0.29	0.21	0.29	94.5
26	R2	32	28	35	87.5	0.070	11.2	LOS A	0.3	3.0	0.29	0.21	0.29	55.3
Approach		81	30	88	37.0	0.070	4.9	NA	0.3	3.0	0.29	0.21	0.29	73.9
NorthWest: Collector Road														
27	L2	84	28	91	33.3	0.076	9.8	LOS A	0.3	2.8	0.28	0.61	0.28	62.9
29	R2	9	1	10	11.1	0.010	8.7	LOS A	0.0	0.2	0.31	0.64	0.31	69.0
Approach		93	29	101	31.2	0.076	9.7	LOS A	0.3	2.8	0.28	0.61	0.28	63.4
SouthWest: Bungendore Road														
30	L2	13	1	14	7.7	0.090	8.0	LOS A	0.0	0.0	0.00	0.06	0.00	83.5
31	T1	144	6	157	4.2	0.090	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	98.3
Approach		157	7	171	4.5	0.090	0.7	NA	0.0	0.0	0.00	0.06	0.00	96.8
All Vehicles		331	66	360	19.9	0.090	4.2	NA	0.3	3.0	0.15	0.25	0.15	79.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
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 [Braidwood Road/Wallace Street (Site Folder: Existing + Construction PM Peak)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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: Braidwood Road														
1	L2	8	0	9	0.0	0.041	5.8	LOS A	0.1	0.8	0.12	0.18	0.12	52.2
2	T1	42	7	47	16.7	0.041	0.1	LOS A	0.1	0.8	0.12	0.18	0.12	57.8
3	R2	12	2	13	16.7	0.041	6.0	LOS A	0.1	0.8	0.12	0.18	0.12	51.3
Approach		62	9	69	14.5	0.041	2.0	NA	0.1	0.8	0.12	0.18	0.12	55.6
East: Wallace Street														
4	L2	2	0	2	0.0	0.131	7.7	LOS A	0.5	4.0	0.43	0.98	0.43	46.4
5	T1	32	4	36	12.5	0.131	9.2	LOS A	0.5	4.0	0.43	0.98	0.43	43.2
6	R2	32	14	36	43.8	0.131	14.9	LOS B	0.5	4.0	0.43	0.98	0.43	44.6
Approach		66	18	73	27.3	0.131	11.9	LOS A	0.5	4.0	0.43	0.98	0.43	44.0
North: Braidwood Road														
7	L2	41	2	46	4.9	0.116	5.8	LOS A	0.5	4.4	0.15	0.33	0.15	51.1
8	T1	60	7	67	11.7	0.116	0.2	LOS A	0.5	4.4	0.15	0.33	0.15	56.6
9	R2	57	28	63	49.1	0.116	6.3	LOS A	0.5	4.4	0.15	0.33	0.15	49.7
Approach		158	37	176	23.4	0.116	3.9	NA	0.5	4.4	0.15	0.33	0.15	52.5
West: Wallace Street														
10	L2	132	33	147	25.0	0.245	8.7	LOS A	1.1	8.8	0.18	0.98	0.18	46.8
11	T1	88	6	98	6.8	0.245	9.3	LOS A	1.1	8.8	0.18	0.98	0.18	44.4
12	R2	8	0	9	0.0	0.245	8.9	LOS A	1.1	8.8	0.18	0.98	0.18	47.3
Approach		228	39	253	17.1	0.245	8.9	LOS A	1.1	8.8	0.18	0.98	0.18	45.9
All Vehicles		514	103	571	20.0	0.245	6.9	NA	1.1	8.8	0.20	0.69	0.20	48.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
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 [Collector Road/Site Access (existing) (Site Folder: Existing + Operation AM Peak)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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: Site Access (existing)														
1	L2	1	0	1	0.0	0.001	0.0	LOS A	0.0	0.0	0.02	0.00	0.02	31.8
3	R2	12	12	17	100.0	0.023	1.4	LOS A	0.1	0.9	0.23	0.21	0.23	26.8
Approach		13	12	19	92.3	0.023	1.3	LOS A	0.1	0.9	0.21	0.19	0.21	27.1
East: Collector Road														
4	L2	75	28	107	37.3	0.074	8.8	LOS A	0.0	0.0	0.00	0.65	0.00	62.8
5	T1	2	0	3	0.0	0.074	0.0	LOS A	0.0	0.0	0.00	0.65	0.00	82.9
Approach		77	28	110	36.4	0.074	8.6	NA	0.0	0.0	0.00	0.65	0.00	63.2
West: Collector Road														
11	T1	11	0	16	0.0	0.026	0.4	LOS A	0.1	0.9	0.23	0.38	0.23	86.8
12	R2	18	2	26	11.1	0.026	8.4	LOS A	0.1	0.9	0.23	0.38	0.23	32.7
Approach		29	2	41	6.9	0.026	5.4	NA	0.1	0.9	0.23	0.38	0.23	42.8
All Vehicles		119	42	170	35.3	0.074	7.0	NA	0.1	0.9	0.08	0.53	0.08	50.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
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 [Collector Road/Site Access (new) (Site Folder: Existing + Operation AM Peak)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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: Site Access (existing)														
1	L2	1	0	1	0.0	0.001	0.3	LOS A	0.0	0.0	0.19	0.05	0.19	31.6
3	R2	10	10	11	100.0	0.015	1.9	LOS A	0.0	0.6	0.29	0.25	0.29	26.7
Approach		11	10	12	90.9	0.015	1.8	LOS A	0.0	0.6	0.28	0.24	0.28	27.1
East: Collector Road														
4	L2	33	10	35	30.3	0.080	8.7	LOS A	0.0	0.0	0.00	0.19	0.00	71.1
5	T1	85	36	89	42.4	0.080	0.0	LOS A	0.0	0.0	0.00	0.19	0.00	93.5
Approach		118	46	124	39.0	0.080	2.4	NA	0.0	0.0	0.00	0.19	0.00	86.0
West: Collector Road														
11	T1	22	20	23	90.9	0.023	0.2	LOS A	0.0	0.5	0.14	0.22	0.14	84.2
12	R2	9	0	9	0.0	0.023	8.1	LOS A	0.0	0.5	0.14	0.22	0.14	32.3
Approach		31	20	33	64.5	0.023	2.5	NA	0.0	0.5	0.14	0.22	0.14	57.5
All Vehicles		160	76	168	47.5	0.080	2.4	NA	0.0	0.6	0.05	0.20	0.05	69.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
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 [Bungendore Road/Collector Road (Site Folder: Existing + Operation AM Peak)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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
NorthEast: Bungendore Road														
25	T1	141	9	176	6.4	0.186	0.2	LOS A	0.8	6.5	0.15	0.27	0.15	90.9
26	R2	104	23	130	22.1	0.186	8.5	LOS A	0.8	6.5	0.15	0.27	0.15	72.1
Approach		245	32	306	13.1	0.186	3.7	NA	0.8	6.5	0.15	0.27	0.15	81.9
NorthWest: Collector Road														
27	L2	23	23	29	100.0	0.027	10.9	LOS A	0.1	1.4	0.10	0.59	0.10	53.1
29	R2	1	1	1	100.0	0.002	13.5	LOS A	0.0	0.1	0.45	0.67	0.45	48.9
Approach		24	24	30	100.0	0.027	11.0	LOS A	0.1	1.4	0.12	0.59	0.12	53.0
SouthWest: Bungendore Road														
30	L2	25	15	31	60.0	0.037	9.4	LOS A	0.0	0.0	0.00	0.37	0.00	62.0
31	T1	20	0	25	0.0	0.037	0.0	LOS A	0.0	0.0	0.00	0.37	0.00	93.3
Approach		45	15	56	33.3	0.037	5.2	NA	0.0	0.0	0.00	0.37	0.00	72.9
All Vehicles		314	71	393	22.6	0.186	4.5	NA	0.8	6.5	0.13	0.31	0.13	77.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
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 [Braidwood Road/Wallace Street (Site Folder: Existing + Operation AM Peak)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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: Braidwood Road														
1	L2	12	0	13	0.0	0.019	5.6	LOS A	0.0	0.1	0.01	0.25	0.01	52.1
2	T1	18	2	20	11.1	0.019	0.0	LOS A	0.0	0.1	0.01	0.25	0.01	57.6
3	R2	1	0	1	0.0	0.019	5.6	LOS A	0.0	0.1	0.01	0.25	0.01	51.5
Approach		31	2	34	6.5	0.019	2.3	NA	0.0	0.1	0.01	0.25	0.01	55.1
East: Wallace Street														
4	L2	1	0	1	0.0	0.096	7.6	LOS A	0.3	2.4	0.32	0.95	0.32	47.8
5	T1	62	0	69	0.0	0.096	8.3	LOS A	0.3	2.4	0.32	0.95	0.32	44.6
6	R2	16	0	18	0.0	0.096	8.5	LOS A	0.3	2.4	0.32	0.95	0.32	47.4
Approach		79	0	88	0.0	0.096	8.3	LOS A	0.3	2.4	0.32	0.95	0.32	45.2
North: Braidwood Road														
7	L2	10	2	11	20.0	0.106	5.9	LOS A	0.5	4.0	0.12	0.44	0.12	50.1
8	T1	35	7	39	20.0	0.106	0.1	LOS A	0.5	4.0	0.12	0.44	0.12	55.6
9	R2	116	10	129	8.6	0.106	5.7	LOS A	0.5	4.0	0.12	0.44	0.12	49.7
Approach		161	19	179	11.8	0.106	4.5	NA	0.5	4.0	0.12	0.44	0.12	50.9
West: Wallace Street														
10	L2	23	3	26	13.0	0.038	8.0	LOS A	0.1	1.1	0.07	1.02	0.07	47.3
11	T1	12	2	13	16.7	0.038	9.2	LOS A	0.1	1.1	0.07	1.02	0.07	44.4
12	R2	2	0	2	0.0	0.038	8.6	LOS A	0.1	1.1	0.07	1.02	0.07	47.3
Approach		37	5	41	13.5	0.038	8.4	LOS A	0.1	1.1	0.07	1.02	0.07	46.3
All Vehicles		308	26	342	8.4	0.106	5.7	NA	0.5	4.0	0.15	0.62	0.15	49.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
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 [Collector Road/Site Access (existing) (Site Folder: Existing + Operation PM Peak)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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: Site Access (existing)														
1	L2	14	0	18	0.0	0.011	0.1	LOS A	0.0	0.3	0.09	0.02	0.09	31.7
3	R2	28	0	35	0.0	0.028	0.7	LOS A	0.1	0.6	0.10	0.15	0.10	31.6
Approach		42	0	53	0.0	0.028	0.5	LOS A	0.1	0.6	0.10	0.11	0.10	31.6
East: Collector Road														
4	L2	1	0	1	0.0	0.016	7.9	LOS A	0.0	0.0	0.00	0.03	0.00	87.9
5	T1	23	2	29	8.7	0.016	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	99.0
Approach		24	2	30	8.3	0.016	0.3	NA	0.0	0.0	0.00	0.03	0.00	98.5
West: Collector Road														
11	T1	6	0	8	0.0	0.005	0.0	LOS A	0.0	0.0	0.03	0.10	0.03	96.7
12	R2	1	0	1	0.0	0.005	7.8	LOS A	0.0	0.0	0.03	0.10	0.03	34.0
Approach		7	0	9	0.0	0.005	1.1	NA	0.0	0.0	0.03	0.10	0.03	76.5
All Vehicles		73	2	91	2.7	0.028	0.5	NA	0.1	0.6	0.06	0.08	0.06	43.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
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 [Collector Road/Site Access (new) (Site Folder: Existing + Operation PM Peak)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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: Site Access (existing)														
1	L2	9	0	9	0.0	0.006	0.1	LOS A	0.0	0.2	0.07	0.01	0.07	31.7
3	R2	33	10	35	30.3	0.033	0.9	LOS A	0.1	0.9	0.16	0.17	0.16	29.3
Approach		42	10	44	23.8	0.033	0.7	LOS A	0.1	0.9	0.14	0.14	0.14	29.8
East: Collector Road														
4	L2	10	10	11	100.0	0.021	10.5	LOS A	0.0	0.0	0.00	0.24	0.00	56.9
5	T1	18	6	19	33.3	0.021	0.0	LOS A	0.0	0.0	0.00	0.24	0.00	88.5
Approach		28	16	29	57.1	0.021	3.7	NA	0.0	0.0	0.00	0.24	0.00	73.8
West: Collector Road														
11	T1	40	6	42	15.0	0.024	0.0	LOS A	0.0	0.0	0.01	0.02	0.01	99.3
12	R2	1	0	1	0.0	0.024	7.8	LOS A	0.0	0.0	0.01	0.02	0.01	34.3
Approach		41	6	43	14.6	0.024	0.2	NA	0.0	0.0	0.01	0.02	0.01	94.9
All Vehicles		111	32	117	28.8	0.033	1.3	NA	0.1	0.9	0.06	0.12	0.06	50.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
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 [Bungendore Road/Collector Road (Site Folder: Existing + Operation PM Peak)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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
NorthEast: Bungendore Road														
25	T1	49	2	53	4.1	0.041	0.3	LOS A	0.1	0.9	0.15	0.11	0.15	96.4
26	R2	11	7	12	63.6	0.041	10.3	LOS A	0.1	0.9	0.15	0.11	0.15	61.8
Approach		60	9	65	15.0	0.041	2.1	NA	0.1	0.9	0.15	0.11	0.15	87.4
NorthWest: Collector Road														
27	L2	59	7	64	11.9	0.048	9.2	LOS A	0.2	1.5	0.26	0.60	0.26	68.9
29	R2	11	1	12	9.1	0.012	8.5	LOS A	0.0	0.3	0.29	0.64	0.29	69.8
Approach		70	8	76	11.4	0.048	9.1	LOS A	0.2	1.5	0.26	0.61	0.26	69.0
SouthWest: Bungendore Road														
30	L2	13	1	14	7.7	0.090	8.0	LOS A	0.0	0.0	0.00	0.06	0.00	83.5
31	T1	144	6	157	4.2	0.090	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	98.3
Approach		157	7	171	4.5	0.090	0.7	NA	0.0	0.0	0.00	0.06	0.00	96.8
All Vehicles		287	24	312	8.4	0.090	3.0	NA	0.2	1.5	0.10	0.20	0.10	86.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
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 [Braidwood Road/Wallace Street (Site Folder: Existing + Operation PM Peak)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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: Braidwood Road														
1	L2	8	0	9	0.0	0.041	5.8	LOS A	0.1	0.8	0.12	0.18	0.12	52.2
2	T1	42	7	47	16.7	0.041	0.1	LOS A	0.1	0.8	0.12	0.18	0.12	57.8
3	R2	12	2	13	16.7	0.041	6.0	LOS A	0.1	0.8	0.12	0.18	0.12	51.3
Approach		62	9	69	14.5	0.041	2.0	NA	0.1	0.8	0.12	0.18	0.12	55.6
East: Wallace Street														
4	L2	2	0	2	0.0	0.118	7.7	LOS A	0.4	3.6	0.39	0.98	0.39	46.9
5	T1	32	4	36	12.5	0.118	8.9	LOS A	0.4	3.6	0.39	0.98	0.39	43.6
6	R2	32	14	36	43.8	0.118	13.3	LOS A	0.4	3.6	0.39	0.98	0.39	45.0
Approach		66	18	73	27.3	0.118	11.0	LOS A	0.4	3.6	0.39	0.98	0.39	44.4
North: Braidwood Road														
7	L2	41	2	46	4.9	0.085	5.7	LOS A	0.3	2.0	0.10	0.30	0.10	51.3
8	T1	60	7	67	11.7	0.085	0.1	LOS A	0.3	2.0	0.10	0.30	0.10	56.7
9	R2	32	3	36	9.4	0.085	5.8	LOS A	0.3	2.0	0.10	0.30	0.10	50.7
Approach		133	12	148	9.0	0.085	3.2	NA	0.3	2.0	0.10	0.30	0.10	53.4
West: Wallace Street														
10	L2	103	8	114	7.8	0.205	8.0	LOS A	0.9	6.5	0.18	0.97	0.18	47.5
11	T1	88	6	98	6.8	0.205	8.9	LOS A	0.9	6.5	0.18	0.97	0.18	44.5
12	R2	8	0	9	0.0	0.205	8.5	LOS A	0.9	6.5	0.18	0.97	0.18	47.3
Approach		199	14	221	7.0	0.205	8.4	LOS A	0.9	6.5	0.18	0.97	0.18	46.1
All Vehicles		460	53	511	11.5	0.205	6.4	NA	0.9	6.5	0.18	0.67	0.18	48.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Annexure D
Swept path assessment

EMM
creating opportunities

PM S 19M

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 27.8
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

ISS/AMT	DESCRIPTION	BY	APP	DATE
A	PRELIMINARY ISSUE	MZ	JC	08.10.21
B	PRELIMINARY ISSUE - ALIGNMENT OF ENTRY ROAD MODIFIED	MZ	JC	21.10.21

20 0m 20 40 60

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PROJECT
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CLIENT
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PROJECT No	DESIGNED	DRAWN	APPROVED	SCALE
31080	MZ	MZ	JC	1:1000@A1

TITLE TURNING MOVEMENT PLAN 1 OF 8

DRAWING No 00288-C-02-D25-0001

ISSUE/AMT B

ISS/AMT	DESCRIPTION	BY	APP	DATE
A	PRELIMINARY ISSUE	MZ	JC	08.10.21
B	PRELIMINARY ISSUE - ALIGNMENT OF ENTRY ROAD MODIFIED	MZ	JC	21.10.21

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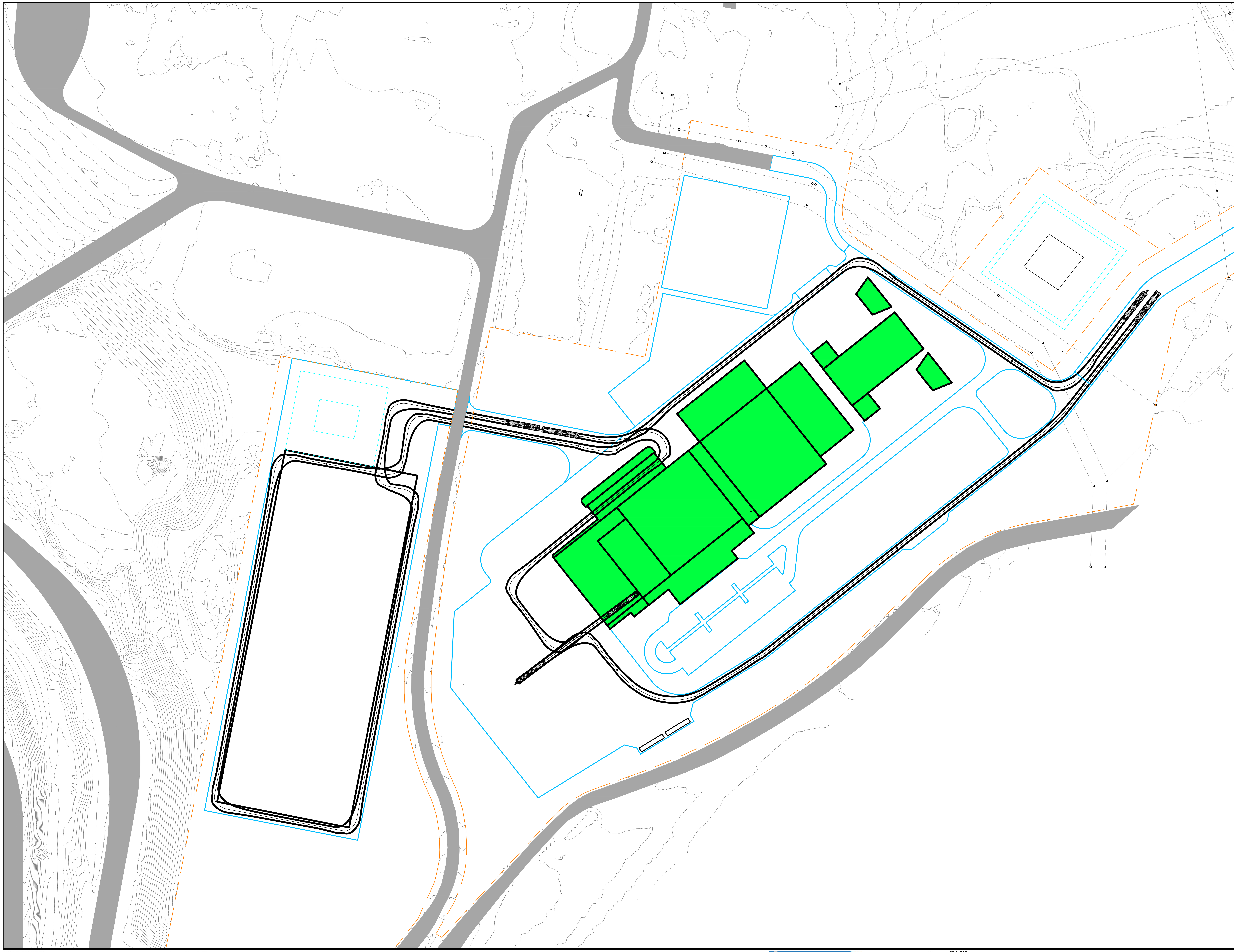
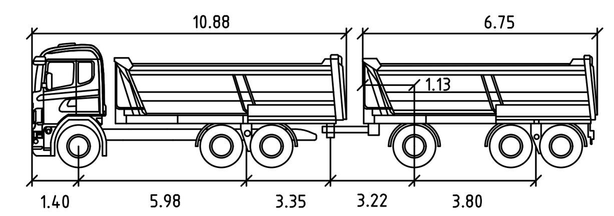
PROJECT No	DESIGNED	DRAWN	APPROVED	SCALE
31080	MZ	MZ	JC	1:1000@A1

TITLE TURNING MOVEMENT PLAN 2 OF 8

DRAWING No	ISSUE/AMT
00288-C-02-D25-0002	B





Isuzu CXY 455 Long_Config 1

meters

First Unit Width : 2.49
Trailer Width : 2.49
First Unit Track : 2.44
Trailer Track : 2.44

Lock to Lock Time : 6.0
Steering Angle : 35.7
Articulating Angle : 70.0

ISS/AMT	DESCRIPTION	BY	APP	DATE
A	PRELIMINARY ISSUE	MZ	JC	08.10.21
B	PRELIMINARY ISSUE - ALIGNMENT OF ENTRY ROAD MODIFIED	MZ	JC	21.10.21

20 0m 20 40 60

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PROJECT No	DESIGNED	DRAWN	APPROVED	SCALE
31080	MZ	MZ	JC	1:1000@A1

TITLE TURNING MOVEMENT PLAN 3 OF 8

DRAWING No 00288-C-02-D25-0003

ISSUE/AMT B

ISS/AMT	DESCRIPTION	BY	APP	DATE
A	PRELIMINARY ISSUE	MZ	JC	08.10.21
B	PRELIMINARY ISSUE - ALIGNMENT OF ENTRY ROAD MODIFIED	MZ	JC	21.10.21

20 0m 20 40 60

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PROJECT No	DESIGNED	DRAWN	APPROVED	SCALE
31080	MZ	MZ	JC	1:1000@A1

TITLE TURNING MOVEMENT PLAN 4 OF 8

DRAWING No 00288-C-02-D25-0004

ISSUE/AMT B

FH 13 4x2 Low WB 3600 - Rogers CR50

meters

Tractor Width	: 2.55	Lock to Lock Time	: 6.0
Trailer Width	: 2.59	Steering Angle	: 17.6
Tractor Track	: 2.55	Articulating Angle	: 70.0
Trailer Track	: 2.59		

ISS/AMT	DESCRIPTION	BY	APP	DATE
A	PRELIMINARY ISSUE	MZ	JC	08.10.21
B	PRELIMINARY ISSUE - ALIGNMENT OF ENTRY ROAD MODIFIED	MZ	JC	21.10.21

20 0m 20 40 60

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PROJECT No	DESIGNED	DRAWN	APPROVED	SCALE
31080	MZ	MZ	JC	1:1000@A1

TITLE TURNING MOVEMENT PLAN 5 OF 8

DRAWING No 00288-C-02-D25-0005

ISSUE/AMT B

ISS/AMT	DESCRIPTION	BY	APP	DATE
A	PRELIMINARY ISSUE	MZ	JC	08.10.21
B	PRELIMINARY ISSUE - ALIGNMENT OF ENTRY ROAD MODIFIED	MZ	JC	21.10.21

20 0m 20 40 60

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PROJECT No	DESIGNED	DRAWN	APPROVED	SCALE
31080	MZ	MZ	JC	1:1000@A1

TITLE TURNING MOVEMENT PLAN 6 OF 8

DRAWING No 00288-C-02-D25-0006

ISSUE/AMT B

ISS/AMT	DESCRIPTION	BY	APP	DATE
A	PRELIMINARY ISSUE	MZ	JC	08.10.21
B	PRELIMINARY ISSUE - ALIGNMENT OF ENTRY ROAD MODIFIED	MZ	JC	21.10.21

20 0m 20 40 60

DRAWING DIMENSIONS IN METRES UNLESS NOTED OTHERWISE

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PROJECT No	DESIGNED	DRAWN	APPROVED	SCALE
31080	MZ	MZ	JC	1:1000@A1

TITLE TURNING MOVEMENT PLAN 7 OF 8

DRAWING No 00288-C-02-D25-0007

ISSUE/AMT B

ISS/AMT	DESCRIPTION	BY	APP	DATE
A	PRELIMINARY ISSUE	MZ	JC	08.10.21
B	PRELIMINARY ISSUE - ALIGNMENT OF ENTRY ROAD MODIFIED	MZ	JC	21.10.21

20 0m 20 40 60

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PROJECT
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TITLE TURNING MOVEMENT PLAN 8 OF 8

CLIENT
VEOLIA ENVIRONMENTAL SERVICES (AUSTRALIA) PTY LIMITED

PROJECT No	DESIGNED	DRAWN	APPROVED	SCALE
31080	MZ	MZ	JC	1:1000@A1

DRAWING No 00288-C-02-D25-0008

ISSUE/AMT B

Annexure E

Draft construction Traffic Management Plan

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Draft Construction Traffic Management Plan

Woodlawn Advanced Energy Recovery Centre

Prepared for Veolia Environmental Services (Australia) Pty Ltd
March 2022

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Draft Construction Traffic Management Plan

Woodlawn Advanced Energy Recovery Centre

Report Number

J200931 RP2

Client

Veolia Environmental Services (Australia) Pty Ltd

Date

23 March 2022

Version

v1 Draft

Prepared by

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Traffic Engineer
23 March 2022

Approved by

Tim Brooker
Associate Transport Planner
23 March 2022

This report has been prepared in accordance with the brief provided by the client and has relied upon the information collected at the time and under the conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of the client and no responsibility will be taken for its use by other parties. The client may, at its discretion, use the report to inform regulators and the public.

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1 Introduction

1.1 Background

Veolia Environmental Services (Australia) Pty Ltd (Veolia) owns and operates the Woodlawn Eco Precinct (the Eco Precinct), located on Collector Road, approximately 6 kilometres (km) west of Tarago, approximately 50 km south of Goulburn and 70 km north of Canberra. Veolia proposes to develop and operate the Woodlawn Advanced Energy Recovery Centre (ARC) (the project), an energy recovery facility (ERF), at the Eco Precinct.

This draft Construction Traffic Management Plan (CTMP) has been prepared as part of the requirements issued in Planning Secretary's Environmental Assessment Requirements (SEARs) Application Number SSD-21184278 issued 2 July 2021. A detailed Construction Traffic Management Plan (CTMP) will be developed by the construction contractor in consultation with Transport for New South Wales (TfNSW) and Goulburn Mulwaree Council (GMC) prior to the commencement of works. This draft CTMP satisfies the SEARS requirement.

1.2 Objectives of the CTMP

The CTMP is associated with the construction activities of the project and aims to ensure the safety of all workers and road users within the vicinity of the construction site. The following are the primary objectives:

- to minimise the impact of the construction vehicle traffic on the local and regional road network and with other road users (eg school bus operators);
- to ensure continuous, safe and efficient movement of traffic for both the general public and construction workers;
- to install appropriate advance warning signs to inform users of the changed traffic conditions;
- to provide a description of the construction vehicles and the volume of these construction vehicles accessing the construction site; and
- to provide information regarding the changed access arrangement and a description of the proposed external routes for vehicles, including the construction vehicles accessing the site.

2 Existing traffic conditions

2.1 Site location and footprint

The Eco Precinct is located on Collector Road, approximately 6 km west of the village of Tarago, and 50 km south of Goulburn, NSW. The Eco Precinct includes operational areas used for waste management, energy generation and mining, as well as primary production including sustainable agriculture, aquaculture and horticulture. The proposed ARC is within the Eco Precinct. The project development footprint along with other facilities is shown in Figure 2.1.

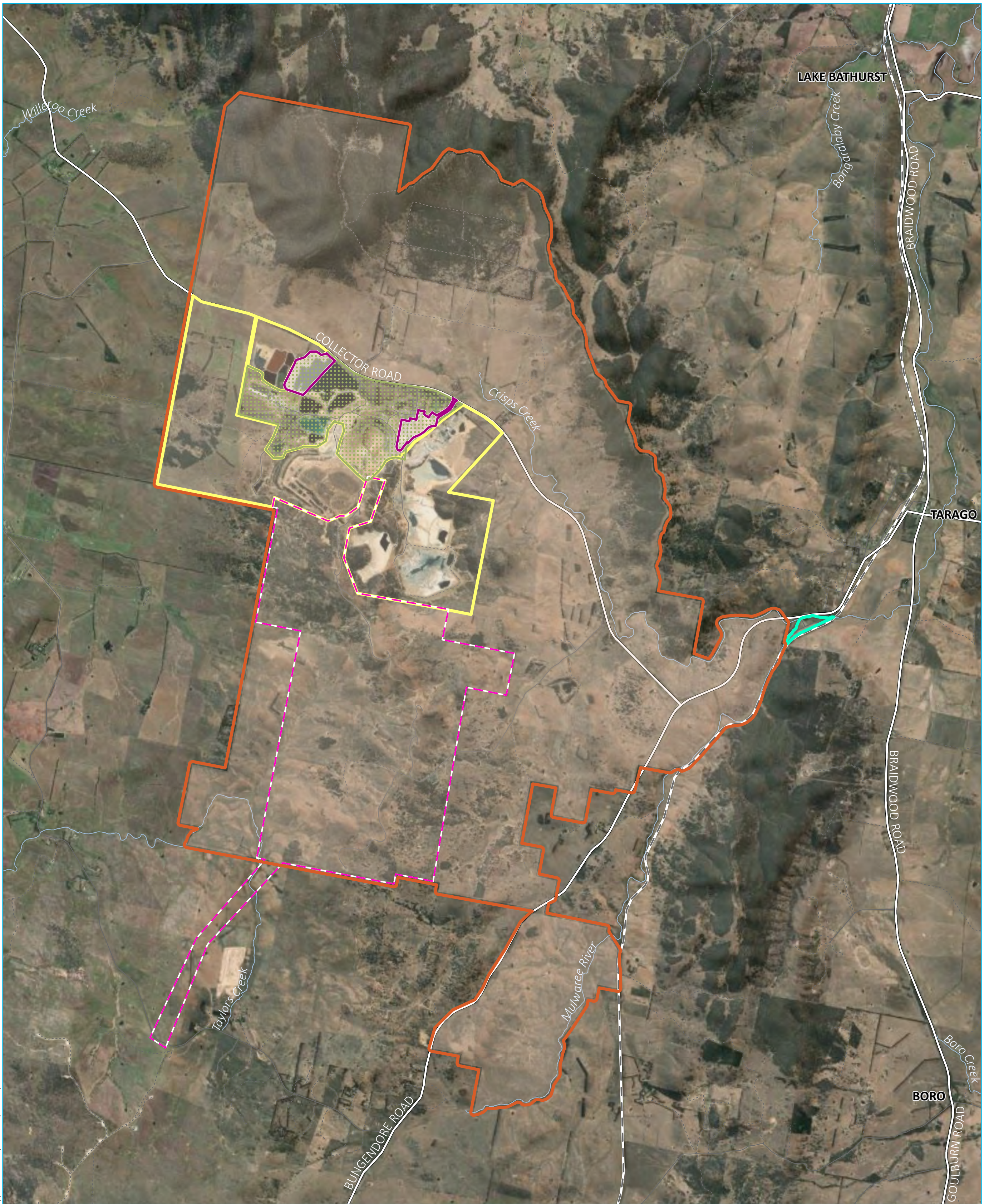
2.2 Road network

The NSW administrative road hierarchy comprises the following road classifications, which align with the generic road hierarchy as follows:

- state roads – freeways and primary arterials (TfNSW managed);
- regional roads – secondary or sub arterials (council managed and part funded by the State); and
- local roads – collector and local access roads (council managed).

The key roads in the vicinity of the Eco Precinct are Collector Road (local), Bungendore Road (regional) and Braidwood Road (state). A visual inspection of roads in the locality used by vehicles accessing the Eco Precinct was undertaken as part of the Traffic Impact Assessment (Appendix Q of the Project Environmental Impact Statement) to confirm the general road widths and traffic conditions for these routes and record photographs of key project access intersections.

The NSW administrative road hierarchy of roads in vicinity of the site is presented in Figure 2.2. An overview of each of the key roads is provided in Table 2.1 to Table 2.3.



\\emmsvr1\emm3\2020\200931 - Woodlawn

Source: EMM (2022); Veolia (2022); DFSI (2017)

0 1 2 km
GDA 1994 MGA Zone 55
N

KEY

- Development footprint
- Veolia integrated waste management operations
- Woodlawn Eco Precinct
- Crisps Creek Intermodal Facility (IMF)
- Woodlawn Mine operations area
- Woodlawn Wind Farm
- Rail line
- Major road
- Minor road
- Vehicular track
- Watercourse

Local setting

Woodlawn Advanced Energy Recovery Centre
Traffic impact assessment
Figure 2.1

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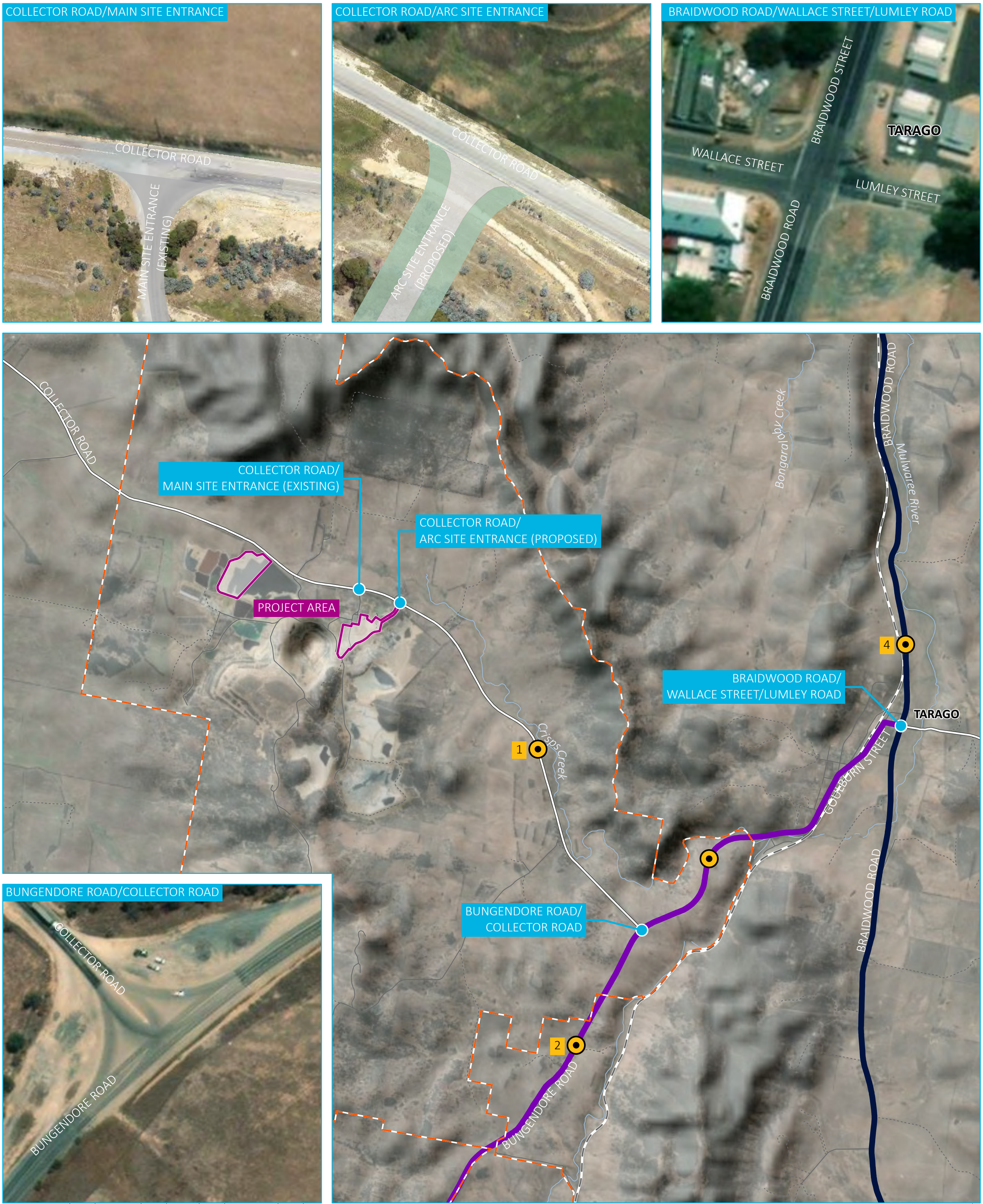

Source: EMM (2022); VEOLIA (2022); DFSI (2017); SIXMAPS (2021)

0 1 2 km
GDA 1994 MGA Zone 55
N

KEY

- Development footprint
- Woodlawn Eco Precinct
- Key intersection
- Tube count location
- State road
- Regional road
- Rail line
- Main road
- Local road
- Track
- Watercourse

Road hierarchy, key intersections & tube count locations

Woodlawn Advanced Energy Recovery Centre
Traffic impact assessment
Figure 2.2

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Table 2.1 Collector Road

Aspect	Description
Road classification and connectivity	Local road between Bungendore Road (east) and Federal Highway (west)
Alignment	East-west
Number of lanes	Two lanes, one lane each way
Carriageway type	Sealed road with shoulders
Carriageway width	Approximately 11 m with 3.5 m travel lane each way and 2 m shoulder on each side
Posted speed limit	100 km per hour (km/h)
Heavy vehicle access	Yes, between Eco Precinct site access and Bungendore/Collector Road intersection
Traffic function	Carries regional and local traffic

Plate 2.2 Collector Road (westbound)

Table 2.2 Bungendore Road

Aspect	Description
Road classification and connectivity	Regional road between Goulburn Street (north) and Tarago Road (south)
Alignment	North-south
Number of lanes	Two lanes, one lane each way
Carriageway type	Sealed road with shoulders

Table 2.2 Bungendore Road

Aspect	Description
Carriageway width	Approximately 9 m with 3.5 m travel lane each way and 1 m shoulder on each side
Posted speed limit	100 km/h, 60 km/h north of Crisps Creek Intermodal Facility access
Heavy vehicle access	Yes, between Goulburn St (north) and Bungendore/Collector Road intersection
Traffic function	Carries regional traffic

Plate 2.2 Bungendore Road (southbound)

Table 2.3 Braidwood Road

Aspect	Description
Road classification and connectivity	State road between Goulburn (north) and Goulburn Road (south)
Alignment	North-south
Number of lanes	Two lanes, one lane each way
Carriageway type	Sealed road with shoulders
Carriageway width	Approximately 9 m with 3.5 m travel lane each way and 1 m shoulder on each side

Table 2.3 Braidwood Road

Aspect	Description
Posted speed limit	100 km/h, 60 km/h through Tarago
Heavy vehicle access	Yes
Traffic function	Carries regional traffic

Plate 2.2 Braidwood Road (northbound)

2.3 Key intersections

The key intersections which are proposed to be utilised for the project related construction traffic access are presented in Figure 2.2 and described in Table 2.4 to Table 2.6.

Table 2.4 Collector Road/Site access road (existing)

Aspect	Description
Location from the site	650 m north-east of the site
Intersection control	Give-way intersection
Major Road	Collector Road
South Approach	One lane each on approach and departure
East Approach	One full lane and one deceleration lane on approach and one lane on departure
West Approach	One lane each on approach and departure
Pedestrian Connectivity	No pedestrian connectivity on all approaches
Traffic function	Predominantly carries regional and local traffic
Speed limit	100 km/hour on Collector Road approaches, 20 km/hour on site access approaches

Table 2.5 Bungendore Road/Collector Road

Aspect	Description
Location from the site	4.8 km south-east of the site
Intersection control	Give-way intersection
Major Road	Bungendore Road
South-West Approach	One lane each on approach and departure
North-East Approach	One lane each on approach and departure
North-West Approach	One lane each on approach and departure
Pedestrian Connectivity	No pedestrian connectivity on all approaches
Traffic function	Predominantly carries regional traffic
Speed limit	100 km/hour on all approaches
Additional comments	Wide flaring on Collector Road approach and departure

Table 2.6 Braidwood Road/Wallace Street/Lumley Road

Aspect	Description
Location from the site	7.3 km east of the site
Intersection control	Give-way intersection
Major Road	Braidwood Road
South Approach	One lane each on approach and departure
North Approach	One lane each on approach and departure
East Approach	One lane each on approach and departure
West Approach	One lane each on approach and departure, on-street parking on both sides
Pedestrian Connectivity	No pedestrian connectivity on all approaches
Traffic function	Predominantly carries regional and local traffic
Speed limit	60 km/hour on north and south approaches, 50 km/hour on east and west approaches
Additional comments	The intersection is located in an urban area

3 Construction traffic management

3.1 General requirements

In accordance with TfNSW requirements, all vehicles transporting loose materials will have the entire load covered and/or secured to prevent any large items, excess dust or dirt particles depositing onto the roadway during travel to and from the site.

All subcontractors must be inducted by the lead contractor to ensure that the CTMP and related traffic control procedures are met for all vehicles entering and exiting the construction site. The lead contractor will monitor the roads leading to and from the site for dirt/debris and take all necessary steps to rectify any road deposits caused by site vehicles.

Vehicles operating to, from and within the site shall do so in a manner which does not create unreasonable or unnecessary noise or vibration. No tracked vehicles will be permitted or required on any paved roads. Public roads and access points will not be obstructed by any materials, vehicles, refuse skips or the like, under any circumstances.

3.2 Hours of work

The typical construction working day would be between 6:00 am – 6:00 pm, however approval is sought for construction 24 hours per day as there will be some stages (for example, concrete works and erection and assembly phases) where work will be required to occur to continuously over 24 hour periods. During 24-hour construction, work would be divided into either two or three shifts.

3.3 Construction heavy vehicle types

The construction of the project will require a variety of construction heavy vehicles such as crawler cranes (up to 600 t), franna cranes, knuckle booms, excavators, rollers, front end loaders, water trucks, concrete trucks etc. Further details of construction vehicles will be provided by the construction contractor in the detailed CTMP.

3.4 Construction traffic routes

The majority of the construction workforce is expected to be sourced from Goulburn and surrounding areas. Construction heavy vehicles are expected to arrive 50% from south of Bungendore/Collector Road intersection (from Canberra via Bungendore) and 50% from north (from Goulburn via Tarago). Construction traffic routes are shown in Figure 3.1.

There will be some Oversize/Overmass (OSOM) vehicles during the construction phase of the project. The NSW OSOM Load Carrying Vehicles Network map (https://roads-waterways.transport.nsw.gov.au/business-industry/heavy-vehicles/maps/nsw-load-carrying-network/map/index.html) displays the NSW OSOM Load Carrying Vehicles Network Approved Roads. According to the map, OSOM vehicles can access the project site via Braidwood Road via Tarago or via Federal Highway via Collector.

An access permit will be required for OSOM vehicles travelling via Bungendore Road and Collector Road from the National Heavy Vehicle Regulator prior to mobilisation, as these roads are not approved OSOM routes. The OSOM vehicle routes are shown in Figure 3.1.

Figure 3.1 Construction traffic routes

3.5 Construction staging and timeline

The construction of the project is expected to be undertaken over a period of approximately three years and will include the following stages:

- Site establishment.
- Civil works.
- Substation construction.
- ARC construction and plant installation.
- Commissioning and testing.
- Operational licensing.

Key project durations are as follows:

- 2021-2023: environmental assessment and approval.
- 2023-2026: project construction (approximately three years).
- 2026: commencement of project operation.

The different and overlapping stages of construction during the three year period are shown in Figure 3.2.

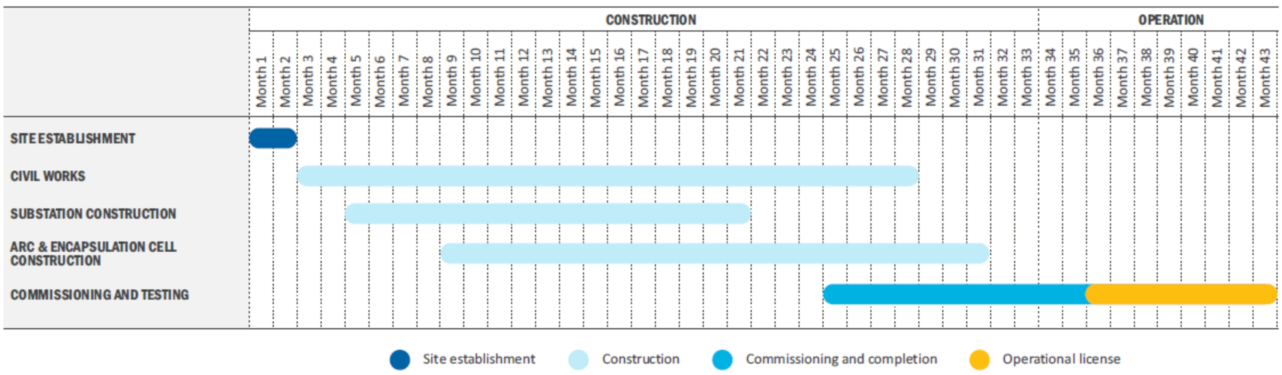

Figure 3.2 Indicative construction sequencing

3.6 Construction traffic volumes

The construction traffic includes construction workforce, construction heavy vehicle and OSOM vehicles movements. Peak construction traffic is expected to occur during month 9 to month 21.

The majority of construction workers (275) are expected to commute in private mini-buses to the Eco Precinct. Approximately 25 workers would travel by light vehicle (construction managers, senior staff). Light vehicle occupancy is assumed at one worker per vehicle. It is expected that there would be approximately 20 daily heavy vehicle trips during the peak construction stage.

The forecast peak daily and peak hourly construction traffic volumes for the project during month 9 to month 21 are presented in Table 3.1.

Table 3.1 Peak daily and hourly construction traffic

Construction Stage	Peak Daily		Peak Hourly	
	Trips	Movements	Trips	Movements
Light vehicles	25	50	25	25
Heavy vehicles	20	40	2	4
Buses	25	50	25	50
Total	**70**	**140**	**52**	**79**

A 'vehicle trip' is defined as a vehicle entering the site once (1 movement) and a vehicle exiting the site once (1 movement)

There may be periods during construction, such as concrete truck deliveries during particular phases, where movements may exceed the peak daily and/or hourly construction traffic numbers presented in Table 3.1. However, these will be 'one-off' events which will not be typically representative of the overall construction program.

3.7 Stakeholder consultation

State and local government transport agency stakeholders will be identified and informed of the proposed timing of the works and possible impacts. The initial stakeholders are identified as follows:

- Goulburn Mulwaree Council (GMC); and
- Transport for NSW (TfNSW).

3.8 Traffic control measures

Relevant Traffic Control Plans (TCPs) will be developed by the lead contractor in accordance with the Australian Standards and the TfNSW Traffic control at work sites manual (Transport for NSW 2022).

All recommended signs would be installed at the start of the shift and removed at the end of the shift on a typical construction day. No sign would be placed on days when construction activities are not scheduled to occur.

3.9 Construction works zone requirements

No construction work zones are proposed at this stage. In the event that works do require an on-street work zone/construction loading zone, a works zone application will be submitted to GMC for approval, prior to carrying out the associated works.

3.10 Road occupancy licences

No lane or road closures are proposed at this stage. In the event that works do require a lane or road closure, the construction contractor shall submit a Road Occupancy Licence application to the GMC for approval, prior to carrying out the associated works.

3.11 Construction workers' parking

Construction workers (managers, senior staff) parking will be provided on-site. No construction workers or visitor parking will be allowed on Collector Road.

3.12 Works site security

Security to the construction site and protection to the general public will be ensured as the majority of works will be constructed within the site boundaries. Where construction works are required outside the site boundaries eg, for construction of the new site access, temporary road barriers and fences will be used to secure the construction area. All access points to the work sites will be securely locked when construction activities are not in progress.

3.13 Staff induction

All staff and subcontractors will be required to undergo a site induction on entry. The induction will include approved access routes to and from the construction site for all vehicles, as well as standard environmental, occupation health and safety, driver protocols and emergency procedures. Additionally, the lead contractor will discuss the site traffic management requirements regularly as part of a toolbox talk and advise workers of private mini-buses and car sharing opportunities.

3.14 Occupational health & safety

Any personnel required to undertake works or traffic control within the public domain shall be suitably trained and covered by appropriate insurances. If any traffic controllers are used, they must be TfNSW accredited.

3.15 Swept path assessment

A swept path assessment has been undertaken for various construction vehicles accessing and manoeuvring at the new site access and within the internal areas of the site. Swept paths are presented in Appendix A.

3.16 Traffic Monitoring Program

- In accordance with the regulatory conditions, all construction vehicles associated with the ARC shall be monitored where required, to ensure heavy vehicles are suitably covered when loaded and cleaned before exiting the site to Collector Road.
- The following measures may be employed to monitor and record the movement of vehicles accessing the construction work sites:
  - Spot monitoring of vehicle movements by Construction Manager, Contractor or Woodlawn Eco Precinct Site Manager;
  - Recording of any breaches identified through spot monitoring, through the Contractor's incident management system; and
  - Reviewing any complaints related to transport routes.
- A driver education and enforcement program shall be developed as part of the site induction processes by the Contractor in conjunction with Veolia, for the construction phase of the ARC, to ensure conformance with the detailed CTMP.

- A risk assessment shall be undertaken for the site to identify the potential traffic hazards prior to commencement of construction, and the management strategies for mitigation reported.

3.17 Driver's Code of Conduct

The Driver's Code of Conduct (Appendix B) will be sent to all relevant personnel prior to their arrival at site. The Driver's Code of Conduct will be required to be read and signed by all light and heavy vehicle drivers prior to operation of vehicles. This will be in addition to regular safety briefings and updates. The Driver's Code of Conduct will address all relevant site and locality road safety and traffic management measures including:

- compliance with all road rules and regulations;
- commuter traffic routes;
- vehicle speeds;
- driving to local road conditions;
- driver behaviour near schools, residential and shopping areas;
- courtesy to other road users;
- fatigue management;
- dangers of mobile phone use while driving;
- checking vehicles and covering loads;
- the appropriate use of compression braking; and
- safety procedures for accidents and breakdowns.

The Driver's Code of Conduct will also include a single page summary detailing the site access, primary and OSOM transport routes and other key aspects of light and heavy vehicle related compliance.

3.18 Complaint management

A complaint management system to enable active community consultation and maintain positive communication with local residents will be implemented for the site. The purpose of this system will be to minimise complaints by providing timely responses to community concerns and monitoring the ongoing environmental performance of the site construction activity.

3.18.1 Registering complaints

Any enquiries or complaints made by members of the public to site personnel will be directed to the lead contractor/construction manager.

Complaints may be made to the contractor's direct line during business hours which and will be forwarded to a site representative outside of business hours in the case of emergencies. This number will be provided on a sign at the site entrance.

3.18.2 Complaint response

Any complaint received by the lead contractor regarding driver conduct or road condition will be acted on within 24-hours in the following manner:

- details of the complaint (date, time, specifics, complainants contact details) will be recorded;
- activities occurring during the complaint period will be investigated;
- findings of operations during the complaint period will be recorded in the complaints register;
- relevant management practices will be reviewed as necessary; and
- findings of the review will be communicated to the complainant.

4 References

Transport for NSW. 2022. “Traffic control at work sites .”

Appendix A

Swept path assessment

PM S 19M

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 27.8
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

ISS/AMT	DESCRIPTION	BY	APP	DATE
A	PRELIMINARY ISSUE	MZ	JC	08.10.21
B	PRELIMINARY ISSUE - ALIGNMENT OF ENTRY ROAD MODIFIED	MZ	JC	21.10.21

20 0m 20 40 60

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TITLE TURNING MOVEMENT PLAN 1 OF 8

DRAWING No 00288-C-02-D25-0001

ISSUE/AMT B

MFB Platform Scania P113HL

	meters
Width	: 2.50
Track	: 2.42
Lock to Lock Time	: 6.0
Steering Angle	: 35.0

ISS/AMT	DESCRIPTION	BY	APP	DATE
A	PRELIMINARY ISSUE	MZ	JC	08.10.21
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TITLE TURNING MOVEMENT PLAN 2 OF 8

DRAWING No 00288-C-02-D25-0002

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TITLE TURNING MOVEMENT PLAN 3 OF 8

DRAWING No 00288-C-02-D25-0003

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TITLE TURNING MOVEMENT PLAN 4 OF 8

DRAWING No 00288-C-02-D25-0004

ISSUE/AMT B

FH 13 4x2 Low WB 3600 - Rogers CR50

meters

Tractor Width	: 2.55	Lock to Lock Time	: 6.0
Trailer Width	: 2.59	Steering Angle	: 17.6
Tractor Track	: 2.55	Articulating Angle	: 70.0
Trailer Track	: 2.59		

ISS/AMT	DESCRIPTION	BY	APP	DATE
A	PRELIMINARY ISSUE	MZ	JC	08.10.21
B	PRELIMINARY ISSUE - ALIGNMENT OF ENTRY ROAD MODIFIED	MZ	JC	21.10.21

20 0m 20 40 60

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TITLE TURNING MOVEMENT PLAN 5 OF 8

DRAWING No 00288-C-02-D25-0005

ISSUE/AMT B

PASSENGER-CAR

	meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.0
Steering Angle	: 33.6

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TITLE TURNING MOVEMENT PLAN 6 OF 8

DRAWING No	ISSUE/AMT
00288-C-02-D25-0006	B

BUS

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 36.6

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TITLE TURNING MOVEMENT PLAN 7 OF 8

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TITLE TURNING MOVEMENT PLAN 8 OF 8

DRAWING No 00288-C-02-D25-0008

ISSUE/AMT B

Appendix B

Drivers Code of Conduct

B.1 Vehicle driver requirements

Veolia will implement all reasonable and feasible measures to minimise the impact of traffic generated by construction traffic, in particular on Bungendore Road and Collector Road, as well as approved OSOM transport routes.

As part of the site induction, all drivers of heavy vehicles associated with construction worksite deliveries will be notified that queuing or parking of vehicles on Collector Road is to be avoided.

All heavy vehicles hauling construction materials to and from the project construction worksites must:

- have undertaken a site induction;
- have comprehension of the relevant requirements of the TfNSW Heavy Vehicle Driver Handbook;
- hold a valid driver's licence for the class of vehicle that they operate;
- operate the vehicle in a safe manner within and external to the construction worksites, including adherence to Veolia's Workplace Health and Safety Policy and Veolia's Fitness for Work Policy. Drug and alcohol testing will be in accordance with these policies. Failure to comply will result in removal from site; and
- comply with all directions of authorised site personnel when within the site.

A single page document detailing the Site Access Traffic Routes and summarising other key aspects of light and heavy vehicle related compliance will be issued to contractors prior to commencement of works. This document is to be read and signed by all contractors. Where there is a failure to comply with this document (or associated contractor or Veolia policies), disciplinary action may be considered.

B.2 Heavy vehicle speed

Increased speed means not only an increased risk of collision but also increased severity if an accident does occur. A study undertaken for the Australian Transport Safety Bureau found that travelling 10 km/h faster than the average traffic speed can more than double the risk of involvement in a casualty or fatality accident (TfNSW).

There are two (2) types of speeding:

- Where a heavy vehicle travels faster than the posted speed limit; and
- Where a driver travels within the speed limit but due to road conditions (eg fog or rain) this speed is inappropriate (TfNSW).

Drivers and truck operators are to be aware of the 'Three Strikes Scheme' introduced by TfNSW, which applies to all vehicles over 4.5 t. 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 (3) year period, TfNSW will act to suspend the registration and driver of that vehicle (up to three months). More information is available from TfNSW.

Vehicle speeds on public roads in NSW are enforced by the NSW Police Service. The speed limit within the project construction worksites is 10 km/h which is to be strictly maintained.

All heavy vehicle drivers associated with the project construction worksite are to observe the posted speed limits, with speed adjusted appropriately to suit the road environment and prevailing weather conditions and comply with other Australian road rules. The vehicle speed must also be appropriate to ensure the safe movement of the vehicle based on the vehicle configuration.

B.3 Heavy vehicle driver fatigue

Fatigue is one of the biggest causes of accidents for heavy vehicle drivers. The Heavy Vehicle Driver Fatigue Reform was developed by the National Transport Commission (NTC) and approved by Ministers from all States and Territories in February 2007.

The Heavy Vehicle (Fatigue management) National Regulation 2013 (NSW) commenced in NSW on 12 February 2014 and applies to trucks and truck combinations over 12 tonnes GVM (however there are Ministerial Exemption Notices that can apply).

Under the law, an industry has the choice of operating under three (3) fatigue management schemes:

- Standard Hours of Operation;
- Basic Fatigue Management (BFM); and
- Advanced Fatigue Management (AFM).

All heavy vehicle drivers associated with the project construction are to be aware of their adopted fatigue management scheme and operate within its requirements.

B.4 Heavy vehicle noise and compression braking

The transportation of materials to and from the worksite would generally only occur during the typical construction work hours.

Transportation of construction equipment and materials may be undertaken outside of the above hours in the following circumstances:

- works that will not cause noise impacts to the community;
- for the delivery of materials outside these hours, as required by the NSW Police Force or other authorities for safety reasons; or
- where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm.

Compression braking by heavy vehicles is a source of irritation to the community, generating many complaints especially at night when residents are especially sensitive to noise.

In some instances, compression braking is required for safety reasons however when passing through or adjacent to residential areas a reduction in the speed of the vehicle is recommended to reduce the instances and severity of compression braking.

B.5 Vehicle site entry and exit checking

Signage will be provided at each construction worksite entry or exit gate advising the following:

- no truck queuing or parking on public roads;
- cover heavy vehicle loads at all times except during loading and unloading;
- remove any loose debris from vehicle body and wheels before leaving the site;

- ensure all heavy vehicles pass through wheel wash bay before leaving the site;
- ensure tailgate is locked before leaving site;
- observe all local and site speed limits;
- driving to the road conditions;
- responsible fatigue management;
- warning of dangers of mobile phone use while driving; and
- minimise noise from driving or braking.

Loose material or construction debris on the road surface has the potential to cause road crashes and vehicle damage. All construction heavy vehicles arriving at or departing from the construction site that are carrying loads of potential dust generating material must have their loads covered at all times except during loading or unloading, within the site.

All care must be taken to ensure that all loose debris from the vehicle body and wheels is removed prior to leaving the site. Drivers must ensure that following tipping, all tipper vehicle tailgates must be locked before leaving the site.

Heavy vehicles travelling to or from the site must avoid travelling together in close proximity (within 200 m) on any single lane or single lane each way public road.

B.6 Incident reporting

To assist in the orderly resolution of complaints and monitoring the effectiveness of this plan, site management will keep a register itemising all reported incidents or complaints regarding heavy vehicle driver conduct external to the site.

Information to be logged for each incident shall include (as a minimum):

- date and time;
- location/s;
- driver/heavy vehicle details;
- contact details of person lodging the complaint;
- what/when actions were taken to resolve the issue; and
- any response made to a complaint.

The Construction Environmental Management Plan (CEMP), which will be prepared post project approval will include further details of all incident reporting procedures for the project construction management.

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