APPENDIX E UPDATED TRAFFIC IMPACT ASSESSMENT (TIA)

Lightsource bp

Wellington North Solar Project Development
Traffic Impact Assessment

January 2021

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1. Introduction

1.1 Overview

GHD has been engaged by NGH Pty Ltd to undertake a review of the traffic impact assessment to assist with the construction and operation of the proposed Wellington North Solar Farm (WNSF).

The Wellington North Solar Farm (Project) in central-western NSW is currently being developed by Lightsource bp. The project is located approximately seven kilometres northeast of Wellington town centre, off Goolma Road, in the Dubbo Regional Council Local Government Area.

This Traffic and Parking Impact assessment report discusses the following:

- Existing Conditions – a review of existing road features and access, adjacent developments, traffic volumes and crash data;
- Proposed Development – a review of additional traffic generated as a result of the proposed solar plan during construction and operation;
- Development Impact – assessment of the performance of the existing intersections resulting from the proposed solar farm development; and
- Parking and Access Review – a review of the parking provision in relation to relevant local development requirements or future construction / operational activity, and a summary of the transportation routes for access and egress arrangements.

1.2 Study area

1.2.1 Site location

The subject site is located within the Dubbo Regional Council Local Government Area (LGA), seven kilometres northeast of Wellington town centre between Saxa Road and Goolma Road. The site shown in Figure 1-1 is located to the west of Goolma Road and consists of approximately 970 hectares of land that is currently used for agricultural purposes.

The vehicular access point to the development site is proposed to utilise the existing driveway off Goolma Road that currently leads to the residential dwelling on the property. This report will review the suitability of this access and outline potential upgrades that may be required

The location of the proposed WNSF in relation to the surrounding road network is shown in Figure 1-2.

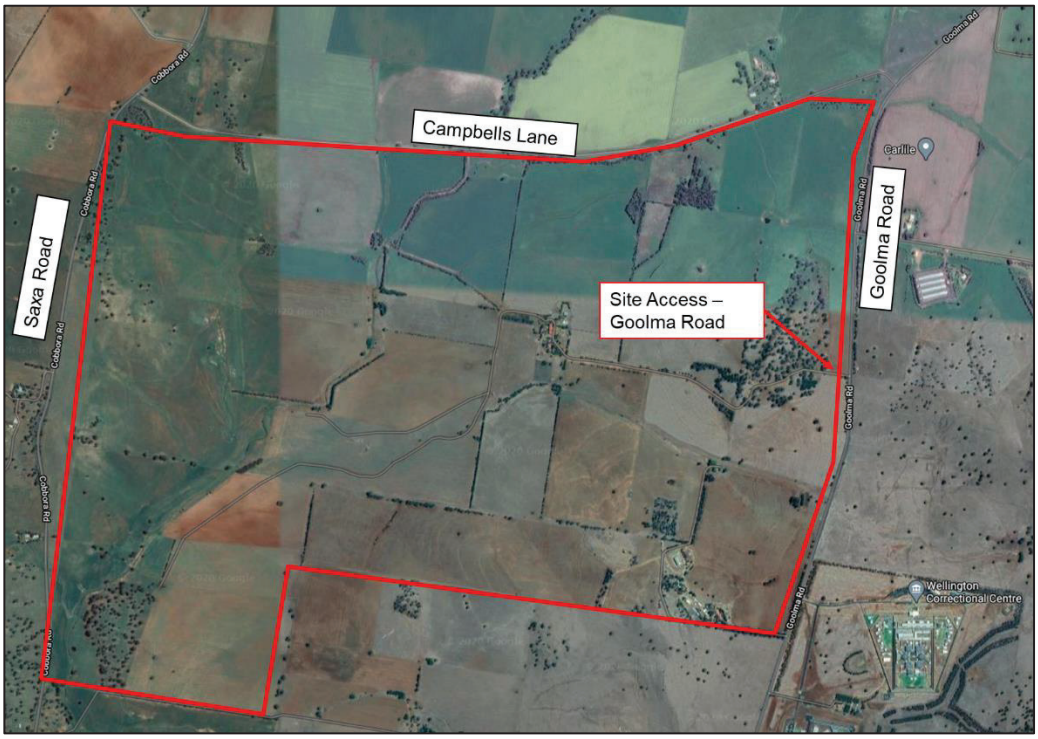


Figure 1-1 Site location

Source: Google Maps – Modified by GHD

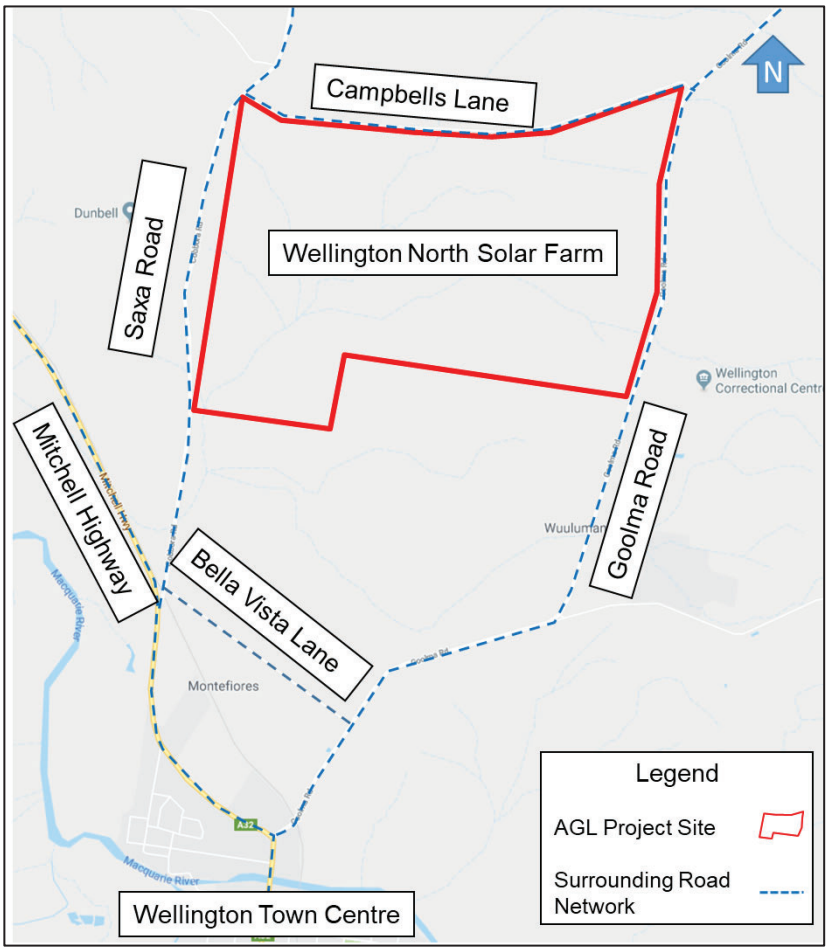


Figure 1-2 Road network near the subject site

Source: Google Maps – Modified by GHD

1.3 Study assumptions and limitations

This report and assessment for the proposed WNSF are based on the following assumptions and limitations:

- The information provided by NGH and Lightsource bp in relation to expected truck and vehicle generation and arrival-departure locations for the construction and staff personnel is accurate.
- The traffic count survey data based on automatic tube count conducted between 28 February 2018 and 6 March 2018 by Matrix Traffic and Data Solutions is accurate.
- The analysis is a desktop study and no site visits have been undertaken.
- The conditions of the surrounding road network are based on information either supplied by the traffic surveys and Google Maps / Streetview.

1.4 Report structure

The report is structured as follows:

- Section 2 Existing conditions.
- Section 3 Traffic impact and assessment.
- Section 4 Parking provision.
- Section 5 Mitigation measures.
- Section 6 Summary and recommendations.

2. Existing conditions

2.1 The site

The proposed WNSF is located within Dubbo Regional Council LGA on the western side of Goolma Road, south-west of its intersection with Campbells Lane.

As indicated in Figure 2-1, the site is located in a RU1 (Primary Production) zone with the Wellington and Macquarie Correctional Centre to the east of the site zoned as SP2 (Infrastructure). The land south of the site, at the intersection of Mitchell Highway and Goolma Road, is zoned as R5 (Large Lot Residential).

The site currently consists predominately of greenfield area with the land used for agricultural purposes.

Primary access to the proposed WNSF will be off Goolma Road, which currently consists of residential driveway access located to the east of the site. South of the site is a local road network (Bela Vista Lane) providing access to the residential dwellings located within the R5 Residential Zone.

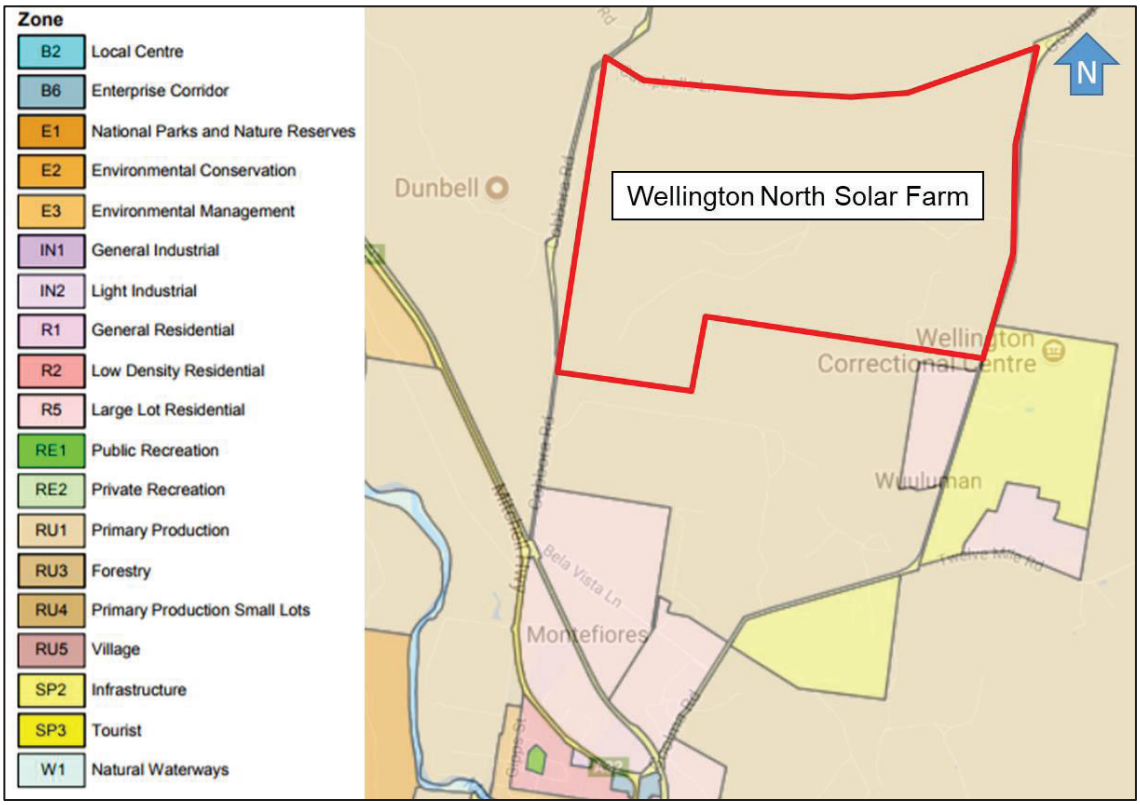


Figure 2-1 Land zoning

Source: www.planningportal.nsw.gov.au – Modified by GHD

2.2 Existing road network characteristics

This section provides an understanding of the existing road network surrounding the site.

2.2.1 Road hierarchy

Roads within NSW are categorised in the following two ways:

- By Classification (ownership); and
- By the function that they perform.

Road Classification

Roads are classified (as defined by the *Roads Act 1993*) based on their importance to the movement of people and goods within NSW (as a primary means of communication).

The classification of a road allows Transport for NSW to exercise authority of all or part of the road. Classified roads include Main Roads, State Highways, Tourist Roads, Secondary Roads, Tollways, Freeways and Transitways.

For management purposes, Transport for NSW has three administrative classes of roads. These are:

- **State Roads –** Major arterial links through NSW and within major urban areas. They are the principle traffic carrying roads and fully controlled by Transport for NSW with maintenance fully funded by Transport for NSW. State Roads include all Tollways, Freeways and Transitways; and all or part of a Main Road, Tourist Road or State Highway.
- **Regional Roads** – Roads of secondary importance between State Roads and Local Roads which, with State Roads provide the main connections to and between smaller towns and perform a sub arterial function in major urban areas. Regional roads are the responsibility of councils for maintenance funding, though Transport for NSW funds some maintenance based on traffic and infrastructure. Traffic management on Regional Roads is controlled under the delegations to local government from Transport for NSW. Regional Roads may own all part of all or part of a Main Road, Secondary Road, Tourist Road or State Highway; or other roads as determined by Transport for NSW.
- **Local Roads** – The remainder of the council controlled roads. Local Roads are the responsibility of councils for maintenance funding. Transport for NSW may fund some maintenance and improvements based on specific programs (e.g. urban bus routes, road safety programs). Traffic management on Local Roads is controlled under the delegations to local government from Transport for NSW.

Functional Hierarchy

Functional road classification involves the relative balance of the mobility and access functions. Transport for NSW define four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility, to high accessibility and low mobility. These road classes are:

- **Arterial Roads** – generally controlled by Transport for NSW, typically no limit in flow and designed to carry vehicles long distance between regional centres.
- **Sub-Arterial Roads** – can be managed by either Transport for NSW or local council. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and their aim is to carry through traffic between specific areas in a sub region, or provide connectivity from arterial road routes (regional links).

- **Collector Roads** – provide connectivity between local roads and the arterial road network and typically carry between 2,000 and 10,000 vehicles per day.
- **Local Roads** – provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

The surrounding road network is shown in Figure 2-2.

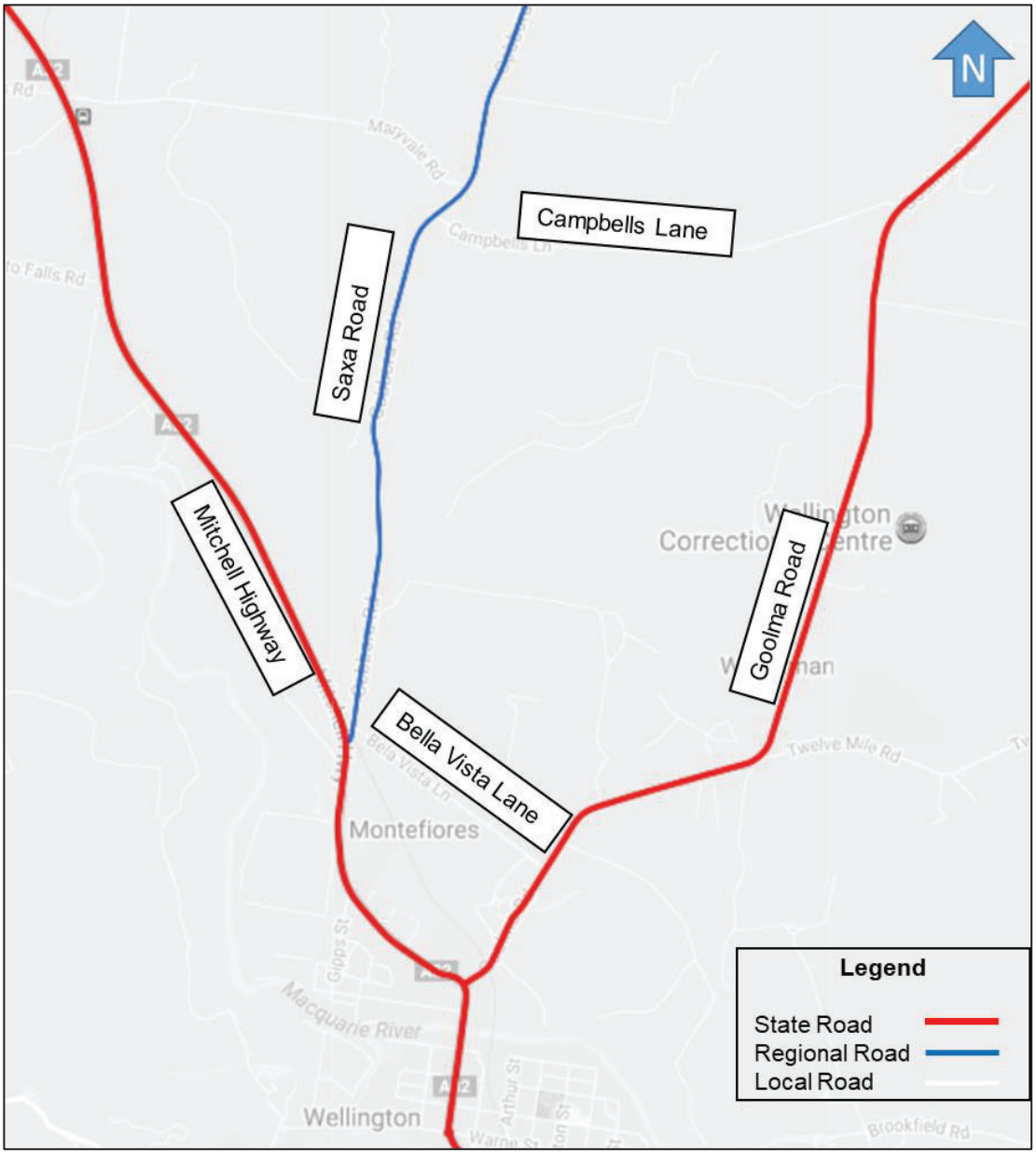


Figure 2-2 Surrounding road network

Source: Transport for NSW maps – Modified by GHD

2.2.2 Saxa Road

Saxa Road acts as a regional road in the vicinity of the WNSF running in a north-south alignment. Saxa Road connects to Mitchell Highway to the south and Golden Highway to the north with priority-controlled intersections at both locations. The intersection of Saxa Road with Campbells Lane is a give-way priority-controlled intersection.

Saxa Road has the following key features within proximity of site as outlined in Table 2-1 and shown in Figure 2-4.

Table 2-1 Saxa Road key features

Feature	Description
Carriageway	Undivided carriageway, with typically one travel lane in each direction
Parking	Unrestricted
Speed Limit	No sign-posted speed limit (100 km/h)
Pedestrian Facilities	No dedicated pedestrian facilities
Bicycle Facilities	No dedicated bicycle facilities
Public Transport	No dedicated public transport facilities; however a level crossing exists across Saxa Road approximately 80 m north of the Mitchell Highway

Figure 2-3 Saxa Road, west of the site (looking south)

Source: Google Maps Streetview

2.2.3 Goolma Road

Goolma Road functions as a sub-arterial road with a north-south alignment. Goolma Road runs between Gulgong in the north and Wellington in the south, forming priority-controlled intersections at Mitchell Highway and Campbells Lane.

Goolma Road has the following key features within proximity of site as outlined in Table 2-3 and Figure 2-4.

Table 2-2 Goolma Road key features

Feature	Description
Carriageway	Undivided carriageway, with a single travel lane in each direction. A right turn lane is provided northbound on Goolma Road to access the Wellington and Macquarie Correctional Centre
Parking	Unrestricted
Speed Limit	100 km/h
Pedestrian Facilities	No dedicated pedestrian facilities
Bicycle Facilities	No dedicated bicycle facilities
Public Transport	No dedicated public transport facilities

Figure 2-4 Goolma Road, east of the site (looking south)

Source: Google Maps Streetview

2.2.4 Campbells Lane

Campbells Lane is located along the northern boundary of the WNSF. Campbells Lane is a local road running in an east-west alignment from Goolma Road, east of the site, to Saxa Road in the west. Campbells Lane forms part of a priority-controlled intersection at both these locations.

Campbells Lane has the following key features within proximity of site as outlined in Table 2-3 and shown in Figure 2-5.

Table 2-3 Campbells Lane key features

Feature	Description
Carriageway	Undivided carriageway, with one travel lane in each direction
Parking	Unrestricted
Speed Limit	No sign-posted speed limit (100 km/h)
Pedestrian Facilities	No dedicated pedestrian facilities
Bicycle Facilities	No dedicated bicycle facilities
Public Transport	No dedicated public transport facilities

Figure 2-5 Campbells Lane, north of the site (looking west)

Source: Google Maps Streetview

2.2.5 Bela Vista Lane

Bela Vista Lane is located south of the WNSF. Bela Vista Lane is a local road running in an east-west alignment from Goolma Road, east of the site, to Saxa Road in the west. Bela Vista Lane forms part of a priority-controlled intersection at both these locations.

Bela Vista Lane has the following key features within proximity of site as outlined in Table 2-3 and shown in Figure 2-6.

Table 2-4 Bela Vista Lane key features

Feature	Description
Carriageway	Undivided carriageway, with one travel lane in each direction; gross load limit of 20 tonne
Parking	Unrestricted
Speed Limit	No sign-posted speed limit (100 km/h)
Pedestrian Facilities	No dedicated pedestrian facilities
Bicycle Facilities	No dedicated bicycle facilities
Public Transport	No dedicated public transport facilities

Figure 2-6 Bela Vista Lane, north of the site (looking west)

Source: Google Maps Streetview

2.2.6 Mitchell Highway

Mitchell Highway forms part of the arterial road network and runs from Dubbo in the north to Bathurst to the south. In the vicinity of the WNSF, Mitchell Highway has a north-south alignment and forms priority-controlled intersections at Goolma Road and Saxa Road.

Mitchell Highway is a state road providing access from the WNSF to Wellington town centre. Access to the WNSF via Mitchell Highway is provided through its intersection with Cob Saxa bora Road south-west of the site and its intersection with Goolma Road south of the site.

Mitchell Highway has the following key features within proximity of site as outlined in Table 2-5 and shown in Figure 2-7.

Table 2-5 Mitchell Highway key features

Feature	Description
Carriageway	Undivided carriageway, with typically one travel lane in each direction. An additional turning lane is provided in both directions on the approach to Saxa Road and a right turn lane from Mitchell Highway northbound into Goolma Road.
Parking	Unrestricted
Speed Limit	110 km/h with 80 km/h in the southbound direction near its intersection with Saxa Road and Goolma Road.
Pedestrian Facilities	No dedicated pedestrian facilities
Bicycle Facilities	No dedicated bicycle facilities
Public Transport	No dedicated public transport facilities within the vicinity of the site. Nearest bus stops are located on Mitchell Highway near Gobolion Street, on both sides of the road.

Figure 2-7 Mitchell Highway, west of the site (looking west)

Source: Google Maps Streetview

2.3 Existing road network performance

This section provides an understanding of the traffic volumes on the key roads in proximity to the subject site.

2.3.1 Base (2018) traffic volumes

In order to identify the existing traffic volumes in proximity to the site, seven-day tube count was undertaken by Matrix Traffic and Transport Data between 28 February and 6 March 2018 at the following three locations, as shown in Figure 2-8.

- Saxa Road (approximately 500 m north of Bela Vista Lane).
- Goolma Road (approximately 300 m south of the access point to the Wellington and Macquarie Correction Centres).
- Campbells Lane (approximately 400 m west of Goolma Road – approximately mid-way between property access and 90 degree curve in the road).

During the 2018 base traffic surveys, the following projects were either in operation, construction or planned for construction within the proximity of the WNSF:

- Bodangora Wind Farm.
- Macquarie and Wellington Correctional Centres.
- Maryvale and Wellington Solar Farms.

The traffic survey volumes on the adjoining road network to the WNSF carried out in February/March 2018 would have included the operation and construction of the existing Macquarie and Wellington Correctional Centres and the construction activity of the Bodangora Wind Farm. Since the completion of these traffic surveys, Macquarie and Wellington Correctional Centres remain in operation and Bodangora Wind Farm has been completed. Bodangora Wind Farm operational traffic impacts would be lighter than construction traffic impacts as outlined in the NSW Bodangora Wind Farm Bodangora, Central Western NSW (MP 10_0157) Director-General's Environmental Assessment Report by NSW Government Planning and Infrastructure, dated June 2013. Therefore the 2018 survey is anticipated to represent a higher than typical traffic volume along Goolma Road. There have been no significant developments that may contribute to an increase in traffic flows along Saxa Road and Campbells Lane and therefore the 2018 survey data is anticipated to reflect typical traffic volumes along these road networks.

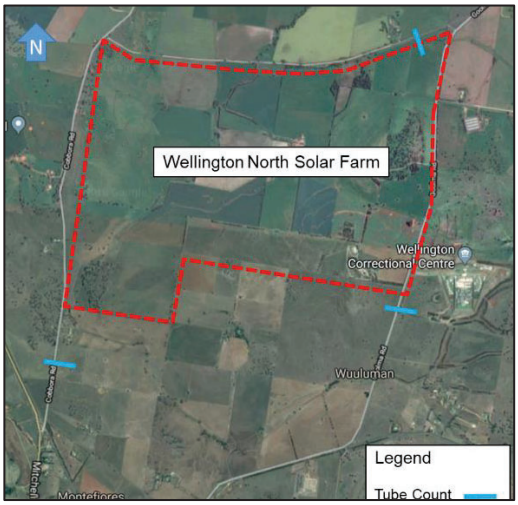


Figure 2-8 Traffic survey locations

Source: Google Maps – Modified by GHD

2.3.1.1 Saxa Road traffic volumes

The identified daily traffic volumes on Saxa Road is shown in Figure 2-9 with the surveyed weekday average and seven day average (weekday and weekend) in Figure 2-10.

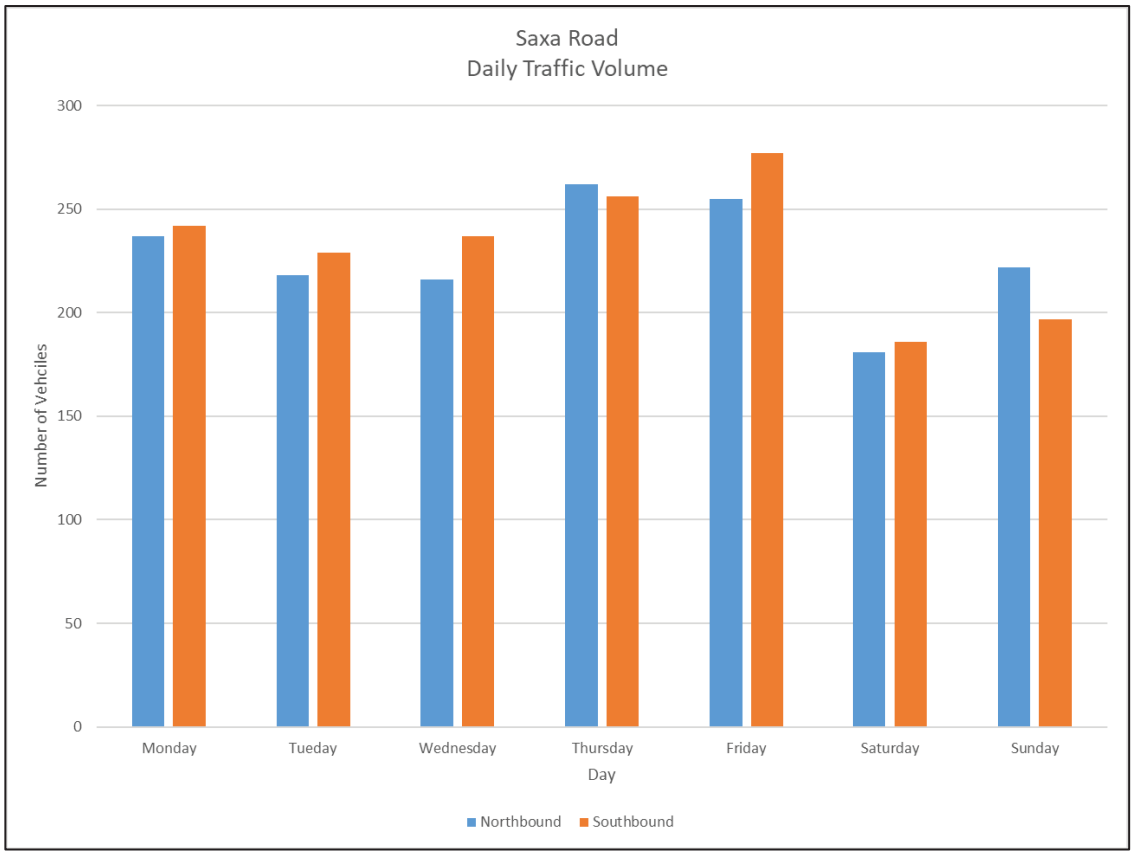


Figure 2-9 Daily traffic volumes on Saxa Road

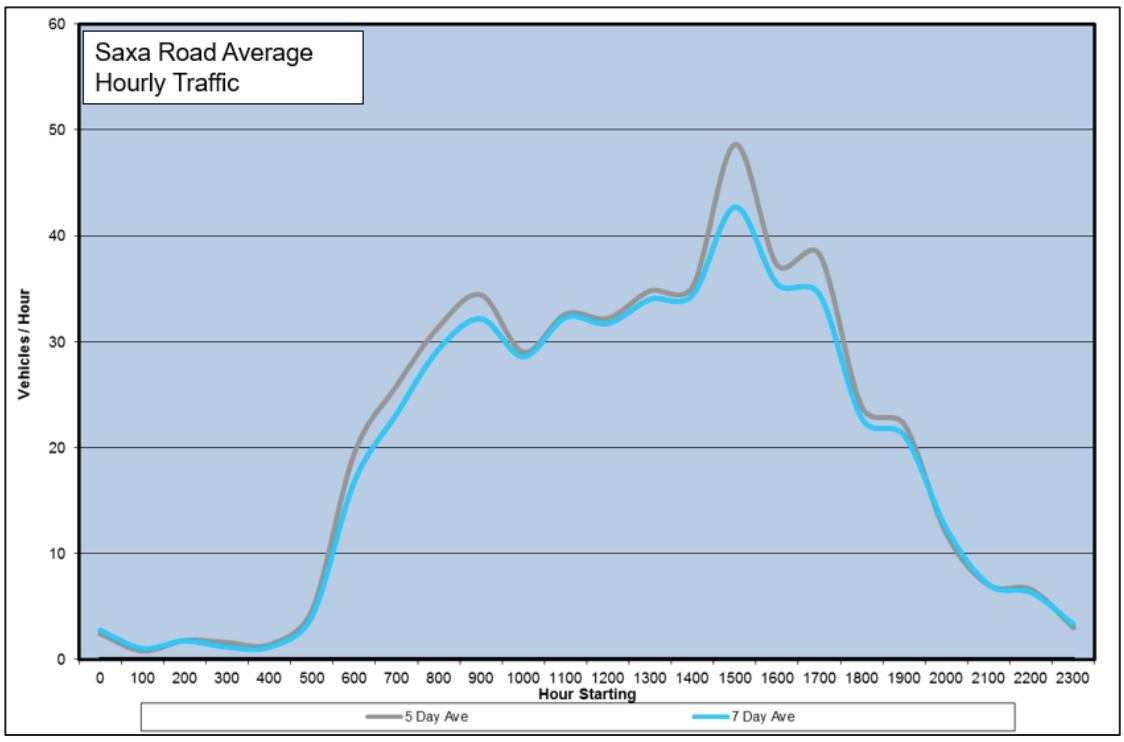


Figure 2-10 Weekday and seven day average hourly traffic profile on Saxa Road (two-way)

Table 2-6 outlines the highest recorded vehicle movements within an hour period during the AM and PM periods, while Table 2-7 surmises 85 percentile traffic speeds and the percentage of heavy vehicles on Saxa Road.

Table 2-6 Peak hour average surveyed traffic volume on Saxa Road

Saxa Road	Average Weekday AM Peak Hour (veh/h)*	Average Weekday PM Peak Hour (veh/h)*	Saturday Peak Hour (veh/h)*
Northbound	20	19	16
Southbound	14	29	20
Total	***34***	***49***	***36***

Notes:
(*) veh/h = vehicles per hour

Table 2-7 Key traffic data summary on Saxa Road

Key Data Description	Amount
Weekday % Heavy Vehicles	25 %
Weekend % Heavy Vehicles	12 %
85 percentile speed	98.1 km/h

The above traffic data is representative of typical traffic flow and conditions to align with hierarchy of a regional / local road network as described in section 2.2.1.

2.3.1.2 Goolma Road traffic volumes

The identified daily traffic volumes on Goolma Road is shown in Figure 2-11 with the surveyed weekday average and seven day average (weekday and weekend) in Figure 2-12.

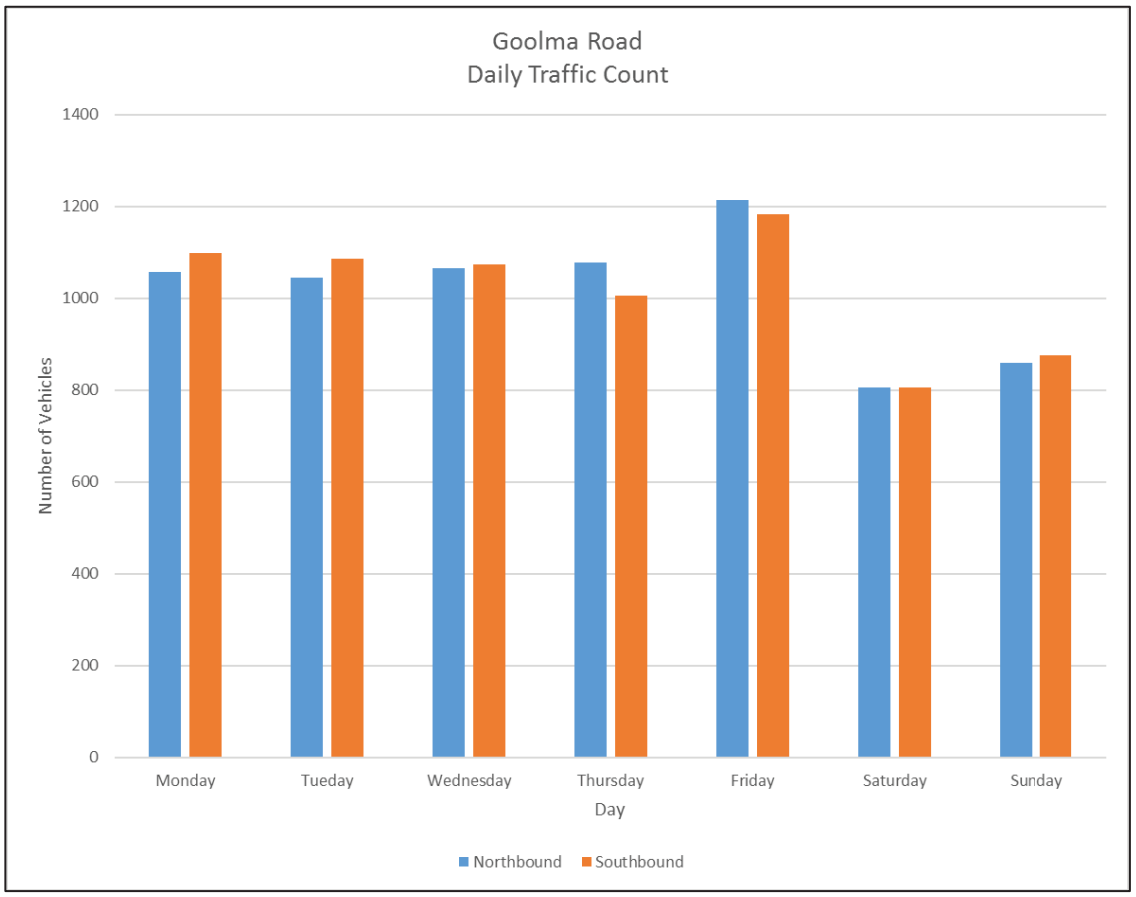


Figure 2-11 Daily traffic volumes on Goolma Road

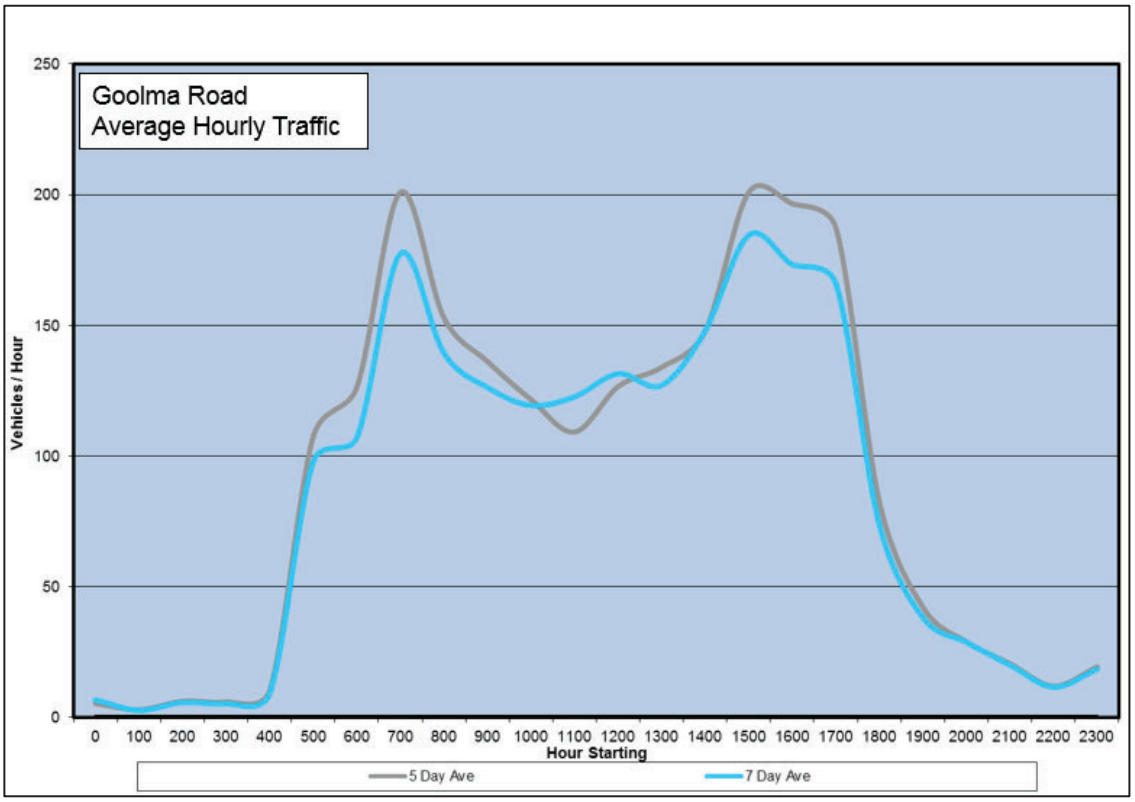


Figure 2-12 Weekday and seven day average hourly traffic profile on Goolma Road (two-way)

Table 2-8 outlines the highest recorded vehicle movements within an hour period during the AM and PM periods, while Table 2-9 surmises 85 percentile traffic speeds and the percentage of heavy vehicles on Goolma Road.

Table 2-8 Peak hour average surveyed traffic volume on Goolma Road

Goolma Road	Average Weekday AM Peak Hour (veh/h)*	Average Weekday PM Peak Hour (veh/h)*	Saturday Peak Hour (veh/h)*
Northbound	157	66	57
Southbound	44	135	94
Total	***201***	***201***	***151***

Notes:
(*) veh/h = vehicles per hour

Table 2-9 Key traffic data summary on Goolma Road

Key Data Description	Amount
Weekday % Heavy Vehicles	18 %
Weekend % Heavy Vehicles	11 %
85 percentile speed	104.7 km/h

The above traffic data is representative of typical traffic flow and conditions to align with the hierarchy of a regional / collector road network as described in section 2.2.1.

2.3.1.3 Campbells Lane traffic volumes

The identified daily traffic volumes on Campbells Lane is shown in Figure 2-13 with the surveyed weekday average and seven day average (weekday and weekend) in Figure 2-14 .

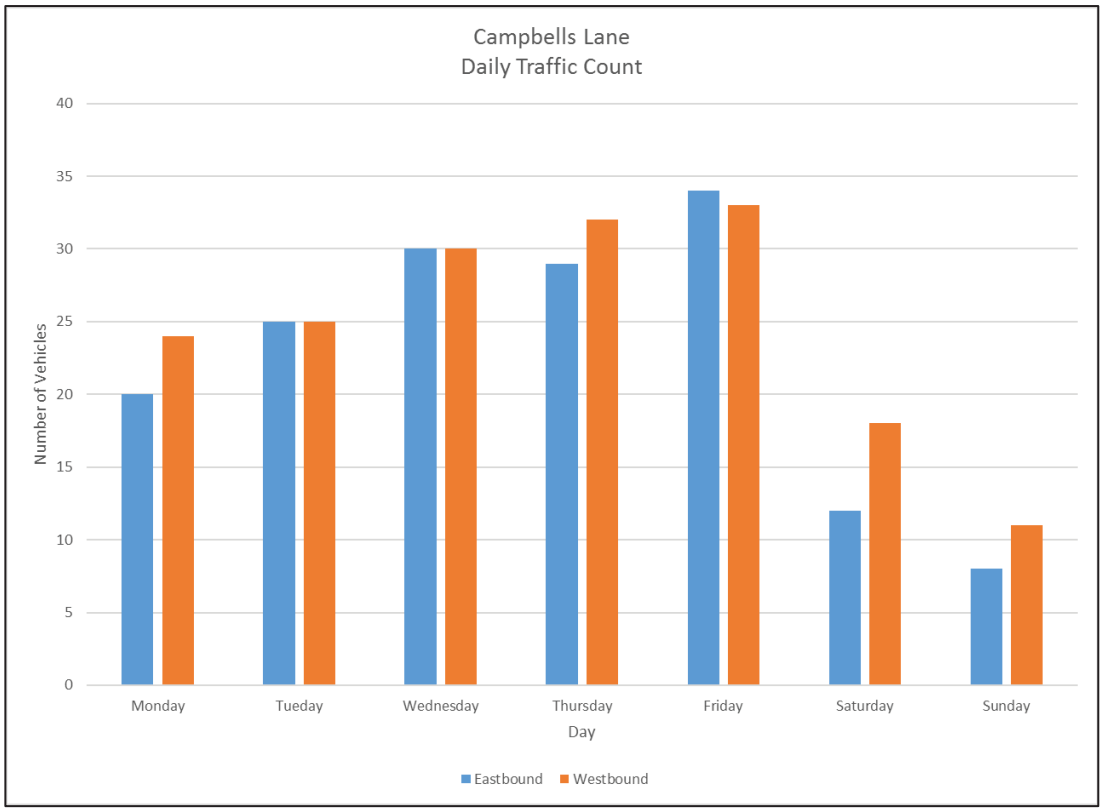


Figure 2-13 Daily traffic volumes on Campbells Lane

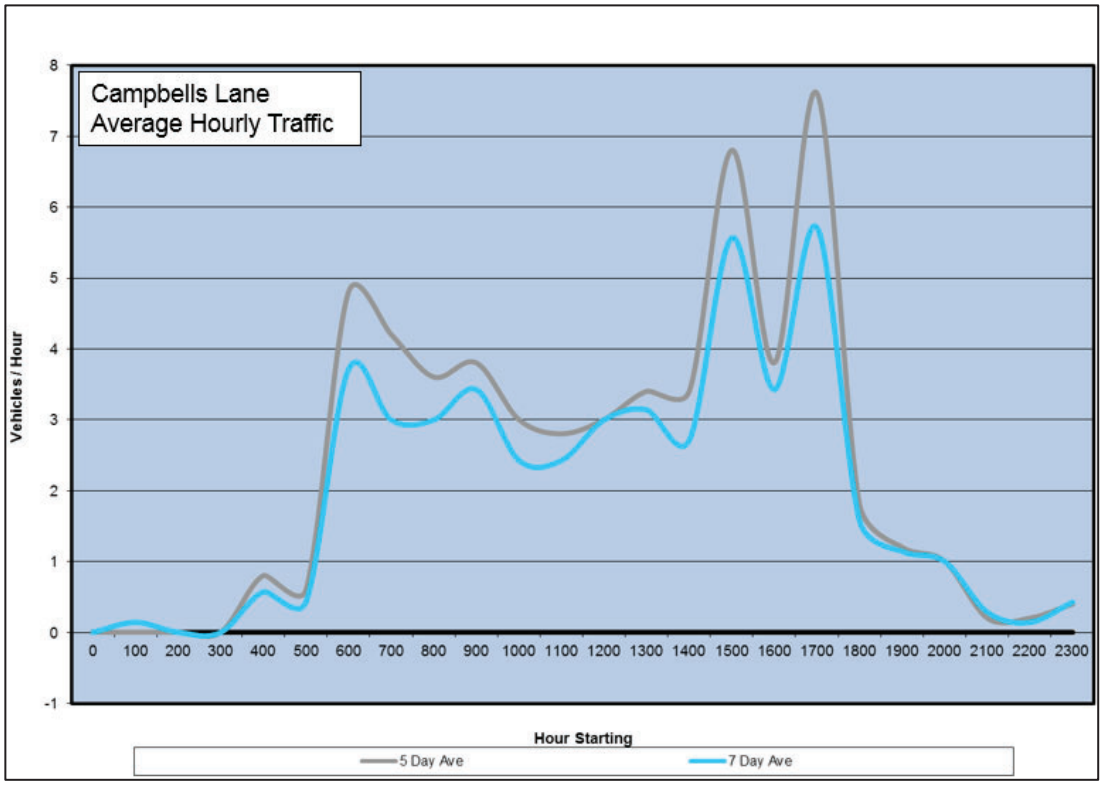


Figure 2-14 Weekday and seven day average hourly traffic profile on Campbells Lane (two-way)

Table 2-10 outlines the highest recorded vehicle movements within an hour period during the AM and PM periods, while Table 2-11 surmises 85 percentile traffic speeds and the percentage of heavy vehicles on Campbells Lane.

Table 2-10 Peak hour average surveyed traffic volume on Campbells Lane

Campbells Lane	Average Weekday AM Peak Hour (veh/h)*	Average Weekday PM Peak Hour (veh/h)*	Saturday Peak Hour (veh/h)*
Eastbound	4	3	1
Westbound	1	5	4
Total	***5***	***8***	***5***

Notes:
(*) veh/h = vehicles per hour

Table 2-11 Key traffic data summary on Campbells Lane

Key Data Description	Amount
Weekday % Heavy Vehicles	12 %
Weekend % Heavy Vehicles	7 %
85 percentile speed	91.9 km/h

The above traffic data is representative of typical traffic flow and conditions to align with the hierarchy of a local road network as described in section 2.2.1.

2.4 Crash data review

GHD utilised the Transport for NSW Centre for Road safety website to review the crash statistics for a five-year period (2015-2019) for roads within proximity of the proposed WNSF.

Crash locations on Goolma Road and Saxa Road near the proposed WNSF are shown in Figure 2-15

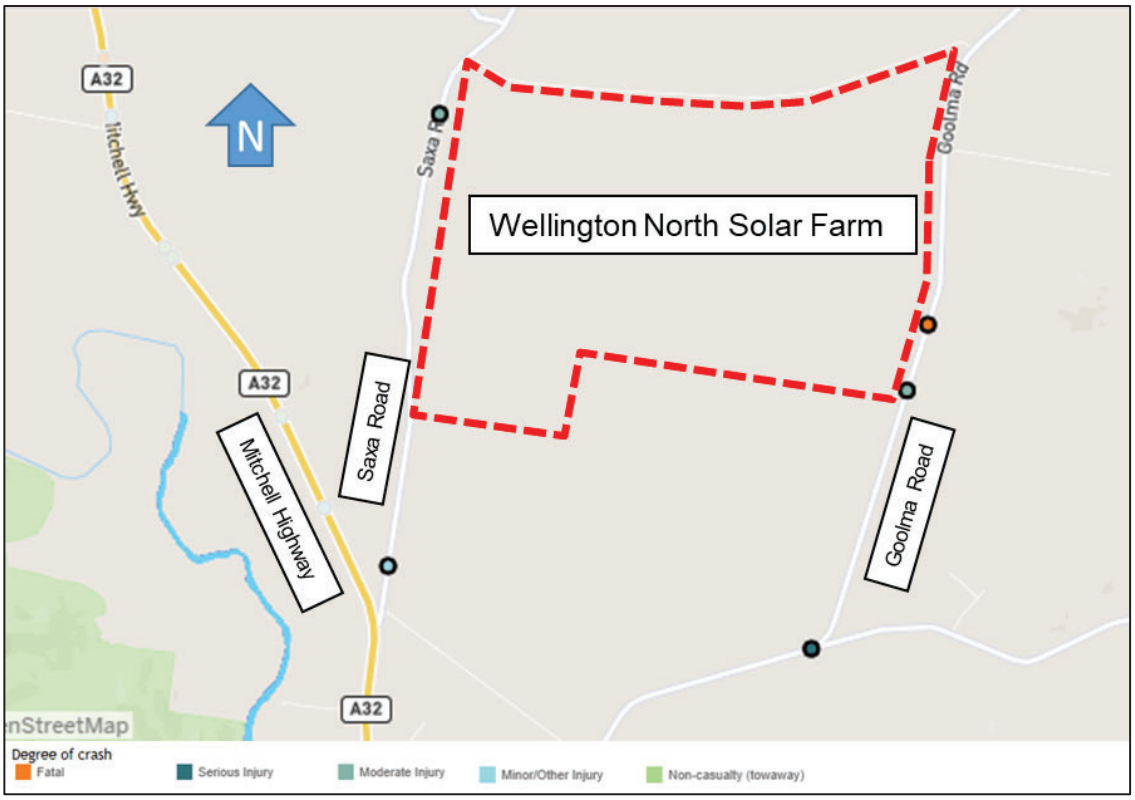


Figure 2-15 Study area crash data

Source: Transport for NSW Centre for Road Safety – Modified by GHD

There was a total of five (5) crashes recorded within proximity to the WNSF over the five year period between 2015 – 2019. Of the five crashes, three (3) were recorded on Goolma Road and two (2) was located on Saxa Road. All recorded crashes occurred within the daylight period and summarised by crash type in Table 2-12.

Table 2-12 Crash summary

Location	Rum Code	Description	Number of Injuries	Degree of crash injury
Goolma Road	40	U-Turn	3	Moderate
	71	Vehicle steered off road to the left and struck an object	1 fatal 2 others	Fatal
	47	Vehicle emerging from driveway	1	Moderate
Saxa Road	55	Vehicle pulling out resulting in rear end	1	Moderate
	32	Rear end	1	Minor/other injury

2.5 Public and active transport

Given the rural nature of the location, there are no formalised pedestrian or cycle facilities on the road network surrounding the site.

Wellington Railway Station, located approximately 7 km south of the site, is serviced by regular train services to Dubbo, Orange, Bathurst, Lithgow and Sydney. Charter coach services also operate between Wellington and major centres.

A local bus service (TLDW – Wellington to Dubbo) operates around the town of Wellington, as shown in Figure 2-16, operates four daily services Monday to Friday.

There are no public transport services that run along Goolma Road or Saxa Road to the site. Accordingly, the vast majority of trips generated by the construction activity and workers are expected to occur using private vehicles or arranged coach / transport services to and from the site. There are three designated school bus routes that run within proximity of the site, as shown in Figure 2-17.

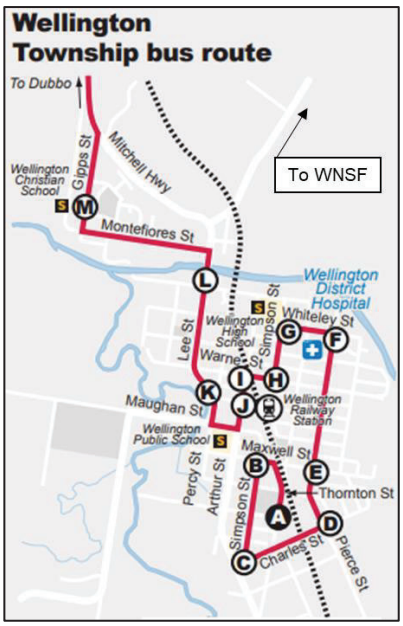


Figure 2-16 Wellington Town Centre bus route

Source: Ogden Coach Services – Modified by GHD

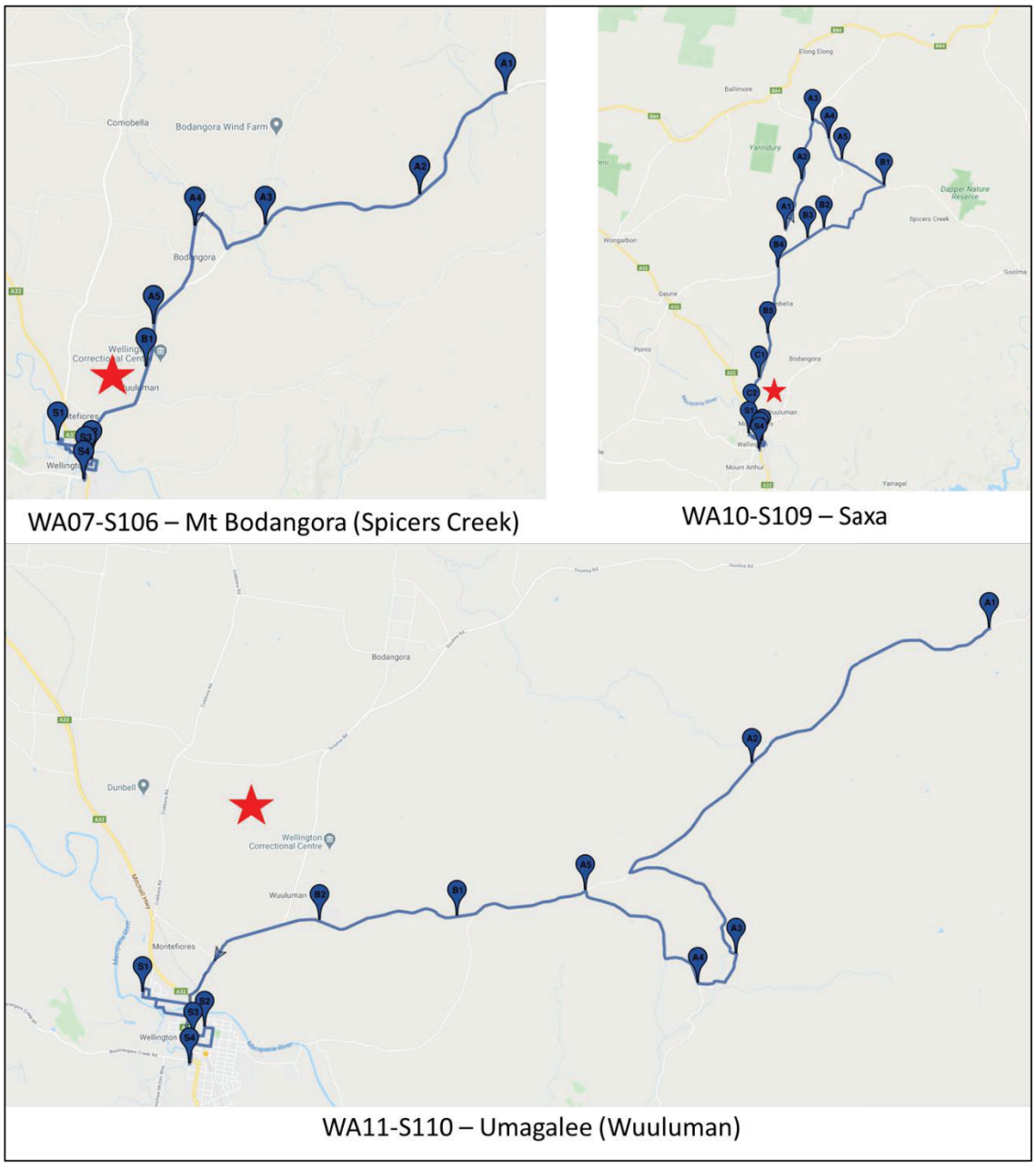


Figure 2-17 School bus routes

Source: Ogden Coach Services – Modified by GHD

3. Traffic impact assessment

This section of the report provides details and assessment of the estimated traffic generation during the construction of the WNSF, based upon estimated staffing numbers and heavy vehicle movements. Vehicle movements were estimated by Lightsource bp based on a review of actual construction traffic generation across its Australian portfolio and extrapolated based of the data to reflect WNSF potential trip generation during construction.

Construction activity is proposed to operate from 7 am to 6 pm Monday to Friday, and 8 am to 1 pm Saturday. No construction activity will occur on Sunday and public holidays without prior approval. However, it is noted that during the COVID-19 pandemic, the permitted construction hours have been granted an exemption on the nearby Wellington Solar Farm, with construction activity permitted 7 am to 6 pm, seven days per week. This might be replicated at the WNSF.

The internal access and parking arrangement for the proposal are currently unknown and have therefore, has not been assessed as part of the traffic study.

3.1 Wellington North Solar Farm life cycle overview

The WNSF is expected to proceed through mobilisation, construction, commissioning, operation and decommissioning stages typical of Photovoltaic (PV) generation facilities.

Mobilisation would be expected to occur for the first 1-3 months of the project delivery timeframe and traffic movements might include:

- Light vehicles to mobilise workers (daily) to and from site.
- Shuttle bus services to facilitate workers to and from the site on a daily basis from nearby population centres (i.e. Wellington, Dubbo and Orange).
- Delivery of infrastructure including temporary offices and associated equipment, power generation equipment, ablutions.
- Delivery of equipment and machinery for civil construction, clearing (if required) and general site establishment.
- Delivery of structural components and some PV equipment.

More intense construction would be expected to follow during months 3-14 to achieve mechanical completion with the following traffic movements:

- Light vehicles to mobilise workers (daily) to and from site – numbers ramping up from mobilisation.
- Shuttle bus services to facilitate workers to and from the site on a daily basis from nearby population centres (i.e. Wellington, Dubbo and Orange).
- Delivery of equipment and machinery for structural, electrical and civil construction activities.
- Ongoing delivery of PV and electrical equipment including deliveries of major equipment such as inverters, switchgear, transformer etc.
- Trucks for removal of waste.

Following mechanical completion, the site will move into a commissioning phase estimated from months 15-18 where equipment deliveries are significantly reduced and the workforce is also reduced. During commissioning the majority of traffic would be expected to be light vehicles for personnel movement.

Following commissioning the site will move to operations phase which would be expected to extend for the life of the asset with very limited light vehicle movements predominately for routine operations and maintenance personnel and activities.

At the end of the useful life of the asset, it is envisaged that decommissioning would take place which would involve mobilisation of a workforce and additional temporary facilities, and then move to the removal of equipment and infrastructure. At this time it is expected that significant movements of light vehicles and trucks for transporting waste will occur. The decommissioning phase would be expected to last less than eight months.

3.2 Construction traffic generation

3.2.1 Daily traffic

Daily construction traffic generation provided by Lightsource bp was based upon the current construction activity across Lightsource bp's Australian portfolio and extrapolated to be representative of the WNSF.

During its peak construction period, consideration was given to the workforce (consisting of some 400 workers) will be transported to and from the site and nearby population centres (i.e. Wellington, Dubbo and Orange) via a shuttle bus system. Such system aims to reduce traffic generation within the surrounding road network, reduction of parking demand on site and improved safety for the workers and the public, by reducing the fatigue of workers that would generally be required to drive between accommodation and the site.

Based on the information estimated by the client, the daily vehicle two-way trips outlined for the project during the peak construction activity is summarised in Table 3-1

Table 3-1 Peak daily trip generation (two-way)

Vehicle Type	Number of Trips (two-way)
Light Vehicles	132
Staff Shuttle Buses	80
Heavy Vehicles	55
Total	***267***

The client has advised that at the peak of the construction, it is anticipated that up to 400 site personnel will be required to undertake the works. They have advised that a shuttle bus system will be in place to transport workers to the site consisting of a typically 20-seater buses. Based on an anticipated modal split of 80 percent of the workers travelling by shuttle bus, it is estimated that this could generate 16 inbound and 16 outbound trips during each of the AM and PM peak periods. The remaining 20 percent of workers travelling by private means could potentially car-pool. Assuming a rate of 1.2 persons per private vehicle, it is anticipated that such would generate up to 66 inbound trips in the AM peak period and visa-versa in the PM peak period (total of 132 daily trips).

Heavy vehicle movements will be spread throughout the day.

3.2.2 Peak hourly traffic generation and distribution

For a worst-case scenario for the impacts of the road network, it has been assumed that the peak traffic associated with construction activity would be during the arrival and departures of the site workers and occur within the road network AM and PM peak hour period. However, while the assessment has been undertaken with comparison to the road network peak periods, it is noted that staff arrival and departure pattern may not necessarily coincide with the road network peak.

It is expected that the heavy vehicle movements (55 two-way trips) generated by the construction activity would be spread throughout the day with up to 6 (approximately 10 percent) two-way trips occurring within the same peak hour of the workers arrival and departure period.

Lightsource bp has advised that all construction traffic is proposed to arrive and depart at the location of the existing domestic driveway access on Goolma Road located on the eastern site boundary (approximately 195 m south of the entry to Wellington Correctional Centre). Travel to the Goolma Road is via the Mitchell Highway located south to the site (to/from Wellington).

The 2018 peak hour AM and PM movements and construction traffic approach routes trip generation within the vicinity of the site access are outlined in Figure 3-1 and Figure 3-2, respectively. The AM and PM peak hour has been reviewed for a worst-case scenario.

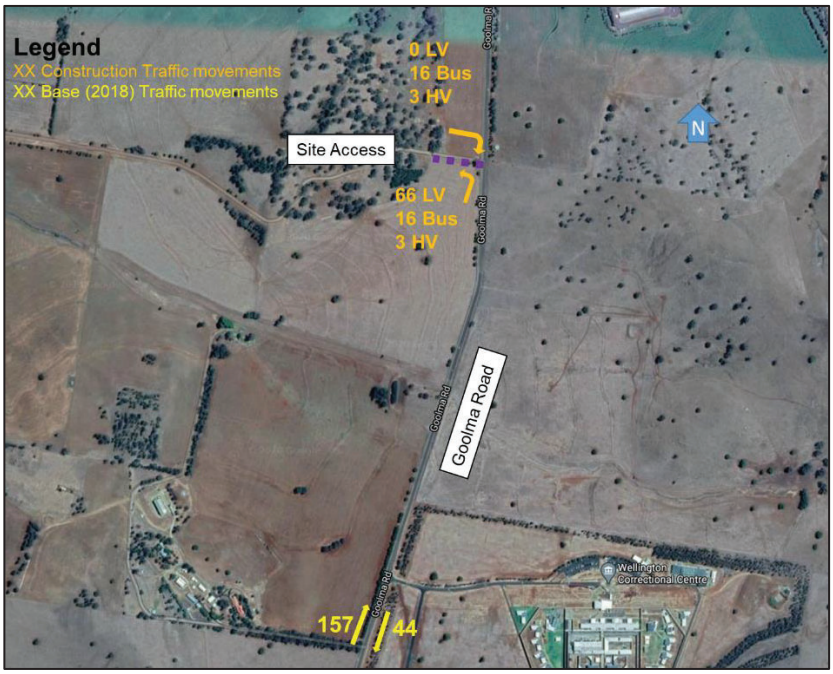


Figure 3-1 AM peak hour construction vehicle movements

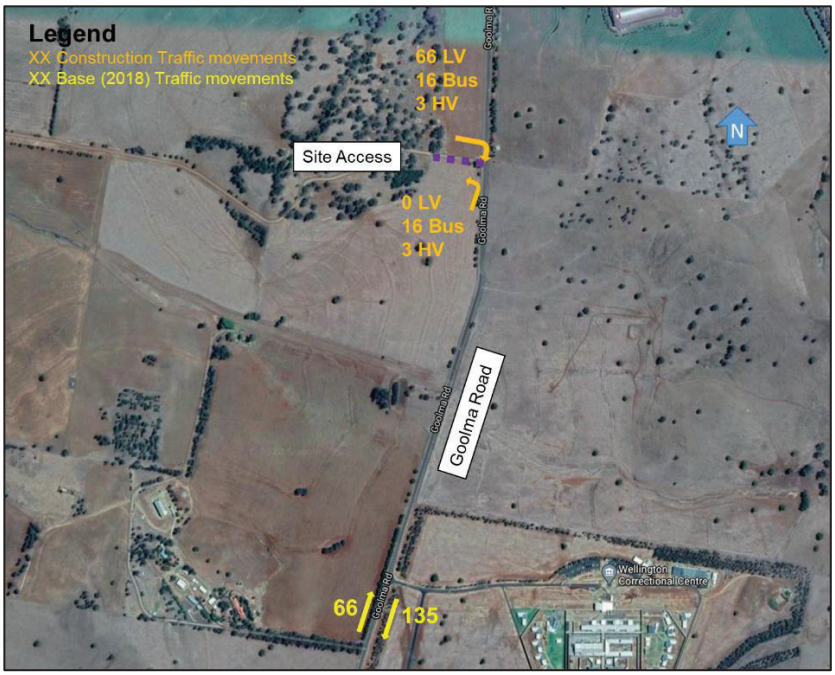


Figure 3-2 PM peak hour construction vehicle movements

3.3 Mid-block assessment

Based on the above information summary of estimated construction vehicle movements, a review of the existing peak traffic and combined construction movement was undertaken with reference to Roads and Maritime Services Guide to Traffic Generating Developments (2002). This outlines mid-block road capacity Levels of Service based on traffic flows per direction per lane to guide road capacity Level of Service as outlined in Table 3-2.

Table 3-2 Mid-block level of service (peak flows per direction)

Level of Service	Peak Hour Volume (veh/h*) One Lane	Peak Hour Volume (veh/h*) Two Lane
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

Source: Guide to Traffic Generating Developments (Roads and Maritime Services 2002)

**Note veh/h = vehicles per hour*

Table 3-3 outlines the Level of Service of the road network with respect to the mid-block level of service.

Table 3-3 Peak hour mid-block level of service

Location	Base (2018) vehicles (each-way)	Additional vehicles (each-way)	Total Vehicles (each-way)	Level of Service
AM peak hour				
Goolma Road				
- Northbound	157	85	242	B
- Southbound	44	19	63	A
Total	*201*	*104*	*305*	
PM peak				
Goolma Road				
- Northbound	66	19	85	A
- Southbound	135	85	220	B
Total	*201*	*104*	*305*	

The above review shows that the mid-block level of service is good. However, it is recommended that the existing road environment pavement conditions be reviewed within the proximity of the site and access configuration.

3.4 Site access intersection treatment

3.4.1 Turn treatment

The *Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections* provides warrants that apply to major road turn treatments with respect to the provision of basic, auxiliary and channelised lanes along the major road. For the purpose of this assessment, the graph for a speed of higher than or equal to 100 km/h has been applied.

A review was undertaken at the intersection of Goolma Road and the proposed site access as shown in Figure 3-3. This was established on the base 2018 traffic survey and the construction traffic volumes, notably for the left turn movement from the major road (considered as the worst turn movement) as vehicles will be arriving from the south during the AM period. Vehicles

exiting the site (primarily in the PM period) will exit via the access road (minor road) and will be required to give way to through travelling vehicles along Goolma Road. Any such queuing that may result, will be within the site and any proposed intersection upgrade is to ensure suitable visibility is maintained from the site, refer to section 3.4.2.

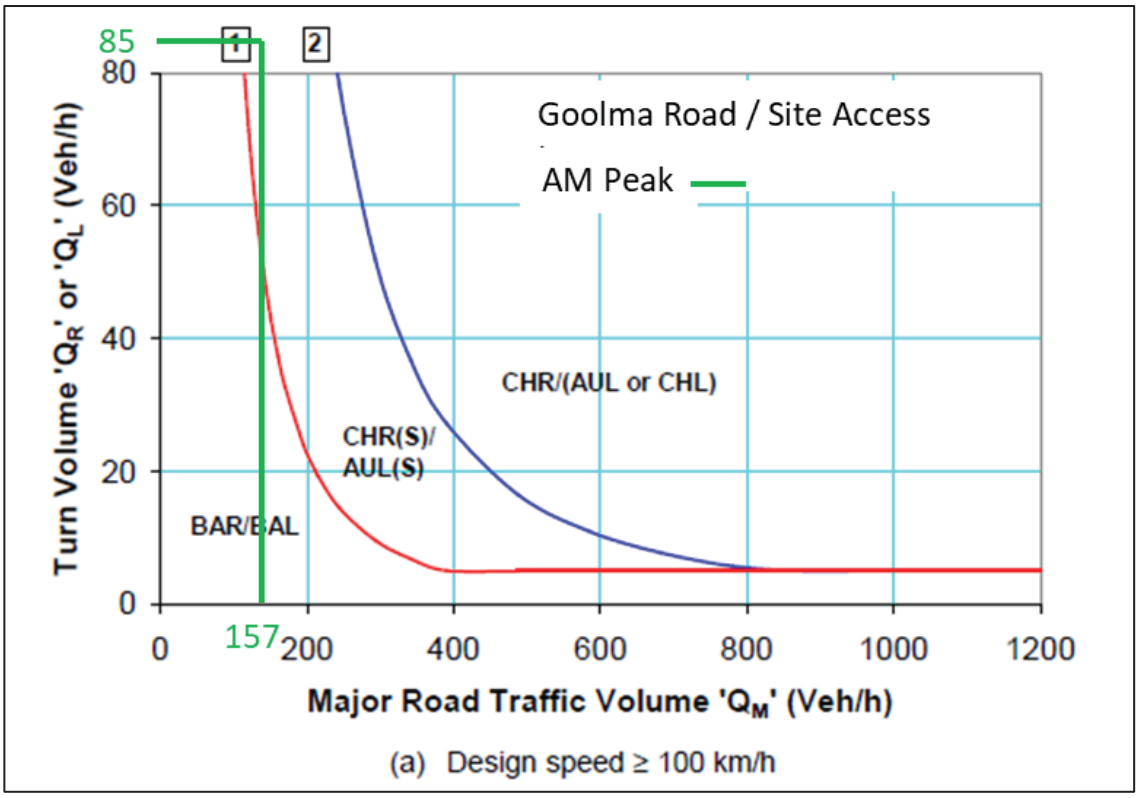


Figure 3-3 Intersection left turn treatment review

Source: Austroads Guide to Road Design – Part 4A: Unsignalised and Signalised Intersections – modified by GHD -

Based on the warrants, it is supposed that consideration could be given to the provision of a short auxiliary left turn lane (AUL(S)) from Goolma Road into the site. Although it is anticipated that all vehicles will be travelling to and from the south, incorporating shoulder widening on the eastern verge (i.e. BAR type treatment) would facilitate improved safety for southbound movement as well as facilitating the turn path of larger vehicles exiting the site, if required.

In conjunction with the AUL(S)/BAR treatment, it is recommended to advise travelling motorists of the potential increase in turning movements at the site access. This may incorporate truck-turning advance warning signs provided on both the northern and southern approaches to the intersection.

Currently, the site access intersection does not provide the AUL(S)/BAR treatment, with no shoulder or road widening provided on the major road. It is considered that Goolma Road, at the site access, be constructed in line with an AUL(S)/BAR treatment as shown in Figure 3-4. This is to include an auxiliary lane and shoulder widening on the western and eastern road alignment, respectively.

The treatments should be designed to accommodate articulated vehicles up to 19 m in length (anticipated typical maximum vehicle length). Larger vehicles will require special permit and traffic management when required.

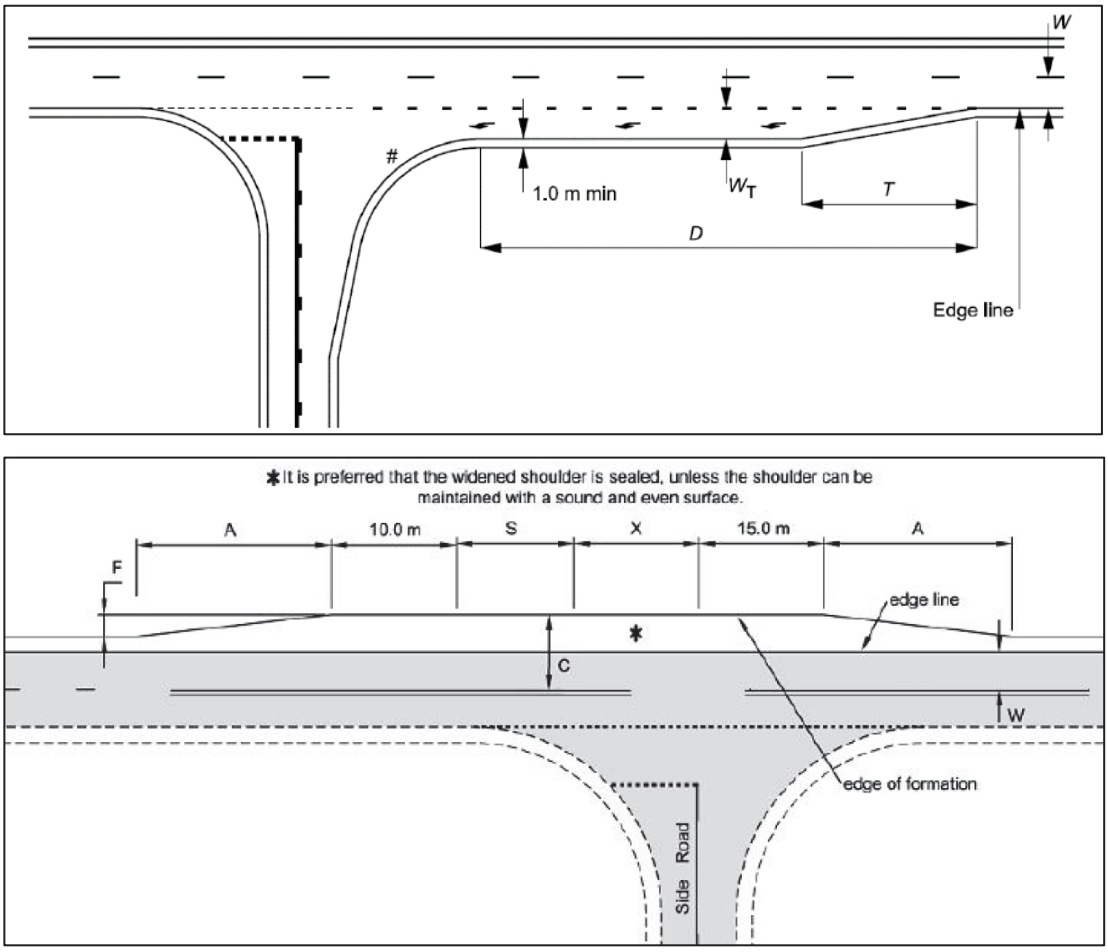


Figure 3-4 AUL(S)/BAL turn treatments

Source: Austroads Guide to Road Design – Part 4A: Unsignalised and Signalised Intersections -

3.4.2 Sight lines

The Austroads *Guide to Road Design Part 3: Geometric Design* (Table 5.5: Truck stopping sight distances) specifies that (accounting for a reaction time of two seconds) for roads with an operating speed of 100 km/h, a minimum sight distance of 191 metres should be provided. A desktop review using Google imagery indicates that these sight lines can be achieved. This would be subject to further assessment when developing a concept and detailed intersection plan and review of current on-site conditions (e.g. vegetation growth).

3.5 Oversize vehicles

The number of oversize vehicles is anticipated to be low for the construction of the WNSF. Oversize vehicles will require permits from Transport for NSW and suitable traffic management subject to the transportation of the type of oversized vehicles that will need to be used. Oversize vehicle routes are to be carried out where possible on designated heavy vehicle routes or routes approved by Transport for NSW. It is proposed that such routes will be via the Golden Highway (north of the site) or the Mitchel Highway (south of the site), Goolma Road and the site access.

Additionally, oversize traffic movements should be carried out, where possible, outside peak road network periods where possible minimising the impacts on the road network.

An example of the potential oversize vehicle that would be required to transport the transformers is a flatbed trailer as shown in Figure 3-5. The vehicle type and its size are to be coordinated to be suitable for transportation of the plant and agreed with the governing authority. Swept paths should be assessed during (re)design of intersections and accesses.

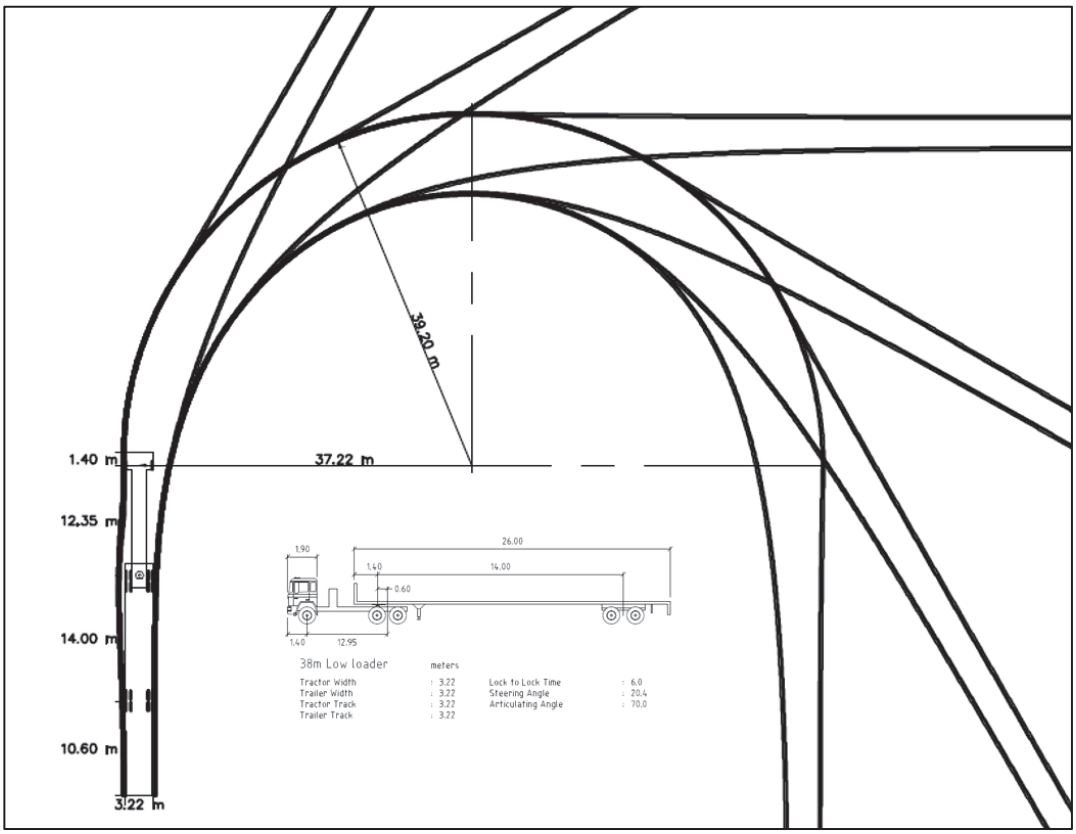


Figure 3-5 Oversized vehicle example

Source: AutoTurn computer aided program

3.6 Cumulative construction traffic impacts

During the 2018 base traffic surveys, the following projects were either in operation, construction or planned for construction within the proximity of the WNSF.

- Bodangora Wind Farm.
- Macquarie and Wellington Correctional Centres.
- Maryvale and Wellington Solar Farms.

The traffic surveys volumes on the adjoining road network to the WNSF carried out in February/March 2018 would have included the operation and construction of the existing Macquarie and Wellington Correctional Centres and the construction activity of the Bodangora Wind Farm. Since the completion of these traffic surveys, Macquarie and Wellington Correctional Centres remain in operation and Bodangora Wind Farm has been completed. Bodangora Wind Farm operational traffic impacts would be lighter than construction traffic impacts as outlined in the NSW Bodangora Wind Farm Bodangora, Central Western NSW (MP 10_0157) Director-General's Environmental Assessment Report by NSW Government Planning and Infrastructure, dated June 2013e. Therefore the 2018 survey represents a higher-than-typical traffic volume along Goolma Road.

During the construction of the WNSF, the Wellington Solar Farm is anticipated to be completed, with Maryvale Solar Farm and the recently submitted Uungula Wind Farm due for construction (commencement of construction in late 2021). Such construction of these facilities could coincide with the WNSF construction activities.

Locations of the existing and future facilities within proximity of the WNSF are shown in Figure 3-6.

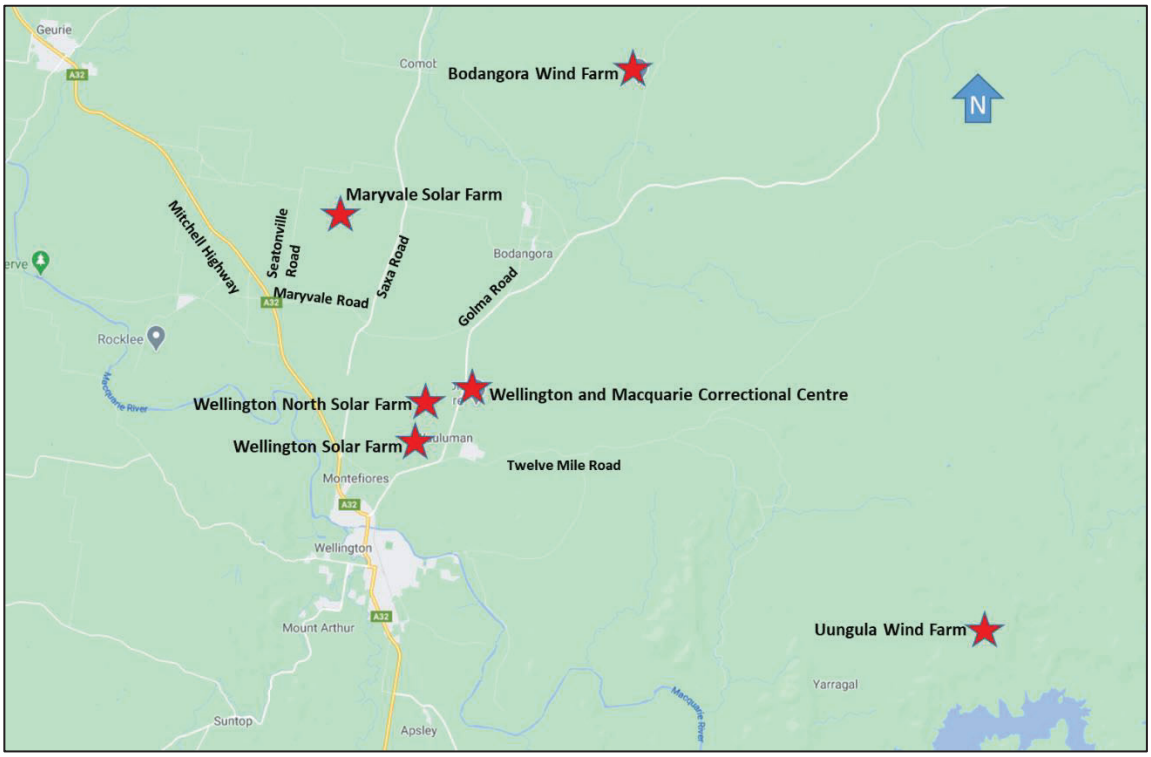


Figure 3-6 Existing and future facilities within proximity of Wellington North Solar Farm

Source: Google Maps – Modified by GHD

A summary of the traffic impacts associated with the construction activity of the facilities that may occur concurrently with WNSF is summarised below.

Maryvale Solar Farm

Source: Maryvale Solar Farm Environmental Impact Statement prepared by Pitt & Sherry Pty Ltd dated 12 November 2018.

- Access routes within vicinity of the WNSF site include:
  - Mitchell Highway from Dubbo to Wellington.
  - Saxa Road and Maryvale Road.
  - Maryvale Solar Farm site Access off Seatonville Road.
- Period of construction: 12 months.
- Staff numbers: Up to 150 personnel.
- Estimated typical vehicle movements:
  - Light vehicles: 75 vehicle movements per day.
  - Heavy vehicles: 20 vehicle movements per day.
  - Use of a shuttle bus for workers to travel to and from site.

It is noted that construction vehicle activity is to utilise Saxa Road to access the site. The WNSF proposes to use Goolma Road, and therefore it is anticipated that there will be no cumulative impacts on the local road network associated with these two sites.

However, it is noted that the construction activity for Maryvale Solar Farm and the proposed WNSF both utilise the Mitchell Highway as a common route to access each proposed development. The Mitchell Highway is a state-designated road which has the capacity to cater for regional and state traffic flow. It is considered that the cumulative impact from both proposed

development's construction activity will have a minimal adverse impact on the network efficiency of the state road network. This assumption is supported by the Department of Planning Environment Maryvale Solar Farm State Significant Development Assessment (SSD 8777) report dated December 2019, which outlines:

"Other than the Wellington North Solar Farm, no other approved or proposed project in the Wellington area shares a common haulage route, except for sections of Mitchell Highway, which is part of the State road network and has sufficient capacity to absorb the associated construction traffic. For this reason, the Department considers that there would be negligible cumulative traffic impacts on the State road network and no road upgrades would be required in relation to cumulative traffic volumes."

Uungula Wind Farm

Source: Uungula Wind Farm Transport Assessment prepared by Samsa Consulting dated April 2020.

- Access routes within vicinity of the WNSF site include:
  - From Golden Highway along Saxa Road (also known as Saxa Road to Michell Highway.
  - Mitchell Highway to Goolma Road.
  - Goolma Road to Twelve Mile Road.
  - Twelve Mile Road to the Uungula Wind Farm site.
- Period of construction: 24 to 30 months.
- Staff numbers: Up to 250 personnel.
- Estimated typical vehicle movements (Goolma Road):
  - Light vehicles: 240 vehicle movements per day (120 vehicles during peak hour).
  - Heavy vehicles: 90 vehicle movements per day (16 vehicles during peak hour).
  - Oversize/Overmass (OSOM) vehicles: Low volume and only on demand at specific times when required.
  - Possible use of a shuttle bus for workers to travel to and from site.

It is noted that the construction activity for Uungula Wind Farm and the proposed WNSF both utilise Goolma Road for a section between the Mitchell Highway and Twelve Mile Road.

A summary of the cumulative traffic impact on Goolma Road between the Mitchell Highway and Twelve Mile Road is outlined in Table 3-4 and is also compared to the mid-block level of service as defined in Table 3-2.

Table 3-4 Goolma Road cumulative peak hour mid-block level of service

Location	Base (2018) vehicles (each-way) *	Additional vehicles (each-way) WNSF	Additional vehicles (each-way) Uungula Wind Farm ^	Total Vehicles (each-way)	Level of Service
AM peak hour					
Goolma Road					
- Northbound	157	85	136	378	B
- Southbound	44	19	0	63	A
Total	*201*	*104*	*136*	*441*	
PM peak					
Goolma Road					
- Northbound	66	19	0	85	A
- Southbound	135	85	136	356	B
Total	*201*	*104*	*136*	*441*	

Notes:

(*) The 2018 traffic survey data which is located north of Twelve Mile Road. It is noted that Twelve Mile Road is a low volume road, it is therefore considered that the 2018 survey data can be representative of potential traffic volumes on Goolma Road south of Twelve Mile Road.

(^) Assumes all the Uungula Wind Farm peak hour traffic volumes from the Samsa Consulting Transport Assessment are inbound from Wellington in the AM peak and outbound to Wellington the PM peak.

Based upon the mid-block assessment of the road network and of the project traffic generation and the WNSF and cumulative impacts associated with Uungula Wind Farm, the major road network (Goolma Road) has additional capacity to cater for additional traffic flow.

With reference to the intersection of Goolma Road and Twelve Mile Road, the Uungula Wind Farm Transport Assessment prepared by Samsa Consulting outlined that:

"Under current traffic volumes, the current Goolma Road / Twelve Mile Road intersection layout (BAR: basic right-turn / BAL: basic left-turn) is considered to be adequate. Sight distance is more than satisfactory in all directions and the T-junction is quite wide with separate turn areas for east and west movements.

During Project construction, the increased traffic generation and in particular, the higher turning movements at the subject intersection may warrant auxiliary and/or protected (channelised) turn lane intersection treatments, eg. AUR: auxiliary right-turn / AUL: auxiliary left-turn or CHR: channelised right-turn / CHL: channelised left-turn"

It should be noted that the WNSF does not contribute to the higher turn movements within the intersection, with vehicles associated with WNSF travelling along the major road (Goolma Road) straight through the intersection.

3.7 Goolma Road / Mitchell Highway intersection performance

Transport for NSW requested in December 2020 that investigation be undertaken on the intersection performance of Goolma Road / Mitchell Highway under cumulative traffic conditions during construction, particularly in association with the review of the potential risk of vehicle queue exceeding the capacity for the right turn lane from Mitchell Highway into Goolma Road.

3.7.1 Intersection turn count survey

GHD engaged Matrix Traffic and Transport Data Pty Ltd to undertake intersection traffic turning counts on Thursday 10 December 2020 and Saturday 12 December 2020 during the following time periods:

- Weekday AM peak (3 hours): 6:00 am to 9:00 am.
- Weekday PM peak (3 hours): 3:30 pm to 6:30 pm.
- Saturday peak (3 hours): 9:30 am to 12:30 pm

The intersection traffic survey data is provided in Appendix A.

Analysis of the survey data identified the following peak hour periods:

- Weekday AM peak hour: 7:45 am to 8:45 am.
- Weekday PM peak hour: 4:00 pm to 5:00 pm.
- Saturday peak hour: 11:00 am to 12:00 pm.

3.7.2 Existing intersection performance

The criteria for evaluating the operational performance of intersections is provided by the Guide to Traffic Generating Developments (Roads and Maritime Services 2002) and reproduced in Table 3-5. The criteria for evaluating the operational performance of intersections is based on a qualitative measure (i.e. Level of Service (LoS)), which is applied to each band of average vehicle delay.

Table 3-5 Level of service criteria for intersections

Level of Service	Average Delay per Vehicle (seconds/veh)	Traffic Signals, Roundabouts	Give Way & Stop Signs
A	< 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays. Roundabouts require other control modes	At capacity, requires other control mode
F	> 70	Over Capacity Unstable operation	Over Capacity Unstable operation

Source: Guide to Traffic Generating Developments (Roads and Maritime Services 2002)

Existing (base 2020) traffic models were developed using the AM / PM weekday and Saturday peak hour surveyed data results. Existing traffic flows at Goolma Road / Mitchell Highway intersection were analysed using SIDRA 8 to obtain the current operating performance. A summary of the results is outlined in Table 3-6 (AM peak), Table 3-7 (PM peak) and Table 3-8 (Saturday peak).

Table 3-6 Existing intersection performance AM Peak (Existing) – Goolma Road / Mitchell Highway

Location	Base AM Peak			
	Deg. of Sat v/c	Average Delay (sec.)	Level of Service	95% Back of Queue (metres)
South: Mitchell Highway				
Right turn	0.05	6.1	A	2
East: Goolma Road				
Left turn	0.069	6.9	A	2
Right turn	0.011	13	A	1
North: Mitchell Highway				
Left turn	0.145	5.9	A	0

Notes:

- *The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.*
- *The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.*
- *The Deg. Sat. degree of saturation is defined as the ratio of the arrival flow (demand) to the capacity of each approach.*
- *Average delay is given in seconds per vehicle.*

Table 3-7 Existing intersection performance PM Peak (Existing) – Goolma Road / Mitchell Highway

	Base PM Peak			
	Deg. of Sat. v/c	Average Delay (sec.)	Level of Service	95% Back of Queue (metres)
South: Mitchell Highway				
Right turn	0.067	6	A	2
East: Goolma Road				
Left turn	0.122	6.7	A	4
Right turn	0.015	12	A	1
North: Mitchell Highway				
Left turn	0.131	5.9	A	0

- *The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.*
- *The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.*
- *The Deg. Sat. (degree of saturation) is defined as the ratio of the arrival flow (demand) to the capacity of each approach.*
- *Average delay is given in seconds per vehicle.*

Table 3-8 Existing intersection performance Saturday Peak (Existing) – Goolma Road / Mitchell Highway

	Base PM Peak			
	Deg. of Sat. v/c	Average Delay (sec.)	Level of Service	95% Back of Queue (metres)
South: Mitchell Highway				
Right turn	0.066	5.9	A	2
East: Goolma Road				
Left turn	0.066	6.4	A	2
Right turn	0.02	12.2	A	1
North: Mitchell Highway				
Left turn	0.116	5.9	A	0

- *The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.*
- *The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.*
- *The Deg. Sat. (degree of saturation) is defined as the ratio of the arrival flow (demand) to the capacity of each approach.*
- *Average delay is given in seconds per vehicle.*

The above SIDRA outputs indicate that each of the analysed intersection currently operates with an acceptable and satisfactory LoS (i.e. better than LoS E) with spare capacity in both the weekday morning and evening peak periods and Saturday peak period.

Mitchell Highway right turn lane queue length review (Existing)

A visual review of the video footage on the maximum queue in the southern approach right turn lane into Goolma Road was undertaken and compared to the SIDRA results to assist in calibration of the model. It was observed that the maximum queue length during the survey was in the order of approximately one to two vehicles, which is within the available storage of the right turn lane.

3.7.3 Cumulative impact intersection performance

Trip Generation and distribution

The trip generation associated with the WNSP and the Ungula Wind Farm has been totalled to show the cumulative impacts. A conservative distribution assumption has been adopted to review the right turn bay movements and associated queue on Mitchell Highway designated right turn lane. The analysis assumes that all traffic associated with the construction of WNSP and Ungula Wind Farm arrive from and depart to the southern approach of Mitchell Highway / Goolma Road intersection (i.e. all construction vehicles utilising the designated right turn lane on the Mitchell Highway). To account for medium to long heavy rigid vehicles (11.5 to 19 metres) generated by the construction activity, a passenger car unit (PCU) factor of 2.5 has been assumed for this road user class (User Class 5 as shown in Figure 3-7 to Figure 3-9). It has been assumed that the light vehicles and shuttle buses (bus) are associated with workers arriving to the sites during the AM peak and departing the site during the PM peak. No worker traffic flow movements (light vehicle and buses) have been applied at the intersection during the Saturday peak, as workers will already be on site during the Saturday road network peak period.

The cumulative construction traffic generation and distribution used for the SIDRA modelling assessment is shown in Figure 3-7 (AM peak), Figure 3-8 (PM peak) and Figure 3-9 (Saturday peak).

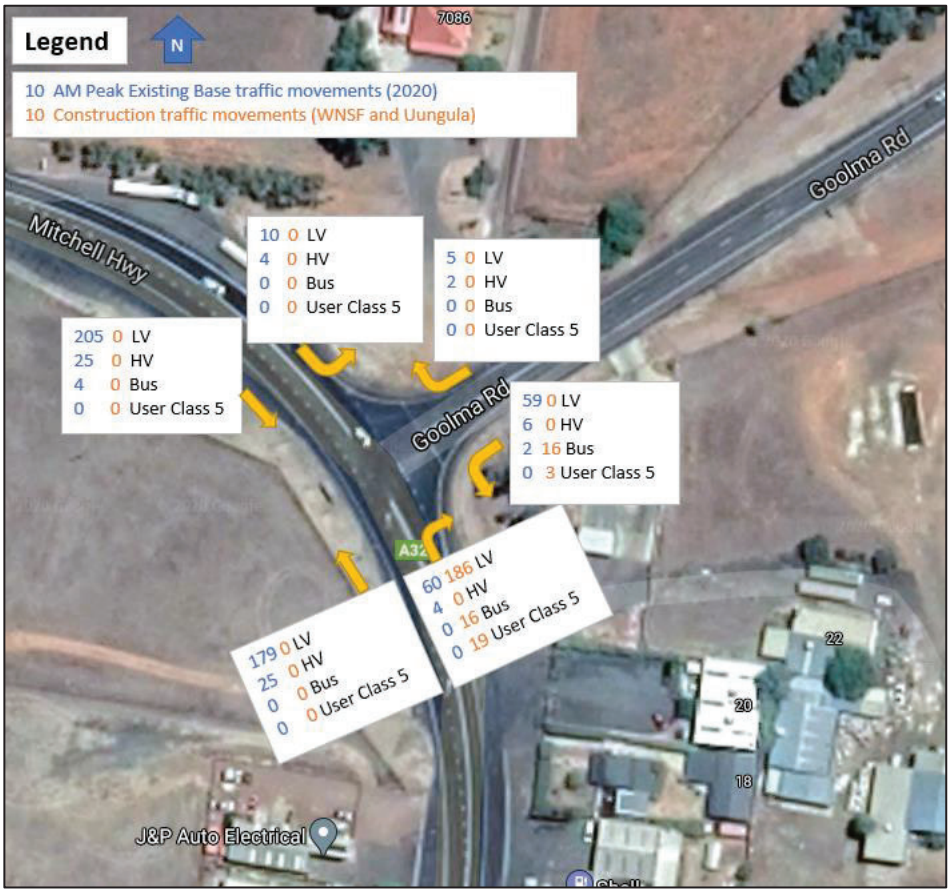


Figure 3-7 AM Peak cumulative construction traffic movements

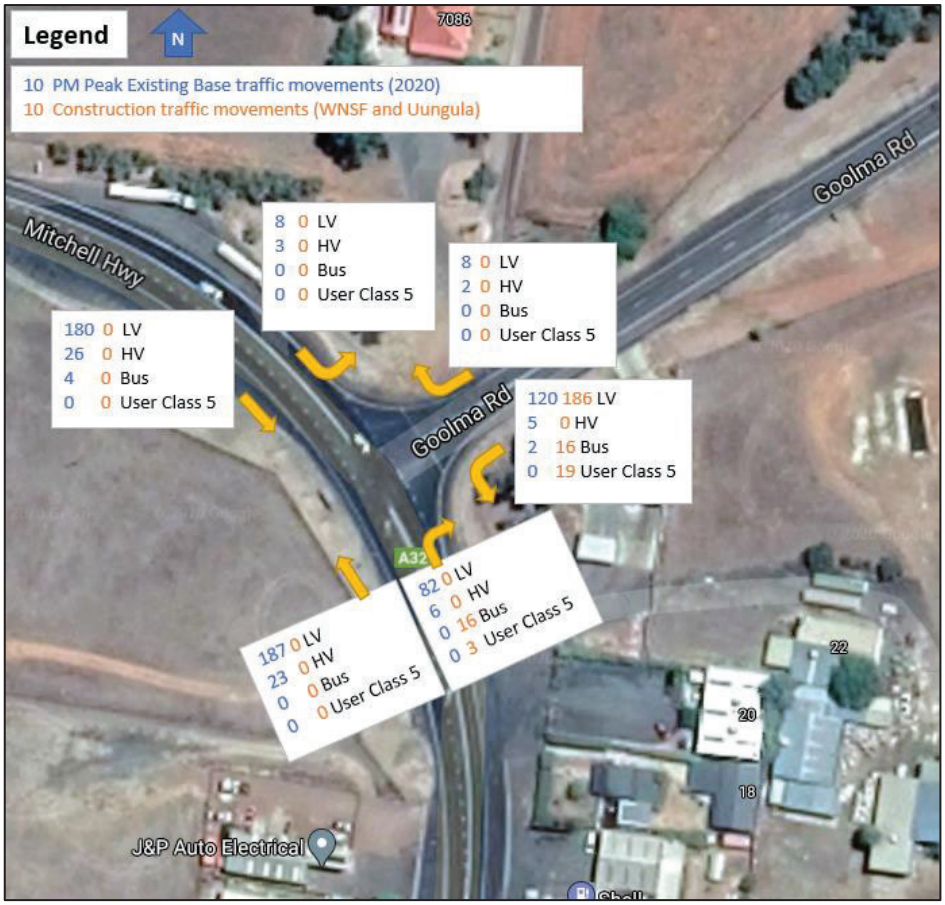


Figure 3-8 PM Peak cumulative construction traffic movements

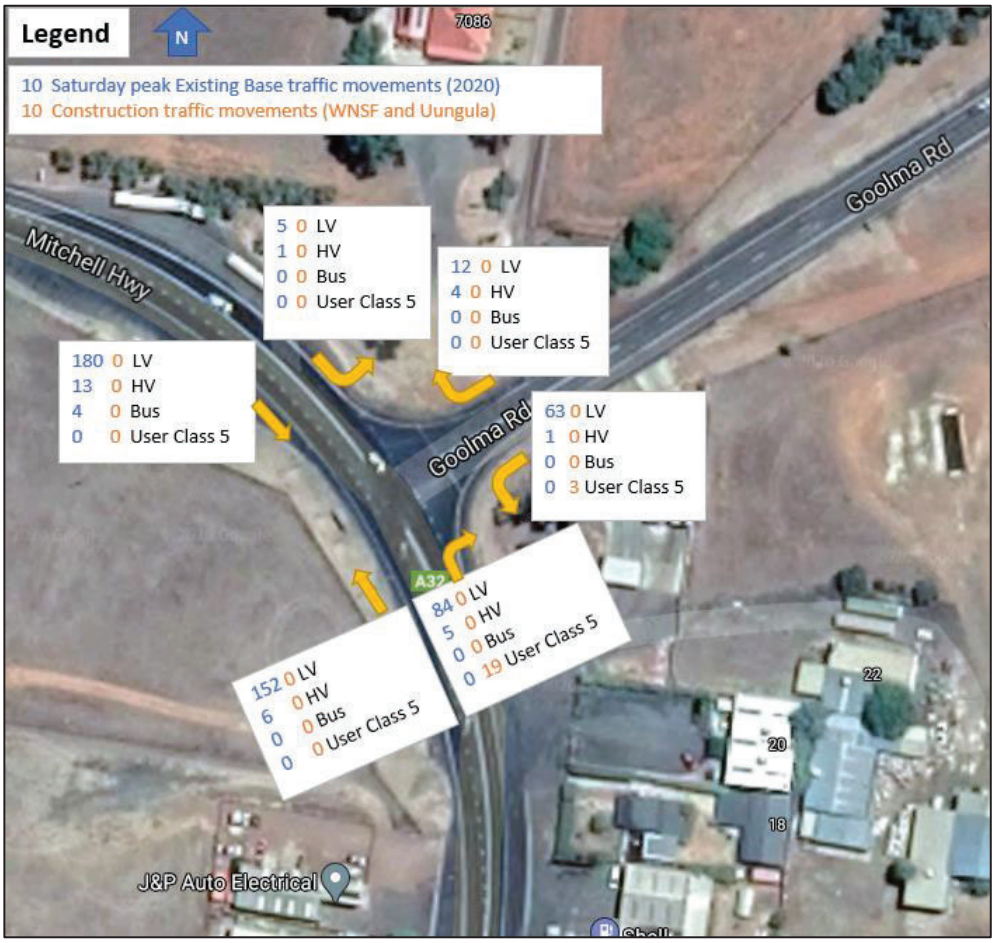


Figure 3-9 Saturday peak cumulative construction traffic movements

Intersection performance

Cumulative traffic models were developed based on the existing AM / PM weekday and Saturday peak hour surveyed data results and incorporated the cumulative trip generation. Traffic flows at Goolma Road / Mitchell Highway intersection were analysed using SIDRA 8. A summary of the results is outlined in Table 3-9, Table 3-10 and Table 3-11. Detailed results are outlined in Appendix B.

Table 3-9 Existing intersection performance AM Peak(Cumulative) – Goolma Road / Mitchell Highway

Location	Construction scenario			
	Deg. of Sat v/c	Average Delay sec	Level of Service	95% Back of Queue (metres)
South: Mitchell Highway				
Right turn	0.254	6.6	A	11
East: Goolma Road				
Left turn	0.103	7.6	A	4
Right turn	0.012	14.2	A	1
North: Mitchell Highway				
Left turn	0.145	5.9	A	0

Table 3-10 Existing intersection performance PM Peak(Cumulative) – Goolma Road / Mitchell Highway

Location	Construction scenario			
	Deg. of Sat v/c	Average Delay sec	Level of Service	95% Back of Queue (metres)
South: Mitchell Highway				
Right turn	0.093	6.2	A	4
East: Goolma Road				
Left turn	0.369	7.6	A	16
Right turn	0.016	12.5	A	1
North: Mitchell Highway				
Left turn	0.131	5.9	A	0

Table 3-11 Existing intersection performance Saturday Peak(Cumulative) – Goolma Road / Mitchell Highway

Location	Construction scenario			
	Deg. of Sat v/c	Average Delay sec	Level of Service	95% Back of Queue (metres)
South: Mitchell Highway				
Right turn	0.106	6.4	A	5
East: Goolma Road				
Left turn	0.066	6.7	A	2
Right turn	0.02	11.9	A	1
North: Mitchell Highway				
Left turn	0.116	5.7	A	0

Notes:

- *The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.*
- *The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.*
- *The Deg. Of Sat. (Degree of saturation) is defined as the ratio of the arrival flow (demand) to the capacity of each approach.*
- *Average delay is given in seconds per vehicle.*

The above SIDRA outputs indicate that each of the analysed intersection currently operates with an acceptable and satisfactory LoS (i.e. better than LoS E) with spare capacity in both the weekday morning and evening peak periods and Saturday peak period.

Mitchell Highway right turn lane queue length review (Cumulative)

As shown in the tables above, the SIDRA modelling results show that for the cumulative construction traffic scenario, that there is sufficient lane storage to cater for the proposed additional traffic movements in the AM, PM and Saturday peak periods. The longest queue is likely to occur in the weekday AM peak with a 95 percentile queue of 11 metres. This fits within the 80 metres of lane storage available for the designated right turn lane from the Mitchell Highway into Goolma Road.

3.8 Operational phase traffic movements

It is considered that the traffic generated during operation will consist of minor traffic movements in association with the maintenance of the WNSF. Although no specific details of on-site vehicle movements have been provided by the client, it is anticipated that traffic movement required during maintenance and monitoring of the WNSF would be less than construction traffic. Therefore, the road network would continue to operate satisfactorily post-construction, subject to the recommendations outlined in the construction traffic generation assessment being carried out.

3.9 Decommissioning phase traffic movements

If the WNSF is decommissioned by the client in the future, it is considered that the traffic generated during decommissioning will consist of less daily vehicular movements than the construction of the WNSF. Therefore, the road network would continue to operate satisfactorily during the demolition phase, subject to a future review of demolition impacts and implementation of a suitable construction traffic management plan.

4. Parking provision

The internal access and parking arrangement for the proposal are currently unknown at this stage of the application and therefore have not been assessed as part of this traffic study. However, the following outlines the items for consideration during the development the site arrangement and associated parking.

4.1 Parking provision

Neither the Dubbo Regional Council DCP nor Roads and Maritime Services Guide to Traffic Generating Developments outline recommended parking provisions for solar farm developments. Therefore, the parking required should be based on a first principles approach dependent upon site personnel required, to carry out the construction works and ongoing maintenance required post-construction.

Given the rural nature of the site, it should be assumed that all site personnel during the operational phase will arrive by private vehicle on an individual basis and the shuttle bus system, with the parking provision to be accommodated on-site near the main administration/office/maintenance area.

Construction parking should be allocated within close proximity to the site office, suitable to accommodate the estimated peak light vehicles (minimum of approximately 60 to 70 vehicles based upon the information provided) on-site and the number of shuttle buses utilised.

4.2 Parking layout

In line with *AS2890.1 – Off Street Car Parking,* the parking area should be designed to accommodate the specific design vehicle. For light vehicles, the parking space dimensions and associated aisle widths for a Class 2 (generally medium-term parking) facility classification are presented in AS2890.1 include:

- Spaces: 2.5 m x 5.4 m
- Aisle Width: 5.8 m

Additionally, allowance should be made to accommodate larger design vehicles such as a truck, should it be required for the use of maintenance vehicles.

5. Mitigation measures

5.1 Construction activity traffic management

5.1.1 Construction traffic management objective

A Construction Traffic Management Plan (CTMP) will need to be prepared prior to the commencement of works with site induction for construction personnel being undertaken to outline the requirements of the CTMP. The aim of the CTMP is to maintain the safety of all workers and road users within the vicinity of the site and the following are the primary objectives:

- To minimise the impact of the construction vehicle traffic on the overall operation of the road network.
- To provide continuous, safe and efficient movement of traffic for both the general public and construction workers.
- Installation of appropriate advance warning signs to inform users of the changed traffic condition.
- To provide a description of the construction vehicles and the volume of these construction vehicles accessing the construction site.
- To provide information regarding the changed access arrangement and also a description of the proposed external routes for vehicles including the construction vehicles accessing the site.
- Establishment of a safe pedestrian environment in the vicinity of the site.

5.1.2 Traffic management

Public access to the site is to be maintained on the surrounding road network. Vehicles will be permitted to travel past the worksite with traffic signage in accordance with a Traffic Control Plan (TCP) to be developed in accordance with *RMS Traffic Control at Works Sites and AS1742.3 – Traffic Control for Works on Roads*. This is to advise motorists of changes in the road network or vehicle movements to/from the site including “Truck turning” activity.

It is not anticipated to implement road closures within the public road network as part of the construction activity.

Traffic Control Plans will need to be developed as part of the CTMP prior to commencing of construction activity on the site.

5.1.3 Traffic activity and parking provisions

It is anticipated that access and egress for site personnel may occur during the AM and PM peak hour periods of the surrounding road network. For a worst-case perspective, the intersection and mid-block review have been based on peak hour traffic volumes.

Encouraging carpooling between workers will decrease traffic activity and parking demand in conjunction with the shuttle bus system proposed.

Parking for construction personnel is to be accommodated within the site. The area is to be allocated to accommodate the peak site personnel. Parking within the public road network should not be permitted. Details of the proposed parking were not available at the time of this assessment; however, given the large greenfield site, it is anticipated adequate parking area can be provided to facilitate the parking of workers and visitors to the site.

5.1.4 Pedestrian and cycle management

Site access is to be restricted to authorised personnel only and existing employees on site. Pedestrian and cycle access to and around the site is to be maintained at all times. It is anticipated the pedestrian and cycle activity in public areas surrounding the site will be low due to the rural nature of the surrounding properties and no formalised pedestrian facilities.

Within the site, pedestrian travel paths are to be maintained to key areas such as building entrances and be free from trip hazards.

5.1.5 Road hazards

The CTMP should identify specific road hazards associated with the area, including but not limited to:

- fog and frost
- wet weather
- heat
- wildlife
- school and local bus routes
- coordination with other development construction activity (i.e. Uungula Wind Farm and Maryvale Solar Farm)

5.2 Road improvements

5.2.1 Intersection treatments

The following intersections treatments are recommended:

- The intersection of Goolma Road and site access be upgraded to provide a short Auxiliary Left turn lane AUL(S) northbound and a Basic Right turn lane (BAR) southbound.
- Intersection treatment should be designed to accommodate articulated vehicles of 19 m in length. Note: larger vehicles will require permits and traffic management.

6. Summary and recommendations

6.1 Traffic impact

The construction of the project is estimated to generate at peak periods 267 two-way movements daily and up to 104 two-way movements during the peak hour during the peak construction period, with the predominate traffic flow associated with the access and egress for workers to and from the site daily. This is minimised by implementation of a shuttle bus system and car-pooling. It is estimated that the operational phase traffic generation would be much less than the peak construction period.

The construction, operational and decommissioning traffic generation can be accommodated within the existing road network within the vicinity of the site subject to the recommended intersection treatment at the site access on Goolma Road outlined in the mitigation measures.

SIDRA modelling results at the intersection of Mitchell Highway / Goolma Road indicated there is sufficient storage length within the designated right turn lane from Mitchell Highway into Goolma Road to facilitate the cumulative traffic generation of Wellington North Solar Farm and other concurrent construction developments (i.e. Uungula Wind Farm).

Based upon the mid-block assessment of the road network and of the project traffic generation and the WNSF, the background traffic along the major road network has additional capacity to cater for additional traffic flow as a result of surrounding projects or fluctuations in traffic volumes.

6.2 Parking

The internal access and parking arrangement for the proposal are currently unknown at this stage of the application and therefore have not been assessed as part of this traffic study, however the following outlines the items for considerations during the development the site arrangement and parking.

- Parking provision to be provided on a first principles approach, with parking provided within the site boundary assuming all personnel post construction will travel individually by private vehicles to the site.
- Recommended parking dimensions:
  - Spaces: 2.5 m x 5.4 m
  - Aisle Width: 5.8 m
- Additional allowance should be made to accommodate larger design vehicles such as a truck, should it be required for the use of maintenance vehicles.
- Construction parking to be provided within the site suitable to accommodate peak light vehicles provision, shuttle bus parking and heavy vehicle waiting areas.
- Given the greenfield site, it is assumed such provisions can be accommodated within the site boundary.

6.3 Mitigation measures

6.3.1 Construction traffic management plan

A Construction Traffic Management Plan (CTMP) will need to be prepared prior to the commencement of works with site induction for construction personnel being undertaken to

outline the requirements of the CTMP. The aim of the CTMP is to maintain the safety of all workers and road users within the vicinity site. The plan can include such items as:

- Vehicle approach routes.
- Traffic management and traffic control plans.
- Workers transportation (shuttle bus and car pooling).
- Pedestrian management.
- Oversize vehicle permit requirements.
- Road hazards (including fog, wet weather, frost, wildlife etc.).
- Cumulative impacts from nearby development proposals.

The CTMP will be developed in consultation with Dubbo Regional Council and Roads and Maritime Services.

6.3.2 Road improvements

The following road improvements are recommended to facilitate construction and post-construction traffic movements:

- The intersection of Goolma Road and site access be upgraded to provide a short Auxiliary Left turn lane AUL(S) northbound and a Basic Right turn lane (BAR) southbound.
- Intersection treatment should be designed to accommodate articulated vehicles of 19 m in length. Note: larger vehicles will require permits and traffic management.

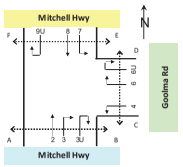
6.4 Conclusion

Based on the investigations undertaken by GHD, the proposed WNSF development does not have an adverse impact on the road system subject to the recommended mitigation measures being applied.

Appendices

Appendix A - Mitchell Highway / Goolma Road: Traffic surveys

Job No.	: N6116
Client	: GHD
Suburb	: Wellington
Location	: 1. Mitchell Hwy / Goolma Rd
Day/Date	: Thu, 10th Dec 2020
Weather	: Fine
Description	: Classified Intersection Count
	: 15 mins Data



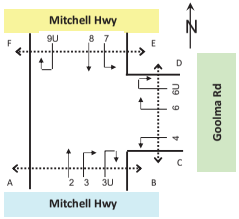
MATRIX
Traffic and Transport Data

Classifications	**Class 1**	**Class 2**	**Class 3**	**Class 4**
	Cars	Trucks	Buses	Cyclists

Approach	**Mitchell Hwy**																**Goolma Rd**															
Direction		**Direction 2 (Through)**					**Direction 3 (Right Turn)**					**Direction 3U (U Turn)**					**Direction 4 (Left Turn)**						**Direction 6 (Right Turn)**					**Direction 6U (U Turn)**				
Time Period		Cars	Trucks	Buses	Cyclists	Total	Cars	Trucks	Buses	Cyclists	Total	Cars	Trucks	Buses	Cyclists	Total	Cars	Trucks	Buses	Cyclists	Total		Cars	Trucks	Buses	Cyclists	Total	Cars	Trucks	Buses	Cyclists	Total	
6:00 to 6:15		21	7	0	0	**28**	25	1	0	0	**26**	0	0	0	0	**0**	6	2	0	0	**8**		0	0	0	0	**0**	0	0	0	0	**0**	
6:15 to 6:30		24	3	0	0	**27**	35	0	0	0	**35**	0	0	0	0	**0**	3	2	0	0	**5**		1	0	0	0	**1**	0	0	0	0	**0**	
6:30 to 6:45		19	2	0	0	**21**	34	2	0	0	**36**	0	0	0	0	**0**	5	0	0	0	**5**		0	1	0	0	**1**	0	0	0	0	**0**	
6:45 to 7:00		30	4	1	0	**35**	26	0	0	0	**26**	0	0	0	0	**0**	9	0	0	0	**9**		1	0	0	0	**1**	0	0	0	0	**0**	
7:00 to 7:15		36	3	0	0	**39**	15	2	0	0	**17**	0	0	0	0	**0**	5	1	0	0	**6**		1	1	0	0	**2**	0	0	0	0	**0**	
7:15 to 7:30		30	5	0	0	**35**	25	1	1	0	**27**	0	0	0	0	**0**	7	3	0	0	**10**		2	0	0	0	**2**	0	0	0	0	**0**	
7:30 to 7:45		30	11	0	0	**41**	34	2	1	0	**37**	1	0	0	0	**1**	11	1	0	1	**13**		0	0	0	0	**0**	0	0	0	0	**0**	
7:45 to 8:00		49	9	0	0	**58**	20	0	0	0	**20**	0	0	0	0	**0**	17	1	0	0	**18**		0	0	0	0	**0**	0	0	0	0	**0**	
8:00 to 8:15		43	6	0	0	**49**	9	1	0	0	**10**	0	0	0	0	**0**	12	3	0	0	**15**		3	0	0	0	**3**	0	0	0	0	**0**	
8:15 to 8:30		39	7	0	0	**46**	19	3	0	0	**22**	0	0	0	0	**0**	17	1	1	0	**19**		0	1	0	0	**1**	0	0	0	0	**0**	
8:30 to 8:45		48	3	0	0	**51**	12	0	0	0	**12**	0	0	0	0	**0**	13	1	1	0	**15**		2	1	0	0	**3**	0	0	0	0	**0**	
8:45 to 9:00		32	7	0	0	**39**	17	1	0	0	**18**	0	0	0	0	**0**	19	0	0	0	**19**		5	0	0	0	**5**	0	0	0	0	**0**	
AM Totals		**401**	**67**	**1**	**0**	**469**	**271**	**13**	**2**	**0**	**286**	**1**	**0**	**0**	**0**	**1**	**124**	**15**	**2**	**1**	**142**		**15**	**4**	**0**	**0**	**19**	**0**	**0**	**0**	**0**	**0**	
15:30 to 15:45		51	5	2	0	**58**	23	0	1	0	**24**	0	0	0	0	**0**	23	2	0	0	**25**		0	0	0	0	**0**	0	0	0	0	**0**	
15:45 to 16:00		47	6	0	0	**53**	22	1	0	0	**23**	0	0	0	0	**0**	22	1	0	0	**23**		0	1	0	0	**1**	0	0	0	0	**0**	
16:00 to 16:15		57	5	0	0	**62**	22	1	0	0	**23**	0	0	0	0	**0**	46	0	0	0	**46**		3	0	0	0	**3**	0	0	0	0	**0**	
16:15 to 16:30		33	3	0	0	**36**	14	4	0	0	**18**	0	0	0	0	**0**	24	2	1	0	**27**		4	2	0	0	**6**	0	0	0	0	**0**	
16:30 to 16:45		46	9	0	0	**55**	20	1	0	0	**21**	0	0	0	0	**0**	15	1	1	0	**17**		0	0	0	0	**0**	0	0	0	0	**0**	
16:45 to 17:00		51	6	0	0	**57**	26	0	0	0	**26**	0	0	0	0	**0**	35	2	0	0	**37**		1	0	0	0	**1**	0	0	0	0	**0**	
17:00 to 17:15		52	2	2	0	**56**	33	1	0	0	**34**	0	0	0	0	**0**	16	0	0	0	**16**		1	0	0	0	**1**	0	0	0	0	**0**	
17:15 to 17:30		49	2	0	0	**51**	16	2	0	0	**18**	0	0	0	0	**0**	34	0	0	0	**34**		0	1	0	0	**1**	0	0	0	0	**0**	
17:30 to 17:45		49	2	0	0	**51**	12	1	0	0	**13**	0	0	0	0	**0**	37	1	0	0	**38**		1	1	0	0	**2**	0	0	0	0	**0**	
17:45 to 18:00		38	4	0	0	**42**	10	1	0	0	**11**	0	0	0	0	**0**	19	1	0	0	**20**		1	0	0	0	**1**	0	0	0	0	**0**	
18:00 to 18:15		35	8	1	0	**44**	5	1	0	0	**6**	0	0	0	0	**0**	16	1	0	0	**17**		3	0	0	0	**3**	0	0	0	0	**0**	
18:15 to 18:30		27	5	0	0	**32**	12	0	0	0	**12**	0	0	0	0	**0**	14	0	0	0	**14**		2	0	0	0	**2**	0	0	0	0	**0**	
PM Totals		**535**	**57**	**5**	**0**	**597**	**215**	**13**	**1**	**0**	**229**	**0**	**0**	**0**	**0**	**0**	**301**	**11**	**2**	**0**	**314**		**16**	**5**	**0**	**0**	**21**	**0**	**0**	**0**	**0**	**0**	

Approach	**Mitchell Hwy**																**Crossing Pedestrians**						
Direction	**Direction 7 (Left Turn)**					**Direction 8 (Through)**						**Direction 9U (U Turn)**											
Time Period	Cars	Trucks	Buses	Cyclists	Total	Cars	Trucks	Buses	Cyclists	Total		Cars	Trucks	Buses	Cyclists	Total		B to A	A to B	D to C	C to D	F to E	E to F	Total
6:00 to 6:15	2	1	0	0	**3**	19	6	0	0	**25**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
6:15 to 6:30	1	3	0	0	**4**	19	7	0	0	**26**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
6:30 to 6:45	1	1	0	0	**2**	29	4	0	0	**33**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
6:45 to 7:00	1	0	0	0	**1**	18	2	0	0	**20**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
7:00 to 7:15	1	0	0	0	**1**	20	12	0	0	**32**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
7:15 to 7:30	2	0	0	0	**2**	23	3	0	0	**26**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
7:30 to 7:45	4	3	0	0	**7**	37	6	0	0	**43**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
7:45 to 8:00	0	1	0	0	**1**	59	5	2	0	**66**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
8:00 to 8:15	4	0	0	0	**4**	40	7	0	0	**47**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
8:15 to 8:30	4	2	0	0	**6**	52	6	1	0	**59**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
8:30 to 8:45	2	1	0	0	**3**	54	7	1	0	**62**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
8:45 to 9:00	0	2	0	0	**2**	49	4	1	0	**54**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
AM Totals	**22**	**14**	**0**	**0**	**36**	**419**	**69**	**5**	**0**	**493**		**0**	**0**	**0**	**0**	**0**		**0**	**0**	**0**	**0**	**0**	**0**	**0**
15:30 to 15:45	2	2	0	0	**4**	40	4	0	0	**44**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
15:45 to 16:00	6	0	0	0	**6**	44	4	0	0	**48**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
16:00 to 16:15	2	1	0	0	**3**	39	7	0	0	**46**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
16:15 to 16:30	1	0	0	0	**1**	49	7	0	0	**56**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
16:30 to 16:45	2	1	0	0	**3**	50	5	0	0	**55**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
16:45 to 17:00	3	1	0	0	**4**	42	7	1	0	**50**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
17:00 to 17:15	1	0	0	0	**1**	49	6	0	0	**55**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
17:15 to 17:30	6	0	0	0	**6**	41	1	0	0	**42**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
17:30 to 17:45	0	0	0	0	**0**	48	8	0	0	**56**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
17:45 to 18:00	1	0	0	0	**1**	41	8	0	0	**49**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
18:00 to 18:15	1	0	0	0	**1**	36	2	0	0	**38**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
18:15 to 18:30	0	0	0	0	**0**	37	5	0	0	**42**		0	0	0	0	**0**		0	0	0	0	0	0	**0**
PM Totals	**25**	**5**	**0**	**0**	**30**	**516**	**64**	**1**	**0**	**581**		**0**	**0**	**0**	**0**	**0**		**0**	**0**	**0**	**0**	**0**	**0**	**0**

Job No.	: N6116
Client	: GHD
Suburb	: Wellington
Location	: 1. Mitchell Hwy / Goolma Rd
Day/Date	: Sat, 12th Dec 2020
Weather	: Fine
Description	: Classified Intersection Count
	: 15 mins Data



	Class 1	Class 2	Class 3	Class 4
Classifications	Cars	Trucks	Buses	Cyclists

Approach	Mitchell Hwy															Goolma Rd										
Direction		Direction 2 (Through)					Direction 3 (Right Turn)					Direction 3U (U Turn)					Direction 4 (Left Turn)						Direction 6 (Right Turn)					Direction 6U (U Turn)				
Time Period		Cars	Trucks	Buses	Cyclists	Total	Cars	Trucks	Buses	Cyclists	Total	Cars	Trucks	Buses	Cyclists	Total	Cars	Trucks	Buses	Cyclists	Total		Cars	Trucks	Buses	Cyclists	Total	Cars	Trucks	Buses	Cyclists	Total
9:30 to 9:45		42	4	0	0	**46**	13	2	0	0	**15**	0	0	0	0	**0**	12	0	0	0	**12**		0	0	0	0	**0**	0	0	0	0	**0**
9:45 to 10:00		43	4	0	0	**47**	17	0	0	0	**17**	0	0	0	0	**0**	21	1	0	0	**22**		5	1	0	0	**6**	0	0	0	0	**0**
10:00 to 10:15		33	7	0	0	**40**	12	1	0	0	**13**	0	0	0	0	**0**	16	0	0	0	**16**		2	0	0	0	**2**	0	0	0	0	**0**
10:15 to 10:30		51	2	0	0	**53**	14	1	0	0	**15**	0	0	0	0	**0**	13	2	0	0	**15**		0	1	0	0	**1**	0	0	0	0	**0**
10:30 to 10:45		44	2	0	0	**46**	10	0	0	0	**10**	0	0	0	0	**0**	19	0	0	0	**19**		1	0	0	0	**1**	0	0	0	0	**0**
10:45 to 11:00		40	0	0	0	**40**	14	3	0	0	**17**	0	0	0	0	**0**	14	0	0	0	**14**		1	0	0	0	**1**	0	0	0	0	**0**
11:00 to 11:15		40	1	0	0	**41**	12	1	0	0	**13**	0	0	0	0	**0**	14	1	0	0	**15**		3	3	0	0	**6**	0	0	0	0	**0**
11:15 to 11:30		39	4	0	0	**43**	26	1	0	0	**27**	0	0	0	0	**0**	20	0	0	0	**20**		4	1	0	0	**5**	0	0	0	0	**0**
11:30 to 11:45		36	0	0	0	**36**	28	2	0	0	**30**	1	0	0	0	**1**	15	0	0	0	**15**		2	0	0	0	**2**	0	0	0	0	**0**
11:45 to 12:00		37	1	0	0	**38**	18	1	0	0	**19**	0	0	0	0	**0**	14	0	0	0	**14**		3	0	0	0	**3**	0	0	0	0	**0**
12:00 to 12:15		35	3	0	0	**38**	19	1	0	0	**20**	0	0	0	0	**0**	9	0	0	0	**9**		2	0	0	0	**2**	0	0	0	0	**0**
12:15 to 12:30		28	3	0	0	**31**	15	2	0	0	**17**	0	0	0	0	**0**	13	4	0	0	**17**		3	1	0	0	**4**	0	0	0	0	**0**
Total		**468**	**31**	**0**	**0**	**499**	**198**	**15**	**0**	**0**	**213**	**1**	**0**	**0**	**0**	**1**	**180**	**8**	**0**	**0**	**188**		**26**	**7**	**0**	**0**	**33**	**0**	**0**	**0**	**0**	**0**

Approach	Mitchell Hwy														
Direction	Direction 7 (Left Turn)					Direction 8 (Through)						Direction 9U (U Turn)				
Time Period	Cars	Trucks	Buses	Cyclists	Total	Cars	Trucks	Buses	Cyclists	Total		Cars	Trucks	Buses	Cyclists	Total
9:30 to 9:45	1	1	0	0	**2**	36	6	2	0	**44**		0	0	0	0	**0**
9:45 to 10:00	1	0	0	0	**1**	39	3	0	0	**42**		0	0	0	0	**0**
10:00 to 10:15	0	0	0	0	**0**	41	0	1	0	**42**		0	0	0	0	**0**
10:15 to 10:30	1	1	0	0	**2**	27	3	0	0	**30**		0	0	0	0	**0**
10:30 to 10:45	2	1	0	0	**3**	38	3	0	0	**41**		0	0	0	0	**0**
10:45 to 11:00	2	1	0	0	**3**	24	4	0	0	**28**		0	0	0	0	**0**
11:00 to 11:15	1	1	0	0	**2**	38	4	0	0	**42**		0	0	0	0	**0**
11:15 to 11:30	1	0	0	0	**1**	40	2	0	0	**42**		0	0	0	0	**0**
11:30 to 11:45	2	0	0	0	**2**	39	5	0	0	**44**		0	0	0	0	**0**
11:45 to 12:00	1	0	0	0	**1**	63	2	0	0	**65**		0	0	0	0	**0**
12:00 to 12:15	1	1	0	0	**2**	43	3	0	0	**46**		0	0	0	0	**0**
12:15 to 12:30	1	1	0	0	**2**	31	3	0	0	**34**		0	0	0	0	**0**
Total	**14**	**7**	**0**	**0**	**21**	**459**	**38**	**3**	**0**	**500**		**0**	**0**	**0**	**0**	**0**

Appendix B - Mitchell Highway / Goolma Road: SIDRA results

MOVEMENT SUMMARY

Site: Site 1 [2020_AM Peak_Base_Mitchell Highway and Goolma Road]

Network: N101 [2020 Base AM Peak]

2020_AM Peak_Base_Mitchell Highway and Goolma Road
Site Category: AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Mitchell Highway														
3	R2	67	6.3	67	6.3	0.050	6.1	LOS A	0.2	1.6	0.37	0.59	0.37	48.1
Approach		67	6.3	67	6.3	0.050	6.1	NA	0.2	1.6	0.37	0.59	0.37	48.1
East: Goolma Road														
4	L2	71	11.9	71	11.9	0.069	6.9	LOS A	0.3	2.1	0.37	0.60	0.37	46.9
6a	R1	7	28.6	7	28.6	0.011	7.3	LOS A	0.0	0.3	0.41	0.61	0.41	48.9
Approach		78	13.5	78	13.5	0.069	7.0	LOS A	0.3	2.1	0.37	0.60	0.37	47.1
North: Mitchell Highway														
7	L2	15	28.6	15	28.6	0.145	5.9	LOS A	0.0	0.0	0.00	0.03	0.00	56.9
8	T1	246	12.4	246	12.4	0.145	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.5
Approach		261	13.3	261	13.3	0.145	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.3
All Vehicles		406	12.2	406	12.2	0.145	2.6	NA	0.3	2.1	0.13	0.23	0.13	54.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Site 1 [2020_AM Peak_Base_Mitchell Highway and Goolma Road]

Network: N101 [2020 Base AM Peak]

2020_AM Peak_Base_Mitchell Highway and Goolma Road
Site Category: AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Mitchell Highway														
2	T1	215	12.3	215	12.3	0.121	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		215	12.3	215	12.3	0.121	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
SouthEast: Merge														
23a	R1	7	28.6	7	28.6	0.005	5.2	LOS A	0.0	0.0	0.00	0.58	0.00	48.0
Approach		7	28.6	7	28.6	0.005	5.2	NA	0.0	0.0	0.00	0.58	0.00	48.0
All Vehicles		222	12.8	222	12.8	0.121	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Site 1 [2020_PM Peak_Base_Mitchell Highway and Goolma Road] — **Network: N101 [2020 Base PM Peak]**

2020_PM Peak_Base_Mitchell Highway and Goolma Road
Site Category: PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Mitchell Highway														
3	R2	93	6.8	93	6.8	0.067	6.0	LOS A	0.3	2.2	0.36	0.58	0.36	48.1
Approach		93	6.8	93	6.8	0.067	6.0	NA	0.3	2.2	0.36	0.58	0.36	48.1
East: Goolma Road														
4	L2	134	5.5	134	5.5	0.122	6.7	LOS A	0.5	3.7	0.36	0.60	0.36	47.1
6a	R1	11	20.0	11	20.0	0.015	7.0	LOS A	0.0	0.4	0.40	0.61	0.40	49.1
Approach		144	6.6	144	6.6	0.122	6.7	LOS A	0.5	3.7	0.36	0.61	0.36	47.3
North: Mitchell Highway														
7	L2	12	27.3	12	27.3	0.131	5.9	LOS A	0.0	0.0	0.00	0.03	0.00	57.0
8	T1	221	14.3	221	14.3	0.131	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.6
Approach		233	14.9	233	14.9	0.131	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.4
All Vehicles		469	10.8	469	10.8	0.131	3.4	NA	0.5	3.7	0.18	0.32	0.18	52.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Site 1 [2020_PM Peak_Base_Mitchell Highway and Goolma Road] — **Network: N101 [2020 Base PM Peak]**

2020_PM Peak_Base_Mitchell Highway and Goolma Road
Site Category: PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Mitchell Highway														
2	T1	221	11.0	221	11.0	0.123	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		221	11.0	221	11.0	0.123	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
SouthEast: Merge														
23a	R1	11	20.0	11	20.0	0.006	5.2	LOS A	0.0	0.0	0.00	0.58	0.00	48.5
Approach		11	20.0	11	20.0	0.006	5.2	NA	0.0	0.0	0.00	0.58	0.00	48.5
All Vehicles		232	11.4	232	11.4	0.123	0.2	NA	0.0	0.0	0.00	0.03	0.00	59.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Site 1 [2020_SAT Peak_Base_Mitchell Highway and Goolma Road]

Network: N101 [2020 Base SAT Peak]

2020_AM Peak_Base_Mitchell Highway and Goolma Road
Site Category: AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Mitchell Highway														
3	R2	94	5.6	94	5.6	0.066	5.9	LOS A	0.3	2.2	0.33	0.57	0.33	48.3
Approach		94	5.6	94	5.6	0.066	5.9	NA	0.3	2.2	0.33	0.57	0.33	48.3
East: Goolma Road														
4	L2	67	1.6	67	1.6	0.058	6.4	LOS A	0.2	1.6	0.32	0.58	0.32	47.4
6a	R1	17	25.0	17	25.0	0.025	7.0	LOS A	0.1	0.7	0.39	0.61	0.39	49.2
Approach		84	6.3	84	6.3	0.058	6.6	LOS A	0.2	1.6	0.33	0.59	0.33	47.7
North: Mitchell Highway														
7	L2	6	16.7	6	16.7	0.116	5.7	LOS A	0.0	0.0	0.00	0.02	0.00	57.6
8	T1	207	8.6	207	8.6	0.116	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.7
Approach		214	8.9	214	8.9	0.116	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.6
All Vehicles		392	7.5	392	7.5	0.116	2.9	NA	0.3	2.2	0.15	0.27	0.15	53.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Site 1 [2020_SAT Peak_Base_Mitchell Highway and Goolma Road]

Network: N101 [2020 Base SAT Peak]

2020_SAT Peak_Base_Mitchell Highway and Goolma Road
Site Category: AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Mitchell Highway														
2	T1	166	3.8	166	3.8	0.089	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		166	3.8	166	3.8	0.089	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
SouthEast: Merge														
23a	R1	17	25.0	17	25.0	0.010	5.2	LOS A	0.0	0.0	0.00	0.58	0.00	48.2
Approach		17	25.0	17	25.0	0.010	5.2	NA	0.0	0.0	0.00	0.58	0.00	48.2
All Vehicles		183	5.7	183	5.7	0.089	0.5	NA	0.0	0.0	0.00	0.05	0.00	59.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Site 1 [2020_AM Peak_construct_Mitchell Highway and Goolma Road]

Network: N101 [2020 Construction AM Peak]

2020_AM Peak_construct_Mitchell Highway and Goolma Road
Site Category: AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Mitchell Highway														
3	R2	300	13.7	300	13.7	0.254	6.6	LOS A	1.3	11.1	0.45	0.64	0.45	47.3
Approach		300	13.7	300	13.7	0.254	6.6	NA	1.3	11.1	0.45	0.64	0.45	47.3
East: Goolma Road														
4	L2	91	31.4	91	31.4	0.103	7.6	LOS A	0.4	3.8	0.40	0.63	0.40	46.5
6a	R1	7	28.6	7	28.6	0.012	9.0	LOS A	0.0	0.4	0.55	0.67	0.55	46.7
Approach		98	31.2	98	31.2	0.103	7.7	LOS A	0.4	3.8	0.41	0.63	0.41	46.5
North: Mitchell Highway														
7	L2	15	28.6	15	28.6	0.145	5.9	LOS A	0.0	0.0	0.00	0.03	0.00	56.9
8	T1	246	12.4	246	12.4	0.145	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.5
Approach		261	13.3	261	13.3	0.145	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.3
All Vehicles		659	16.1	659	16.1	0.254	4.3	NA	1.3	11.1	0.27	0.40	0.27	51.4

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

MOVEMENT SUMMARY

Site: Site 1 [2020_AM Peak_construct_Mitchell Highway and Goolma Road]

Network: N101 [2020 Construction AM Peak]

2020_AM Peak_construct_Mitchell Highway and Goolma Road
Site Category: AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Mitchell Highway														
2	T1	215	12.3	215	12.3	0.121	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		215	12.3	215	12.3	0.121	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
SouthEast: Merge														
23a	R1	7	28.6	7	28.6	0.005	5.2	LOS A	0.0	0.0	0.00	0.58	0.00	48.0
Approach		7	28.6	7	28.6	0.005	5.2	NA	0.0	0.0	0.00	0.58	0.00	48.0
All Vehicles		222	12.8	222	12.8	0.121	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7

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

MOVEMENT SUMMARY

Site: Site 1 [2020_PM Peak_Construction_Mitchell Highway and Goolma Road]

Network: N101 [2020 Construction PM Peak]

2020_PM Peak_Construction_Mitchell Highway and Goolma Road
Site Category: PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Mitchell Highway														
3	R2	113	23.4	113	23.4	0.093	6.2	LOS A	0.4	3.7	0.38	0.60	0.38	47.6
Approach		113	23.4	113	23.4	0.093	6.2	NA	0.4	3.7	0.38	0.60	0.38	47.6
East: Goolma Road														
4	L2	366	12.1	366	12.1	0.369	7.5	LOS A	1.9	16.2	0.46	0.66	0.47	46.5
6a	R1	11	20.0	11	20.0	0.016	7.3	LOS A	0.1	0.4	0.42	0.62	0.42	48.8
Approach		377	12.3	377	12.3	0.369	7.5	LOS A	1.9	16.2	0.46	0.66	0.47	46.6
North: Mitchell Highway														
7	L2	12	27.3	12	27.3	0.131	5.9	LOS A	0.0	0.0	0.00	0.03	0.00	57.0
8	T1	221	14.3	221	14.3	0.131	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.6
Approach		233	14.9	233	14.9	0.131	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.4
All Vehicles		722	14.9	722	14.9	0.369	5.0	NA	1.9	16.2	0.30	0.45	0.30	50.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Site 1 [2020_PM Peak_Construction_Mitchell Highway and Goolma Road]

Network: N101 [2020 Construction PM Peak]

2020_PM Peak_Construction_Mitchell Highway and Goolma Road
Site Category: PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Mitchell Highway														
2	T1	221	11.0	221	11.0	0.123	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		221	11.0	221	11.0	0.123	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
SouthEast: Merge														
23a	R1	11	20.0	11	20.0	0.006	5.2	LOS A	0.0	0.0	0.00	0.58	0.00	48.5
Approach		11	20.0	11	20.0	0.006	5.2	NA	0.0	0.0	0.00	0.58	0.00	48.5
All Vehicles		232	11.4	232	11.4	0.123	0.2	NA	0.0	0.0	0.00	0.03	0.00	59.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: Site 1 [2020_SAT Peak_construct_Mitchell Highway and Goolma Road]

Network: N101 [2020 Construction SAT Peak]

2020_SAT Peak_construct_Mitchell Highway and Goolma Road
Site Category: AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Mitchell Highway														
3	R2	114	22.2	114	22.2	0.106	6.4	LOS A	0.5	5.1	0.39	0.60	0.39	46.6
Approach		114	22.2	114	22.2	0.106	6.4	NA	0.5	5.1	0.39	0.60	0.39	46.6
East: Goolma Road														
4	L2	71	6.0	71	6.0	0.066	6.7	LOS A	0.3	2.1	0.33	0.59	0.33	47.2
6a	R1	17	25.0	17	25.0	0.020	6.9	LOS A	0.1	0.6	0.43	0.60	0.43	49.4
Approach		87	9.6	87	9.6	0.066	6.7	LOS A	0.3	2.1	0.35	0.59	0.35	47.5
North: Mitchell Highway														
7	L2	6	16.7	6	16.7	0.116	5.7	LOS A	0.0	0.0	0.00	0.02	0.00	57.6
8	T1	207	8.6	207	8.6	0.116	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.7
Approach		214	8.9	214	8.9	0.116	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.6
All Vehicles		415	12.7	415	12.7	0.116	3.3	NA	0.5	5.1	0.18	0.30	0.18	52.8

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

MOVEMENT SUMMARY

Site: Site 1 [2020_SAT Peak_construct_Mitchell Highway and Goolma Road]

Network: N101 [2020 Construction SAT Peak]

2020_SAT Peak_construct_Mitchell Highway and Goolma Road
Site Category: AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Mitchell Highway														
2	T1	166	3.8	166	3.8	0.089	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		166	3.8	166	3.8	0.089	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
SouthEast: Merge														
23a	R1	15	14.3	15	14.3	0.008	5.2	LOS A	0.0	0.0	0.00	0.58	0.00	48.9
Approach		15	14.3	15	14.3	0.008	5.2	NA	0.0	0.0	0.00	0.58	0.00	48.9
All Vehicles		181	4.7	181	4.7	0.089	0.4	NA	0.0	0.0	0.00	0.05	0.00	59.3

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

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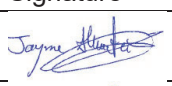
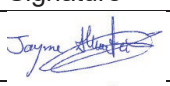
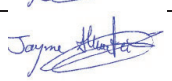
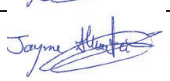
Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
Rev 0	S. Clarke	J. Akstein		J. Akstein		30/10/20
Rev 1	S. Clarke	J. Akstein		J. Akstein		15/1/2021

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