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Mount Pleasant Operation

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Appendix E

Road Transport Assessment

Modification 8

Resource Strategies

Mount Pleasant Operation Modification 8

Road Transport Assessment

Prepared for:

MACH Energy Australia Pty Ltd

19 November 2025

The Transport Planning Partnership

Mount Pleasant Operation Modification 8

Road Transport Assessment

Client: MACH Energy Australia Pty Ltd

Version: Final

Date: 19 November 2025

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Final	19/11/2025	PJD	PJD	

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References

AGL (2024), Viewed on 3 March 2024, https://www.agl.com.au/about-agl/media-centre/asx-and-media-releases/2023/december/final-investment-decision-reached-on-the-500-mw-liddell-battery-

Amber Organisation (2019), *Maxwell Solar Farm – Traffic Impact Assessment.*

Amber Organisation (2022), *Muswellbrook Battery Energy Storage System 20-24 Sandy Creek Road, Muswellbrook Traffic Impact Assessment.*

Amber Organisation (2025a), *Upper Hunter South Solar Farm 1711 Denman Road, Denman Traffic Impact Assessment.*

Amber Organisation (2025b), Denman BESS *1711 Denman Road, Denman Traffic Impact Assessment.*

Arcadis (2018), *Muswellbrook Bypass Traffic and Options Modelling Report.*

ARTC (2023), Network Information Books Map viewed on 8 August 2023, https://artc.maps.arcgis.com/apps/webappviewer/index.html?id=ab297d610e5441a79c53c1a694720c2a

Australian Road Research Board (2011), *Safety on rural roads: run-off-road, head-on and intersection crashes.*

Austroads (2020a), *Guide to Traffic Management Part 3: Traffic Studies and Analysis.*

Austroads (2020b), *Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management.*

Bengalla Mining Company (2019), *Bengalla Mine Annual Review 2018.*

Bengalla Mining Company (2020a), viewed on 6 January 2020. http://www.bengalla.com.au/who-we-are/

Bengalla Mining Company (2020b), *Bengalla Mine Annual Review 2020.*

Bengalla Mining Company (2024a), *Bengalla Mine Scoping Request Water Pipeline Modification 6.*

Bengalla Mining Company (2024b), *Bengalla Mine Scoping Request SSD-5170 Modification 8.*

BHP (2019), *Mt Arthur Coal Annual Review FY19.*

BHP (2020), *Mt Arthur Coal Annual Review FY20.*

Bitzios Consulting and Northrop (2020), *Muswellbrook Mine Affected Roads Network Plan Review*.

Cardno (2013), *Muswellbrook Traffic Survey Report*.

Cardno (2015), *Muswellbrook Mine Affected Roads Stage 1 – Road Network Plan*.

Cardno (2021), *Traffic and Transport Impact Assessment Bowmans Creek Windfarm Environmental Impact Statement*.

Dawn Renewables (2024), Viewed on 4 March 2024, *https://www.dawnrenewables.com/kayuga-solar-farm*

DC Engineering (2013), *Continuation of Mining Project Traffic and Transport Impact Assessment*.

EDF Renewables (2024), *Edderton Solar Project Scoping Report*.

EMM Consulting (2023), *Muswellbrook Solar Farm Traffic Impact Assessment*.

ERM Mitchell McCotter (1997), *Mount Pleasant Mine Environmental Impact Statement*.

GHD (2015), *Thomas Mitchell Drive Contributions Study*.

GHD (2017), *Mount Pleasant Operation Mine Optimisation Modification Road Transport Assessment*.

GHD (2018), *Thomas Mitchell Drive Contributions Study Supplementary Report*.

GHD (2019), *Mangoola Coal Continued Operations Project Traffic and Transport Report*.

Hansen Bailey (2013), *Continuation of Bengalla Mine Environmental Impact Statement*.

Hansen Bailey (2018), *Dartbrook mine Modification 7 Environmental Assessment*.

Hyder (2008), *Muswellbrook Bypass Report*.

Hyder (2013), *Mangoola Coal Project – Modification 6 Traffic and Transport Impact Assessment*.

Jacobs (2021), *Liddell Battery and Bayswater Ancillary Works Project Traffic and Transport Assessment*.

MACH Energy Australia Pty Ltd (2019), *Mount Pleasant Operations Site Access Management Plan*.

MACH Energy Australia Pty Ltd (2021), *Mount Pleasant Operation 2020 Annual Review & Annual Rehabilitation Report.*

MACH Energy Australia Pty Ltd (2023), *Mount Pleasant Operation 2022 Annual Review & Annual Rehabilitation Report.*

MACH Energy Australia Pty Ltd (2024a), *Mount Pleasant Operation 2023 Annual Review & Annual Rehabilitation Report.*

MACH Energy Australia Pty Ltd (2024b) *Mount Pleasant Operation Drivers' Code of Conduct*.

MACH Energy Australia Pty Ltd (2024c) *Mount Pleasant Operation Traffic Management Plan*.

MACH Energy Australia Pty Ltd (2025), *Mount Pleasant Operation 2024 Annual Review.*

Maizewood (2023), *Scoping Report Upper Hunter Battery Energy Storage System.*

Muswellbrook Pumped Hydro Pty Ltd (2023), *Scoping Report Muswellbrook Pumped Hydro Energy Storage Project.*

Muswellbrook Shire Council (2022), *Ordinary Council Meeting Business Paper 1 February 2022*.

Muswellbrook Shire Council (2024), *Ordinary Council Meeting Business Paper 23 January 2024.*

New South Wales Department of Planning, Industry and Environment (2022), *Cumulative Impact Assessment Guidelines for State Significant Projects.*

NSW Government (2024) Viewed on 25 September 2025 https://www.nsw.gov.au/media-releases/more-muswellbrook-roads-to-benefit-from-energy-shift

OX2 (2025), Viewed on 25 September 2025, *https://www.ox2.com/australia/projects/muswellbrook-solar-farm/*

Roads and Maritime Services (2018), *Muswellbrook Bypass Options Report.*

Roads and Maritime Services (2020), *Additional Access Conditions Oversize and overmass heavy vehicles and loads*.

Transport for New South Wales (2021), *New England Highway bypass of Muswellbrook Review of Environmental Factors.*

Transport for NSW Centre for Road Safety (2023), Viewed on 2 August 2023, https://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats/crashes-by-type-and-region

Transport for New South Wales (2024), *Guide to Transport Impact Assessment.*

Transport for New South Wales (2025a), Viewed on 25 August 2025, *https://www.transport.nsw.gov.au/projects/current-projects/muswellbrook-bypass-new-england-highway*

Transport for New South Wales (2025b), *New England Highway bypass of Muswellbrook Addendum review of environmental factors.*

Transportation Research Board (2016), *Highway Capacity Manual.*

The Transport Planning Partnership (2019), *Maxwell Project Road Transport Assessment.*

The Transport Planning Partnership (2020), *Mount Pleasant Optimisation Project Existing Roads – Road Safety Audit.*

The Transport Planning Partnership (2023), *Mt Arthur Coal Modification 2 Road Transport Assessment.*

The Transport Planning Partnership (2024), *Castlerock Road Muswellbrook, Existing Road, Road Safety Audit.*

The Transport Planning Partnership (2025), *Wybong Road Culvert Detailed Design (Pre Construction), Road Safety Audit.*

Umwelt (2019), *Mangoola Coal Continued Operations Project Environmental Impact Statement.*

Umwelt (2024), *Bowmans Creek Wind Farm Stage 2 Scoping Report.*

1 Introduction

The Mount Pleasant Operation is an open cut coal mine and associated rail spur and product coal loading infrastructure, located approximately 3 kilometres (km) north-west of Muswellbrook in the Upper Hunter Valley of New South Wales (NSW) (Figure 1.1 and Figure 1.2).

MACH Mount Pleasant Operation Pty Ltd manages the Mount Pleasant Operation as agent for and on behalf of the unincorporated Mount Pleasant Joint Venture between MACH Energy Australia Pty Ltd (95 percent [%] owner) and J.C.D. Australia Pty Ltd (5% owner) [1].

The Mount Pleasant Operation Development Consent DA 92/97 was granted on 22 December 1999. The Mount Pleasant Operation was also approved under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in 2012 (EPBC 2011/5795).

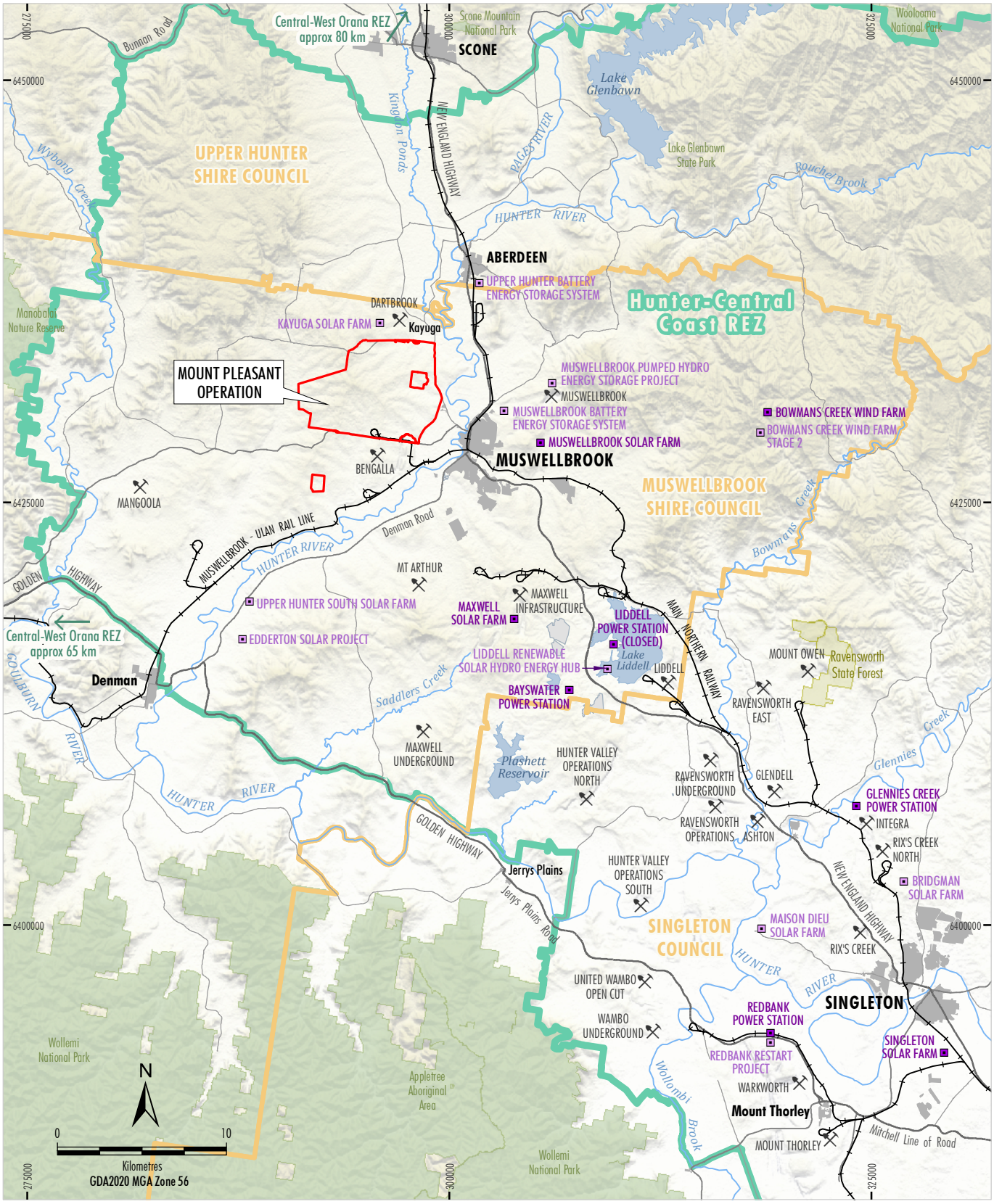
Under Development Consent 92/97, the Mount Pleasant Operation is approved to produce up to 10.5 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal until 22 December 2026. Thermal coal products from the Mount Pleasant Operation are transported by rail to the Port of Newcastle for export, or to domestic customers for use in electricity generation.

MACH is proposing an extension of life to the existing mining operations approved under Development Consent DA 92/97 to create greater certainty for the Mount Pleasant Operation and an increase in extraction rate due to operational efficiencies identified (the Modification).

The Mount Pleasant Optimisation Project was approved in September 2022 (SSD-10418), which permits an increase in the coal production up to 21 Mtpa ROM coal, increased rail transport of up to 17 Mtpa product coal, with an extension of mining operations to 22 December 2048. The granting of SSD-10418 is the subject of ongoing legal challenge, creating some uncertainty about the approvals status of the Mount Pleasant Operation past the end of the approved mining period under Development Consent DA 92/97. The Modification is proposed to create greater certainty for the Mount Pleasant Operation.

This Road Transport Assessment has been prepared by The Transport Planning Partnership (TTPP) to assess the road transport implications of the Modification.

[1] *Throughout this report, MACH Mount Pleasant Operation Pty Ltd and the unincorporated Mount Pleasant Joint Venture will be referred to as MACH.*



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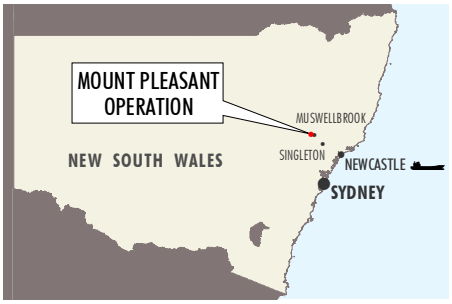
Source: NSW Spatial Services (2025); EnergyCo (2024)



LEGEND

- Mining Operation
- Existing/Approved Major Energy Generation Site
- Proposed Major Energy Generation Site
- Railway
- National Parks and Wildlife Estate
- State Forest/Reserve
- Local Government Boundary
- Hunter-Central Coast Renewable Enery Zone (REZ)
- Mining Lease Boundary (Mount Pleasant Operation)

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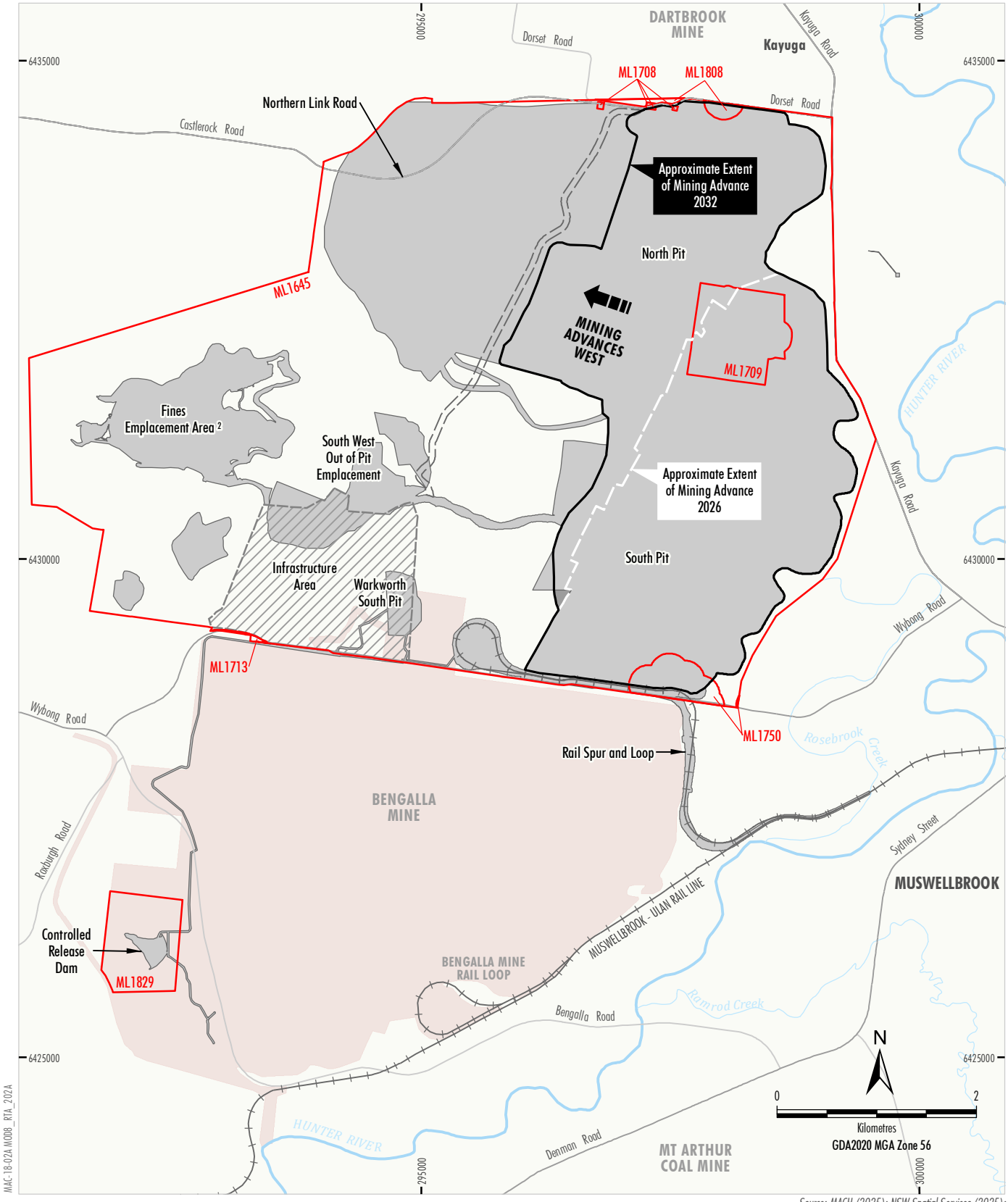
Location of the Mount Pleasant Operation

Figure 1.1



Source: MACH (2025); NSW Spatial Services (2025); Department of Planning and Environment (2016)

LEGEND

- Mining Lease Boundary (Mount Pleasant Operation)
- Approved Surface Disturbance Plan - DA 92/97
- Services Corridor Being Developed Under SSD-10418 to be Used Under the Modification
- Extension of Open Cut Mining and Emplacement Area (Land Lawfully Disturbed under SSD-10418)
- Revised Infrastructure Area Envelope
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)

[1] Excludes some incidental Project components such as water management infrastructure, access tracks, topsoil stockpiles, power supply, temporary offices, other ancillary works and construction disturbance.

[2] The general arrangement of the Fines Emplacement Area has been amended from the area shown in DA 92/97 to reflect as-built structures.

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General Arrangement of the Modification

Figure 1.2

2 Mount Pleasant Operation

2.1 Approved Mount Pleasant Operation

Under Development Consent DA 92/97 (as modified), the mine is approved to produce up to 10.5 Mtpa of ROM coal until 22 December 2026. Up to approximately nine trains per day of thermal coal products from the Mount Pleasant Operation are transported by rail to the Port of Newcastle for export, or to domestic customers for use in electricity generation. Loaded trains operate on the Mount Pleasant Operation spur, and the Muswellbrook-Ulan Railway to the Main Northern Railway.

Development Consent DA 92/97 allows for a number of changes to be made to the road network, including closure of Castlerock Road and Wybong Road, construction of the Mount Pleasant Northern Link Road and Mount Pleasant Western Link Road if required (Condition 38), construction of relevant intersections if required (Condition 39), and construction of a rail over road overpass at Wybong Road and a rail over road bridge at Overton Road (Condition 39A). The closure of Wybong Road would not be required within the Modification period (i.e. prior to December 2032), and therefore the construction of the Western Link Road would not be required. Works associated with construction of the Wybong Road rail overpass and Overton Road bridge were completed in 2021.

Condition 42, Schedule 2 of Development Consent DA 92/97 requires that "*as far as possible the preferred mine access route, as described in the EIS, is the only route used by employees and contractors travelling to the mine site from Muswellbrook*". The preferred mine access route from Muswellbrook and the south is via Bengalla Road, which would also provide alternative access to Muswellbrook for most Wybong Road traffic following the closure of the section of Wybong Road adjacent to the Mount Pleasant Operation (ERM Mitchell McCotter, 1997) although this closure would not be required within the Modification period.

2.2 The Modification

The Modification would involve:

- a six year extension of permitted (ROM coal) mining operations to 31 December 2032; and
- an increase in the approved ROM coal extraction rate from 10.5 Mtpa to 12.5 Mtpa.

The Modification would involve no material changes to existing:

- mining tenements;
- mining methods;
- primary site access;
- electricity supply and distribution;

- Mine Infrastructure Area;
- Coal Handling and Preparation Plant, coal stockpile and rail loading facilities;
- rehabilitation objectives and methods; and
- the existing hours of operation and key on-site activities.

Over the life of the Modification, construction activities are expected to include:

- completion of construction of the approved Northern Link Road (construction commenced);
- progressive raises of the Fines Emplacement Area;
- progressive development of additional water management structures, including Mine Water Dam 2 (MWD2), diversion drains, general operational dams, pipelines, pumping systems; and
- development of access tracks, hardstands and minor supplementary works that may be required to facilitate the proposed construction activities and open cut advance during the Modification period.

Further detail on the Modification is provided in the main text of the Modification Report.

The Mount Pleasant Operation was originally approved with an operational workforce of up to approximately 380 personnel. As at 30 June 2025, the full-time equivalent (FTE) operational workforce of the Mount Pleasant Operation was approximately 700 personnel[2]. Construction activities at the site have also at times required up to approximately 500 personnel.

The Modification's operational workforce is forecast to be approximately 555 personnel[3] in 2026, and remain at that level throughout the modified mine life. The construction workforce would vary throughout the life of the Modification, with a peak of approximately 96 construction personnel[3] forecasted in 2026 based on the expected scheduling of construction activities. Table 2.1 summarises the Modification's operational and construction workforces during the assessment years. It is noted that due to shift and roster arrangements, the total personnel in Table 2.1 would not all attend the site on any one day.

[2] Inclusive of workforce ramp-up associated with the commencement of Development Consent SSD 10418.
[3] During the period of the Modification (nominally from 1 January 2026 to 31 December 2032), the operational employment would be approximately 575 personnel, while construction workforce is anticipated to peak at approximately 80 personnel. However, for the purpose of the traffic analysis and throughout this study, some management and support staff (i.e. sustaining capital and functional support) have been categorised with the construction workforce, due to the similar roles, shift time arrangements and travel habits as construction contractors. This categorisation does not impact the number or timing of vehicle trips generated by those workers.

Table 2.1: Anticipated Modification Operational and Construction Workforce Shifts

Shift	Shift Start	Shift End	Approximate Number of Personnel	
			2026	2032
Operational Workforce				
MACH Employees	7:00 am	5:00 pm	28	28
Staff	7:00 am	4:00 pm	68	68
Contractors	7:00 am 7:00 pm	7:00 pm 7:00 am	77	77
Management/Support Staff	6:00 am 7:00 am	6:00 pm 7:00 pm	337	337
CHPP	6:00 am 6:00 pm	6:00 pm 6:00 am	45	45
Total Operational Personnel	-	-	555	555
Construction Workforce				
Management and Support Staff[A]	6:00 am	5:00 pm	18	6
Contractors	6:00 am	5:00 pm	78	0
Total Construction Personnel	-	-	96	6
Combined Workforce				
Total Personnel	-	-	651	561

[A] *Includes sustaining capital and functional support.*

2.3 Impact Assessment Scenarios and Method

The impacts of the Modification on the road transport environment would result from the proposed:

- construction activity;
- increase in the operational workforce;
- increase in site deliveries due to increased mining and coal production rates; and
- extension of the period of permitted (ROM coal) mining operations from 22 December 2026 to 31 December 2032.

2.3.1 Assessment Scenarios

To assess the potential road transport impacts of the Modification on the road network, and in consideration of the expected workforce and production schedules (Section 2.2), the following scenarios have been adopted with regard to the traffic generated by the Modification:

- 2026, with production of 12.5 million tonnes (Mt) ROM coal and the total workforce of 651 personnel, consisting up of 555 operational personnel and the peak 96 construction personnel; and
- 2032, being the final year of the life of the Modification, with production of approximately 12.5 Mt ROM coal (noting production forecast for 2032 is approximately 4.7 Mt ROM coal), and a total workforce of 561 personnel, consisting of 555 operational personnel and six construction personnel.

2.3.2 Assessment Method

This assessment has considered the potential impacts of the Modification compared with conditions that can be expected without the Modification. Traffic surveys were conducted during February 2020 (refer to Section 3.4) which quantified the traffic generating characteristics of the Mount Pleasant Operation, at which time it employed 380 FTE personnel. Over the 2020 calendar year, 8.54 Mt of ROM coal was extracted (MACH, 2021).

This assessment compares future conditions based on the proposed changes to the workforce and mining activities relative to the surveyed traffic conditions in 2020. Since the surveys were completed, the operational workforce at the Mount Pleasant Operation has increased from 380 FTE personnel to approximately 560 FTE personnel in 2024, and approximately 700 FTE personnel in 2025 while operating under Development Consent SSD-10418. ROM coal extraction has also increased up to 9.99 Mt over the 2022 calendar year (MACH, 2023), 10.5 Mt over the 2023 calendar year (MACH, 2024a) and 11.43 Mt over the 2024 calendar year under Development Consent SSD-10418 (MACH, 2025).

As this assessment is relative to the surveyed traffic conditions, the changes to the Mount Pleasant Operation activities since the traffic surveys were conducted do not affect the forecast traffic volumes or the results.

Unrelated changes to the road transport environment that may result from other approved or proposed major developments, and/or changes to the road network in the region have also been considered (refer to Section 5.2), cumulative with the Modification.

3 Existing Road Transport Environment

3.1 Road Network

The road network in the vicinity of the Mount Pleasant Operation is shown in Figure 3.1, and the key roads in the road network surrounding the site are described below.

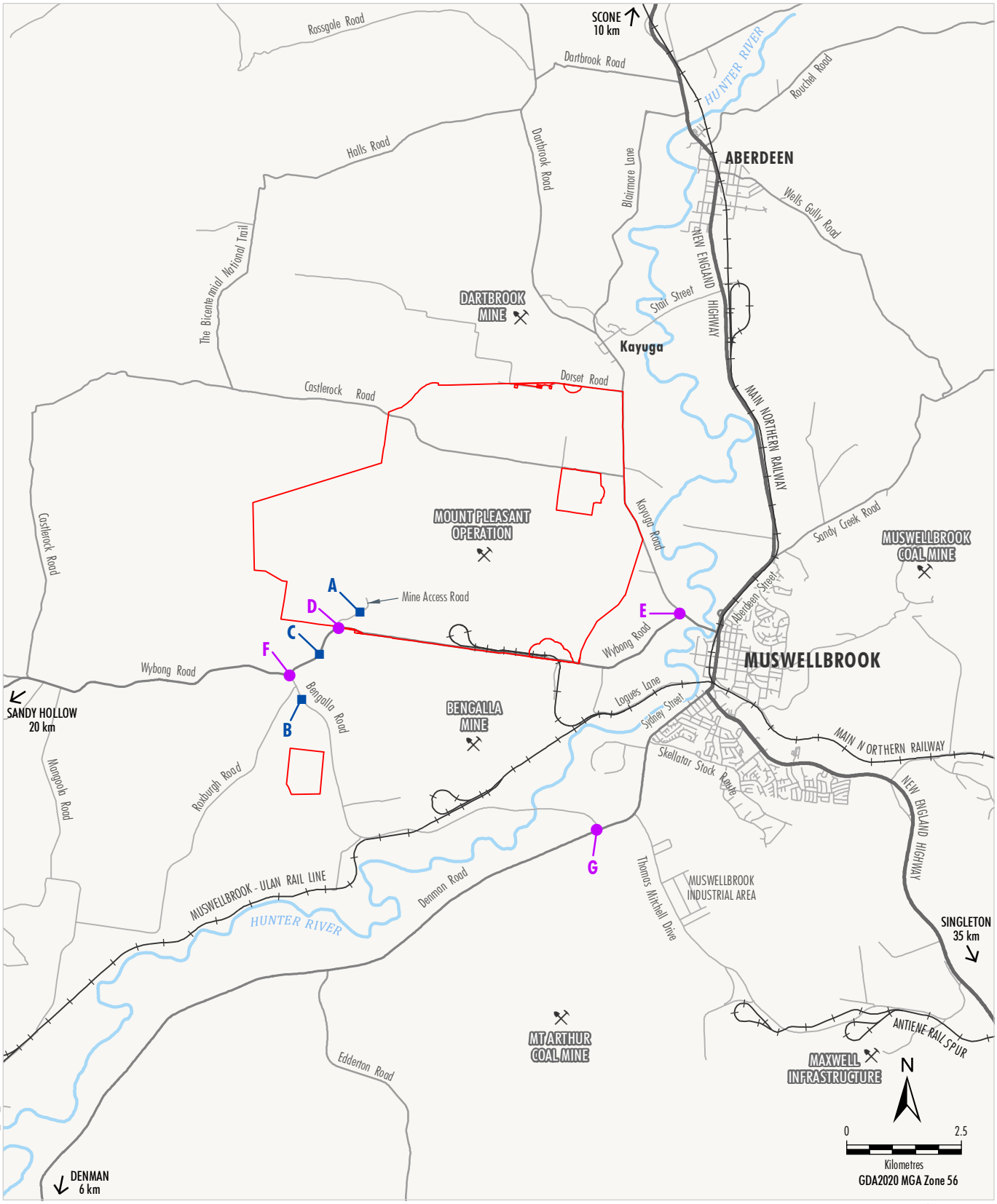
New England Highway (Highway 9, Route A15) is a major State road and forms part of the National Land Transport Network, a defined national network of road and rail infrastructure links for which Commonwealth funding is provided to assist national and regional economic and social development. New England Highway is the main north-south link through the Hunter Region and connects Muswellbrook and Newcastle as part of its route between Hexham and the Queensland border. It is an alternative to the Pacific Highway for the north-south vehicular link between Brisbane and Sydney, and as such carries a significant proportion of regional and interstate traffic movements.

Outside of the urban areas, New England Highway is generally a two-lane high standard rural highway with regular overtaking lanes, wide sealed shoulders, designated turning lanes and a posted speed limit of 100 kilometres per hour (km/h). New England Highway is an approved B-double route. The New England Highway bypass of Scone was opened to traffic in early 2020.

Golden Highway (Highway 27, Route B84) is also known as Merriwa Road, Jerrys Plains Road, Putty Road and Mitchell Line of Road, and is a State road under the control of Transport for NSW (TfNSW). Golden Highway provides a road link between New England Highway at Minimbah and Newell Highway at Dubbo. It is generally a two-lane rural highway with a posted speed limit of 100 km/h outside of urban areas. Golden Highway is an approved B-double route.

Denman Road (Main Road 209) is a State road that is funded by TfNSW but maintained by Muswellbrook Shire Council (MSC). Denman Road forms the primary connection between the township of Denman and Muswellbrook and provides a road link between Golden Highway and New England Highway. Outside of the urban areas, Denman Road is a two-lane rural road, with a 7 metre (m) wide sealed carriageway, additional sealed shoulders, and a posted speed limit of 100 km/h, reducing to 80 km/h from west of Bengalla to the built-up area of Muswellbrook. Denman Road is a designated B-double route.

Denman Road provides access to a number of existing mining operations via local roads such as Bengalla Road, Edderton Road and Thomas Mitchell Drive. As a result, Denman Road carries a significant proportion of mine-related traffic, particularly employee traffic accessing the mining operations.



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Source: TTPP (2024, 2020); NSW Spatial Services (2025)

LEGEND

- Mining Operation
- Railway
- Mining Lease Boundary (Mount Pleasant Operation)
- Road Intersection Survey Location (2020)
- Tube Count Survey Location (2020)

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Traffic Survey Locations

Figure 3.1

Bengalla Road is a local road under the control of MSC and is an approved B-double route between Denman Road and the entry to Bengalla Mine. The NSW Government announced in 2024 that Bengalla Road will be reclassified from local to state owned (NSW Government, 2024). It is a sealed road, with a single travel lane in each direction and sealed shoulders. The speed limit on Bengalla Road is 100 km/h. Together with Wybong Road, Bengalla Road provides a link between Denman Road south of Muswellbrook and Merriwa Road (Golden Highway) at Sandy Hollow. It provides vehicular access to Bengalla Mine, and crosses the Muswellbrook-Ulan Railway at a road over rail crossing approximately 4 km from Denman Road. At the T-intersection formed with Wybong Road, Bengalla Road and Wybong Road west are the priority main road, and Wybong Road north-east is the minor road. Bengalla Road is currently the only permitted heavy vehicle access road to and from the Mount Pleasant Operation (Section 2.1). As use of the Kayuga Bridge by Mount Pleasant Operation-related traffic is currently prohibited by the Mount Pleasant Operation Drivers' Code of Conduct (MACH, 2024b), Bengalla Road is also the route used for travel between Muswellbrook and the Mount Pleasant Operation for the workforce and deliveries.

Wybong Road is a local road under the control of MSC, which provides a link between Kayuga Road north-west of Muswellbrook and Merriwa Road (Golden Highway) at Sandy Hollow. The NSW Government announced in 2024 that Wybong Road between Bengalla Road and Golden Highway will be reclassified from local to state owned (NSW Government, 2024). The speed limit on Wybong Road is 100 km/h, reducing to 80 km/h for approximately 750 m on approach to Kayuga Road. The vehicular access for the Mount Pleasant Operation is provided from Wybong Road, approximately 8 km from Kayuga Road and 1.5 km from Bengalla Road. East of the Mount Pleasant Operation access, Wybong Road is subject to a gross load limit of 12 tonnes (t) and has centre linemarking and no edgelines. West of the Mount Pleasant Operation access, Wybong Road has centre linemarking, solid edgelines and sealed shoulders. Signage indicates the road is subject to flooding in the vicinity of the Rosebrook Bridge east of Logues Lane.

Kayuga Road is a local road under the control of MSC, which provides a link between Aberdeen Street on the western side of the Main Northern Railway in Muswellbrook, and the locality of Kayuga. It is a sealed road with a single travel lane in each direction, with the exception of at Kayuga Bridge over the Hunter River immediately west of Aberdeen Street, which is a single lane bridge, at which westbound vehicles must give way to vehicles on the bridge. Use of the Kayuga Bridge by Mount Pleasant Operation-related traffic is currently prohibited by the Mount Pleasant Operation Drivers' Code of Conduct (MACH, 2024b). Kayuga Road has centre linemarking east of Wybong Road and no linemarking to the north-west of Wybong Road. The speed limit on Kayuga Road is 80 km/h from Aberdeen Street to approximately 1.5 km north-west of Wybong Road, 100 km/h over the next approximately 3.5 km, then reduces to 80 km/h through Kayuga.

Blairmore Lane and **Dartbrook Road** are local roads which link Kayuga Road to New England Highway north of Aberdeen. Most of the length of both roads are under the control of Upper Hunter Shire Council, and a short length at the southern end of each road are under the control of MSC. These roads are of similar standards, being sealed rural roads of varying width with limited linemarking and signage, and each containing a single lane bridge.

Thomas Mitchell Drive is a local road under the control of MSC and is an approved B-double route. It provides a link between Denman Road and New England Highway to the south of Muswellbrook township, thus providing a bypass of Muswellbrook for some traffic and is signposted as an alternative route to Singleton from Denman Road. It is a 7 m wide sealed road, and provides access to the Mt Arthur Coal Mine, the Muswellbrook Industrial Area, and the Maxwell Underground Mine. Thomas Mitchell Drive crosses the Antiene Rail Spur at rail over road crossings at two locations approximately 3 km and 4.8 km west of New England Highway. The speed limit on Thomas Mitchell Drive is 80 km/h and to the west of the Industrial Area, and between the Maxwell Underground Mine access and New England Highway. The remainder has a speed limit of 100 km/h.

The NSW Department of Planning and Environment (now the Department of Planning, Housing and Industry [DPHI]) produced the Thomas Mitchell Drive Contributions Study (GHD, 2015), with a supplementary report (GHD, 2018). These establish a contributions framework for the allocation of funding to upgrade and maintain Thomas Mitchell Drive. Currently, Mangoola Coal, Bengalla Mine, Mt Arthur Coal Mine and the Mount Pleasant Operation contribute funding.

Mount Pleasant Operation Access Road is the private access road for the Mount Pleasant Operation, and intersects with Wybong Road at a priority-controlled T-intersection. It has a single travel lane in each direction, with centre linemarking and painted edge lines.

Mount Pleasant Northern Link Road is an approved road realignment that will provide an east-west link between Dorset Road and Castlerock Road, to the north of the Mount Pleasant Operation. The road is currently under construction and will be completed prior to closure of the eastern section of Castlerock Road to allow access to coal reserves in North Pit. The Northern Link Road would facilitate continued public access around the Mount Pleasant Operation once the approved closure of the eastern portion of Castlerock Road occurs.

3.2 Intersections

Intersections are typically the critical components that influence the overall capacity of the road network, due to the need for conflicting vehicle movements to occupy the same road space. The key intersections in the road network of relevance to the Mount Pleasant Operation are described below.

The intersection of **Wybong Road and Mount Pleasant Operation Mine Access Road** (Figure 3.2) is a priority-controlled T-intersection with a channelised left turn deceleration lane in Wybong Road for vehicles entering the access road, and wide sealed shoulders and a wire rope barrier on the southern side of Wybong Road over approximately 300 m past the intersection. The site access road has a single approach and single departure lane at the intersection.

Figure 3.2: Intersection of Mount Pleasant Operation Access Road and Wybong Road

Source: nearmap, image 14 March 2025.

The intersection of **Wybong Road and Bengalla Road** (Figure 3.3) is a priority-controlled T- intersection with a channelised left turn deceleration lane in Wybong Road west and a channelised right turn deceleration lane in Bengalla Road. Wybong Road north is the minor approach to the intersection, and has a single approach and single departure lane, separated by a concrete median island.

Figure 3.3: Intersection of Wybong Road and Bengalla Road

Source: nearmap, image 14 March 2025.

The intersection of **Bengalla Road and Denman Road** (Figure 3.4) is a priority-controlled T- intersection, with channelised left and right turn deceleration lanes in Denman Road, and an eastbound acceleration lane in Denman Road for those vehicles that have turned left from Bengalla Road. Bengalla Road has a single approach and single departure lane at the intersection, separated by a concrete median island. Overhead lighting is provided at the intersection.

Figure 3.4: Intersection of Bengalla Road and Denman Road

Source: nearmap, image 14 March 2025.

The intersection of **Wybong Road and Kayuga Road** (Figure 3.5) is a basic rural priority-controlled T-intersection, with single approach and departure lanes on all legs, and no auxiliary turn lanes. Kayuga Road is the major road at the intersection, and Wybong Road is the minor road, with "give way" signs. Wybong Road meets Kayuga Road at approximately 75 degrees, and both roads follow a straight and level alignment in the immediate vicinity of the intersection, such that sight lines are good.

Figure 3.5: Intersection of Wybong Road and Kayuga Road

Source: nearmap, image 14 March 2025.

The intersection of **Thomas Mitchell Drive and Denman Road** (Figure 3.6) was upgraded during 2022, as required by Condition 47(c), Schedule 3 of Project Approval 09_0062 for the Mt Arthur Coal Mine Open Cut Consolidation Project. MSC's initial preference for a seagull design was not supported by TfNSW, due to road safety issues associated with seagull treatments (MSC, 2022). The intersection has been constructed with channelised left and right turn lanes in Thomas Mitchell Drive, a wide painted median on the northern approach, and separate left and right turn lanes in Thomas Mitchell Drive. Vehicles turning right into Thomas Mitchell Drive have priority over those turning left into Thomas Mitchell Drive.

Figure 3.6: Intersection of Denman Road and Thomas Mitchell Drive

Source: nearmap, image 12 March 2025.

The intersection of **Thomas Mitchell Drive and New England Highway** (Figure 3.7) is a seagull intersection with channelised deceleration lanes for vehicles turning into Thomas Mitchell Drive, and acceleration lanes for vehicles turning into New England Highway in both directions. Vehicles turning right into Thomas Mitchell Drive have priority over those turning left into Thomas Mitchell Drive, which approach via a slip lane with "give way" control. Vehicles turning right from Thomas Mitchell Drive have a "stop" control prior to crossing the northbound lane of New England Highway.

Figure 3.7: Intersection of New England Highway and Thomas Mitchell Drive

Source: nearmap, image 14 March 2025.

3.3 Historic Traffic Demands

TfNSW collects and publishes Annual Average Daily Traffic (AADT) volume data at selected locations on its roads. Available AADT data on roads in the vicinity of Muswellbrook since 2017 were reviewed and collated, and are summarised in Table 3.1.

Table 3.1: Historic Annual Average Daily Traffic Volumes (vehicles per day)

Road	TfNSW Station	2017	2018	2019	2020	2021	2022	2023	2024
New England Highway North of Macqueen Street, Aberdeen	T6158N	-	-	-	-	-	10,679	10,859	11,008
New England Highway South of Macqueen Street, Aberdeen	T6158S	-	-	-	-	-	10,652	10,866	10,920
New England Highway South of Macqueen Street, Aberdeen	06158	10,355	10,311	10,430	9,620	9,547	8,600	-	-
New England Highway North of Burtons Lane (north of Muswellbrook)	T6157N	-	-	-	-	-	10,450	-	-
New England Highway South of Burtons Lane (north of Muswellbrook)	T6160S						10,344		
New England Highway North of Burtons Lane (north of Muswellbrook)	06157	10,336	10,324	10,299	9,594	9,510	8,774	-	-
New England Highway South of Muscle Creek Road (south of Muswellbrook)	06154	9,349	9,393	9,569	8,660	8,624	8,856	-	-
New England Highway North of Rixs Creek Lane (north of Singleton)	06153	13,796	14,284	14,671	13,888	13,747	13,915	-	-
Merriwa Road West of Giants Creek Road, Sandy Hollow	06164	2,203	2,221	2,164	2,083	2,159	-		
Golden Highway West of Merriwa Road, Sandy Hollow	T6161W	-	-	-	-	2,267	2,420	2,438	2,446
Golden Highway West of Merriwa Road, Sandy Hollow	T6164E	-	-	-	-	2,341	2,412	2,442	2,440
Palace Street North of Kenilworth Street, Denman	05223	2,908	-	-	-	-	-		

Historic daily traffic volume data for roads of relevance to the Modification have also been collated from other available sources, and are summarised in Table 3.2, noting that as mining activity levels have changed over time, current volumes may be significantly different from the historic volumes, particularly on those roads used for access to and from mines in the region.

Table 3.2: Historic Daily Traffic Volumes (vehicles per day)

Road	Survey Date	Average Weekday	Average Daily	Data Source
Denman Road west of Bengalla Road	2012	-	2,993	GHD, 2017
Denman Road North of Thomas Mitchell Drive	2012 October 2013 June 2021	- 8,675 9,140	9,382 7,184 7,885	GHD, 2017 TTPP, 2019 TTPP, 2023
Denman Road north of Golden Highway	October 2013 November 2013	2,371 2,446	2,094 2,219	TTPP, 2019 Cardno, 2013
Golden Highway west of Denman Road	October 2013	4,231	3,898	TTPP, 2019
Golden Highway at Ogilvies Pass	November 2014	2,166	2,141	TTPP, 2019
Thomas Mitchell Drive between Denman Road and Industrial Area	November 2016 June 2018 June 2021	- 6,125 6,370	5,006 4,902 5,147	GHD, 2017 TTPP, 2019 TTPP, 2023
Thomas Mitchell Drive between Industrial Area and Mt Arthur Coal Mine main access	February 2013 June 2021	3,993 3,977	3,191 3,305	Hyder, 2013 TTPP, 2023
Thomas Mitchell Drive west of New England Highway	June 2018	3,350	2,817	TTPP, 2019

3.4 Traffic Survey Program

To quantify traffic conditions as a baseline against which future conditions can be assessed, a program of traffic surveys was undertaken on roads and intersections of relevance to the Mount Pleasant Operation. The traffic survey program was developed to quantify the characteristics of the traffic generated by the Mount Pleasant Operation, and its contribution to traffic on the primary Mount Pleasant Operation access routes.

The survey program included mid-block surveys using Automatic Tube Counters (ATCs) to quantify vehicle volumes and classifications by direction over one week between Tuesday 11 February and Monday 17 February 2020 (inclusive) on:

- Mount Pleasant Operation Access Road north of Wybong Road;
- Bengalla Road south-east of Wybong Road; and
- Wybong Road between Bengalla Road and Mount Pleasant Operation Access Road.

To examine the distribution of traffic, vehicle turning movement surveys were undertaken between 6:00 am and 6:00 pm on Wednesday 27 November 2019 at the intersections of:

- Mount Pleasant Operation Access Road and Wybong Road;
- Wybong Road and Kayuga Road;
- Wybong Road and Bengalla Road; and
- Bengalla Road and Denman Road.

A check survey using an ATC was also conducted on the Mount Pleasant Operation Access Road at the same time as the intersection surveys. The survey locations are presented on Figure 3.1, and results of the midblock and intersection surveys are presented in Appendix A.

At the time of the traffic surveys, the operational workforce at the Mount Pleasant Operation was 380 FTE personnel. Since the surveys were completed in early 2020, the workforce at the Mount Pleasant Operation has increased to approximately 560 FTE personnel in 2024. However, as this assessment is based on the proposed changes to workforce relative to the surveyed traffic conditions, the current workforce has no bearing on the results of the assessment.

3.5 Midblock Traffic Volumes

Table 3.3 presents a summary of the daily traffic volumes [4] surveyed at the midblock locations during February 2020.

Table 3.3: Surveyed Daily Traffic Volumes 2020 (vehicles per day)

Site[A]	Road	Mon	Tue	Wed	Thu	Fri	Sat	Sun
A	Mount Pleasant Operation Access Road	784	895	988	951	820	380	344
B	Bengalla Road south-east of Wybong Road	1,913	1,943	2,111	2,128	1,958	948	900
C	Wybong Road north of Bengalla Road	1,164	1,362	1,460	1,448	1,314	683	661

[A] *Refer to Figure 3.1.*

The results demonstrate that the weekday volumes are distinctly different from those on weekend days at all the surveyed locations. Over the surveyed week, Mount Pleasant Operation generated an average of 888 vehicles per weekday, and 362 vehicles per weekend day.

[4] *Throughout this report, the traffic volume at a point on the road network is the sum of the number of vehicles passing that point in both directions (or a single direction only if stated) within the given time period.*

The surveys included classification of the vehicles based on the Austroads-94 Vehicle Classification System. Light vehicles include motorcycles, cars, vans, 4-wheel drives (4WDs), and utilities (including those towing a trailer or caravan). Heavy vehicles include single unit rigid trucks and buses with two, three or four axles and up to 14.5 m long, as well as articulated vehicles (which include semi-trailers and rigid trucks with trailers, B-doubles and road trains where permitted). The surveyed average weekday daily classified traffic volumes are summarised in Table 3.4.

Table 3.4: Surveyed Average Weekday Daily Traffic Classification 2020 (vehicles per day)

Site[A]	Road	Light	Rigid	Articulated	Total	Percent Heavy
A	Mount Pleasant Operation Access Road	734	136	18	888	17.3
B	Bengalla Road south-east of Wybong Road	1,635	331	44	2,010	18.7
C	Wybong Road north of Bengalla Road	1,146	181	22	1,349	15.0

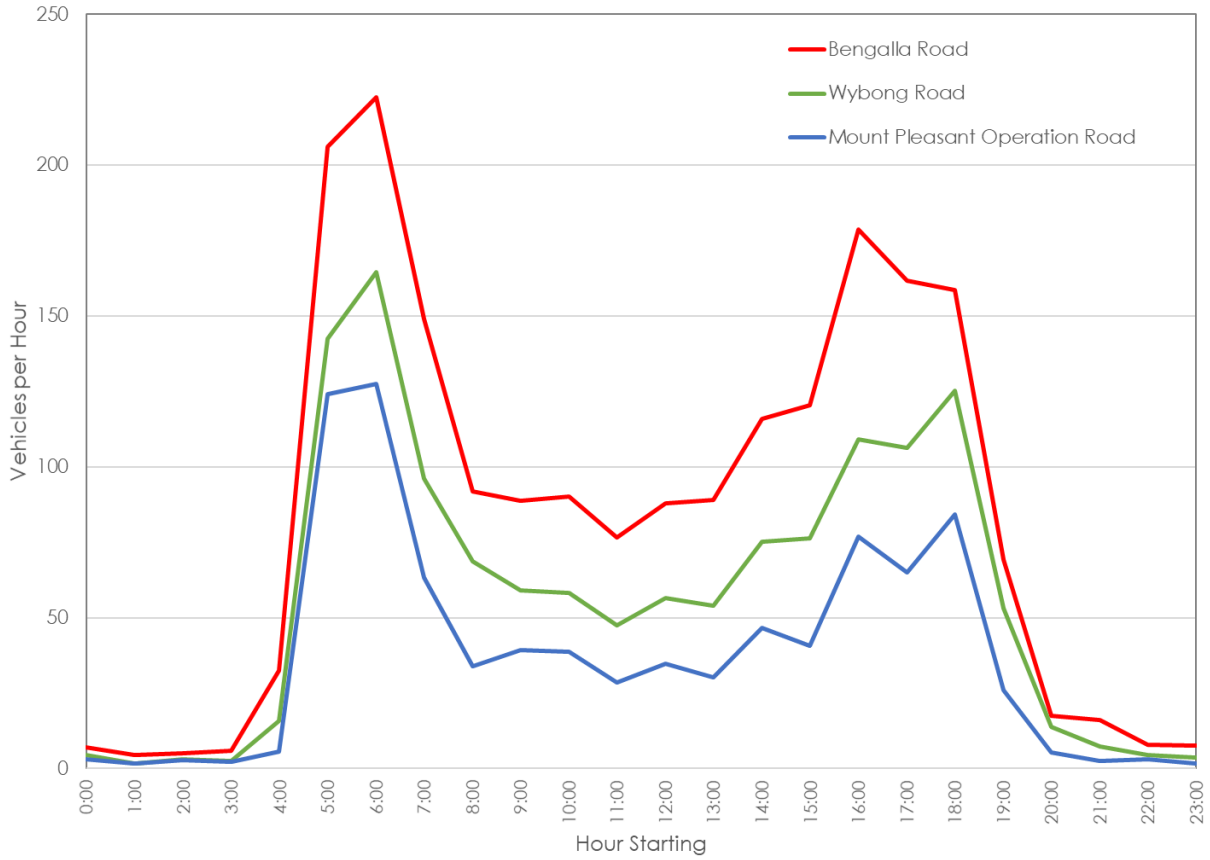
[A] *Refer to Figure 3.1.*

It is noted that, of the rigid vehicles on the Mount Pleasant Operation Access Road in Table 3.4, the significant majority are "Class 3" vehicles under the Austroads system, which include longer wheelbase utilities and 4WDs (such as Ford Rangers and RAM 1500 utilities), which are commonly used in mining operations, and which would otherwise be considered as light vehicles, having a Gross Vehicle Mass of less than 4.5 tonnes. The reported percent heavy vehicles in Table 3.4 assume that these vehicles are all heavy vehicles, and is therefore considered to overestimate the actual number of rigid heavy vehicles.

The survey results allow the distribution of traffic through the day on each road to be quantified. Figure 3.8 presents the hourly two-way traffic volumes over the average weekday at the surveyed locations.

Figure 3.8 demonstrates that the distribution of traffic throughout the day on the surveyed roads follows a similar pattern, with a distinct peak in traffic during the early morning, decreasing through the middle of the day, before increasing to a peak in the evening. The peak traffic on Bengalla Road in the evening occurred earlier than that on the Mount Pleasant Operation Access Road and on Wybong Road.

Figure 3.8: Surveyed Average Weekday Two-Way Traffic 2020 (vehicles per hour)



On the average weekday, the peak hourly traffic generation of the Mount Pleasant Operation occurred in the morning, with an average of 128 vehicles per hour between 6:00 am and 7:00 am, and a slightly lower peak of 124 vehicles per hour between 5:00 am and 6:00 am. The peak hour in the evening was significantly lower than the morning peak hour, with 84 vehicles per hour between 6:00 pm and 7:00 pm. The traffic generation surveyed between 4:00 pm and 5:00 pm was only slightly below that of the peak hour, with 77 vehicles per hour.

Table 3.5 summarises the surveyed average weekday two-way traffic flows during the morning and afternoon peak hours, which represent the busiest hour before and after midday at each survey location, measured over the average weekday.

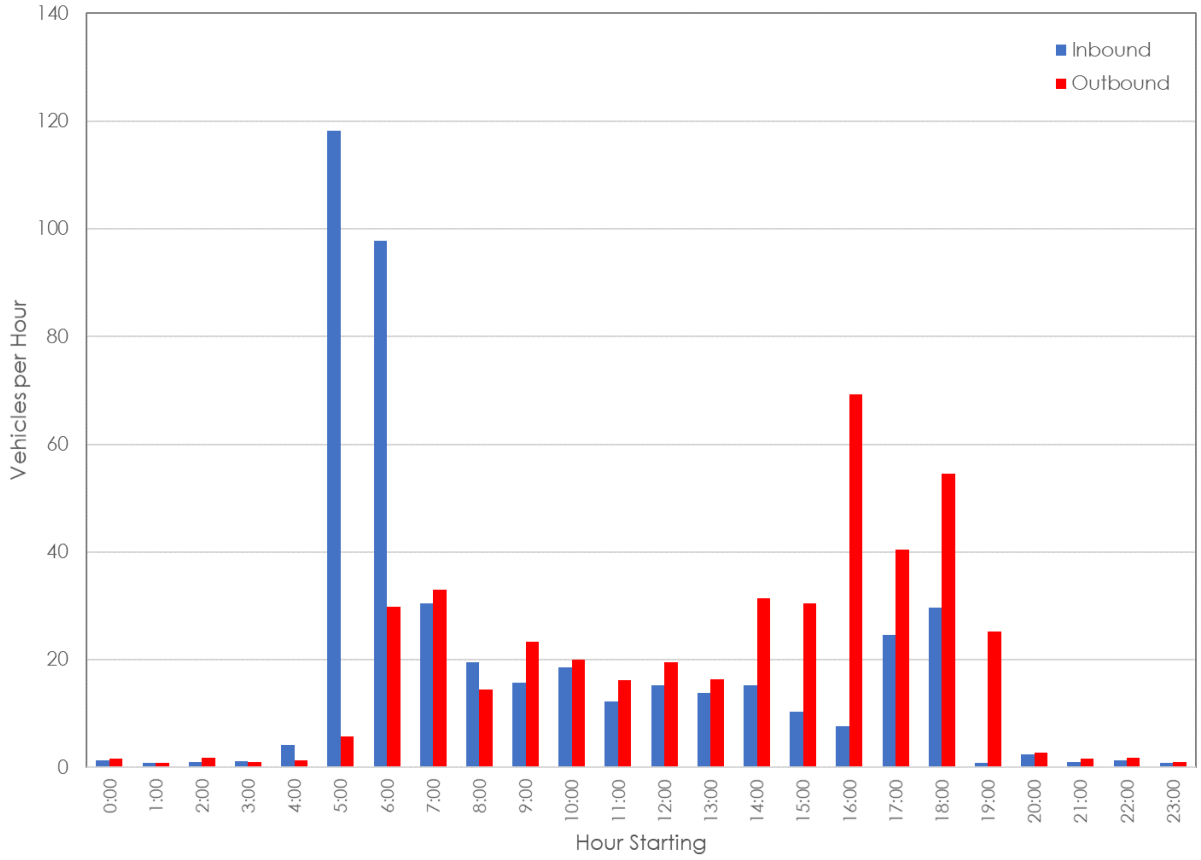
Table 3.5: Surveyed Average Weekday Peak Hourly Two-Way Traffic (vehicles per hour)

Site[A]	Road	AM Peak				PM Peak			
		Hour	Light	Heavy	Total	Hour	Light	Heavy	Total
A	Mount Pleasant Operation Access Road	6:00	109	19	128	18:00	75	9	84
B	Bengalla Road south-east of Wybong Road	6:00	186	36	222	16:00	152	27	179
C	Wybong Road north of Bengalla Road	6:00	145	19	164	18:00	110	15	125

[A] *Refer to Figure 3.1.*

Examination of the survey data (Figure 3.9) indicates that the traffic generated by the Mount Pleasant Operation displays a peak in the number of inbound vehicles between 5:00 am and 7:00 am, and a lower and more spread peak in the number of outbound vehicles between 4:00 pm and 7:00 pm.

Figure 3.9: Mount Pleasant Operation Average Weekday Hourly Traffic Distribution 2020

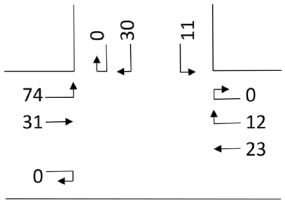
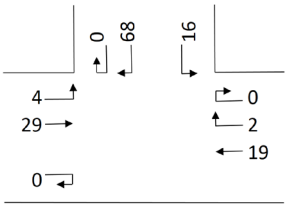
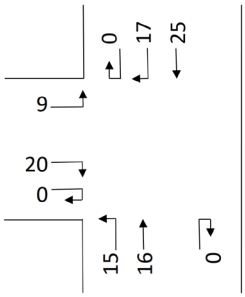
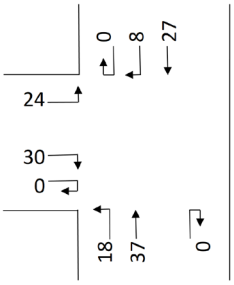
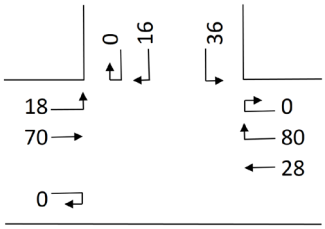
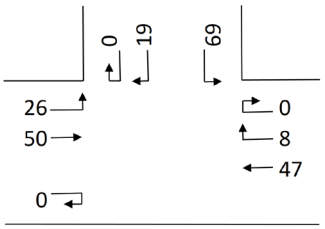
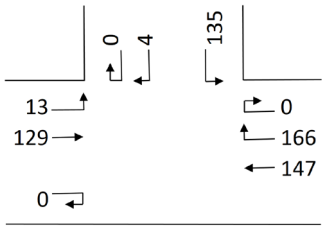
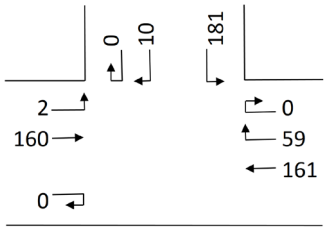


3.6 Intersection Turning Movements

Vehicle turning movements were recorded at the surveyed intersections at 15-minute intervals between 6:00 am and 6:00 pm on Wednesday 27 November 2019, during fine weather. The peak number of vehicle movements surveyed turning into and out of the Mount Pleasant Operation access at Wybong Road occurred between 6:15 am and 7:15 am and between 4:00 pm and 5:00 pm, noting that the intersection survey did not include the period after 6:00 pm when the ATC survey indicates that the busiest hour occurred on both the Mount Pleasant Operation Access Road and on Wybong Road. Based on the ATC survey results, during the peak hour captured by the intersection survey, the total number of vehicles on the Mount Pleasant Operation Access Road is estimated to be approximately 92% of the total during the peak hour between 6:00 pm and 7:00 pm captured by the ATC surveys.

The surveyed turning movements at all intersections during the surveyed peaks associated with the Mount Pleasant Operation traffic are summarised in Table 3.6.

Table 3.6: Traffic at Intersections During Surveyed Mount Pleasant Operation Peak Hours 2020

Site[A]	Intersection	6:15 am to 7:15 am (vehicles per hour)	4:00 pm to 5:00 pm[B] (vehicles per hour)
D	Mount Pleasant Operation Access Road and Wybong Road		
E	Wybong Road and Kayuga Road		
F	Wybong Road and Bengalla Road		
G	Bengalla Road and Denman Road		

[A] *Refer to Figure 3.1.*

[B] *Average weekday evening peak hour on Mount Pleasant Operation Access Road occurred from 6:00 pm to 7:00 pm, intersection surveys concluded at 6:00 pm so do not capture the Mount Pleasant Operation peak hour.*

The following observations were made from the results of the 12-hour intersection turning movement surveys:

- During the 12 hours surveyed at the intersection, 700 vehicles entered or exited the Mount Pleasant Operation, of which 87% were light vehicles and 13% were heavy vehicles. A check ATC survey undertaken on the Mount Pleasant Operation Access Road on the same day indicates that over the 12 hours surveyed, 79% of vehicles were light, 11% of vehicles were small trucks, 7% were medium trucks and less than 2% were large trucks (a small number of vehicles were unclassified by the tube counter). This confirms that the ATC results tend to overestimate the number of rigid heavy vehicles by classifying some larger light vehicles as small heavy vehicles.
- 80% of vehicles using the Mount Pleasant Operation Access Road approached or departed to the west on Wybong Road.

The intersection survey results also indicate that over the surveyed 12-hour period, the peak two-way traffic volumes recorded on the intersection approaches were as summarised in Table 3.7.

Table 3.7: Surveyed Peak Hourly Two-Way Traffic (vehicles per hour)

Road and Location	AM Peak				PM Peak			
	Hour Start	Light	Heavy	Total	Hour Start	Light	Heavy	Total
Bengalla Road East of Wybong Road	6:00	204	10	214	16:00	162	12	174
Bengalla Road North of Denman Road	6:00	354	22	376	16:15	246	17	263
Denman Road West of Bengalla Road	6:00	291	26	317	16:15	304	33	337
Denman Road East of Bengalla Road	6:00	599	48	647	16:15	534	48	582
Kayuga Road North of Wybong Road	6:45	64	5	69	16:15	96	3	99
Kayuga Road South of Wybong Road	8:00	86	9	95	16:15	123	2	125
Mount Pleasant Access North of Wybong Road	6:15	122	5	127	16:00	83	7	90
Wybong Road West of Bengalla Road	6:45	134	10	144	16:00	138	4	142
Wybong Road North of Bengalla Road	6:00	151	8	159	16:00	114	8	122
Wybong Road West of Mount Pleasant Access	6:00	150	8	158	16:00	113	7	120
Wybong Road East of Mount Pleasant Access	6:30	76	4	80	16:00	64	2	66
Wybong Road West of Kayuga Road	6:15	60	1	61	16:15	81	1	82

Between 6:00 am and 6:00 pm, Wednesday 27 November 2019.

3.7 Road Crash History

Road crash information was obtained from TfNSW for the five-year period from 1 January 2019 to 31 December 2023. The data include those crashes that conform to the national guidelines for reporting and classifying road vehicle crashes based on the following criteria:

- The crash was reported to the police.
- The crash occurred on a road open to the public.
- The crash involved at least one moving vehicle.
- The crash involved at least one person being killed or injured or at least one motor vehicle being towed away.

Crash data were reviewed for the following routes relevant to the Modification and surrounding roads:

- Wybong Road;
- Bengalla Road;
- Denman Road (including its intersection with Thomas Mitchell Drive);
- Thomas Mitchell Drive;
- Kayuga Road; and
- Castlerock Road.

Over the investigation period and routes reviewed, a total of 34 crashes occurred, resulting in five fatalities, eight people being seriously injured, and 19 people being moderately injured. Table 3.8 summarises the number and general types of crashes which occurred on the sections of road under consideration.

Table 3.8: General Crash Types (1 January 2019 to 31 December 2023)

Route	Route Length (km)	Pedestrian	Adjacent Approaches	Opposing Directions	Same Direction	U-turn/Parking	Overtaking	On Path	Off Path on Straight	Off Path on Curve	Total
Wybong Road	33	-	-	1	-	-	-	2	2	4	9
Bengalla Road	10	-	-	2	-	-	1	1	1	1	6
Denman Road	21	-	2	1	1	-	-	1	5	1	11
Thomas Mitchell Drive	11	-	-	2	1	1	-	-	-	2	6
Kayuga Road	8	-	1	-	-	-	-	-	1	-	2
Castlerock Road	20	-	-	-	-	-	-	-	-	-	-
Total Crashes by Type		**-**	**3**	**6**	**2**	**1**	**1**	**4**	**9**	**8**	**34**
Number of People Killed		-	-	5	-	-	-	-	-	-	5
Number of People Seriously Injured		-	-	2	-	1	-	-	2	3	8
Number of People Moderately Injured		-	2	8	-	-	2	-	4	3	19

Table 3.8 demonstrates that the most common types of crashes involved single vehicles leaving the carriageway, known as run-off-road (ROR) crashes, which made up 50% of the total reported crashes in Table 3.8. The Australian Road Research Board (2011) states that known causes of ROR crashes include:

- driver behaviours such as speed, inattention, avoidance manoeuvres, errant vehicles;
- driver impairment including fatigue, alcohol, drugs, mood state;
- road conditions such as horizontal alignment, shoulder deficiencies, slippery surface, poor delineation, damaged surfaces;
- vehicle failure; and
- environmental conditions such as rain, fog, snow, livestock or native fauna.

The three fatal crashes that occurred over the period investigated are detailed below.

- In September 2019, an eastbound motorcycle on the incorrect side of Wybong Road struck a westbound car head-on 1 km west of Castlerock Road. The crash occurred in daylight on a curve, with painted double centrelines. The road surface was dry and the weather fine. Neither speed nor fatigue were nominated as contributing factors to the crash, which resulted in one fatality and three people being moderately injured (Crash ID 1210907).
- In December 2020, an eastbound car travelling on the incorrect side of Thomas Mitchell Drive struck a westbound car head-on 4 km from Denman Road. The crash occurred in daylight on a curve, with painted double centrelines. The weather was overcast and the road surface was dry. Speeding was nominated as a contributing factor to the crash, which resulted in one fatality and two people being injured (Crash ID 1249392).
- In January 2021, a southbound light truck travelling on the incorrect side of Bengalla Road struck a northbound passenger van head-on 1 km south of Roxburgh Road. The crash occurred in darkness on a curve with painted double centrelines. The weather was fine, and the road surface was dry. Neither speed nor fatigue were nominated as contributing factors to the crash, which resulted in three fatalities and one person being seriously injured (Crash ID 1251909).

Features of the road crash history at the key intersections on the Mount Pleasant access routes are:

- No crashes occurred at or near the intersection of Wybong Road with the Mount Pleasant Operation Access Road.
- No crashes occurred at or near the intersection of Wybong Road with Bengalla Road.
- No crashes occurred at or near the intersection of Denman Road with Bengalla Road.
- Four crashes occurred at the intersection of Denman Road with Thomas Mitchell Drive, of which two occurred prior to completion of the upgrading of the intersection. Following the upgrade, one crash involved a light truck turning right from Thomas Mitchell Drive which struck a 4WD travelling southbound on Denman Road, and one crash involved a station wagon turning right from Denman Road which struck a light truck travelling southbound on Denman Road. Both crashes occurred in daylight, during fine weather and on a dry road surface
- No crashes occurred at or near the intersection of Kayuga Road with Wybong Road.

The data do not highlight any specific location with a notably poor crash history that may suggest an inherent concern with the road layout at that location.

3.8 Road Safety Audits

A Road Safety Audit (TTPP, 2020) was previously undertaken on existing roads west of Muswellbrook which are used by traffic generated by the Mount Pleasant Operation, including:

- Wybong Road between Kayuga Road and Mangoola Road (at the time of the audit, the eastern end of Wybong Road was closed between the Mount Pleasant Operation access and Logues Lane);
- Bengalla Road between Wybong Road and Denman Road;
- Denman Road between Skellatar Stock Route Road and approximately 2 km west of Edderton Road;
- Thomas Mitchell Drive between Denman Road and New England Highway; and
- Kayuga Road/Invermein Street between Wybong Road and Kayuga.

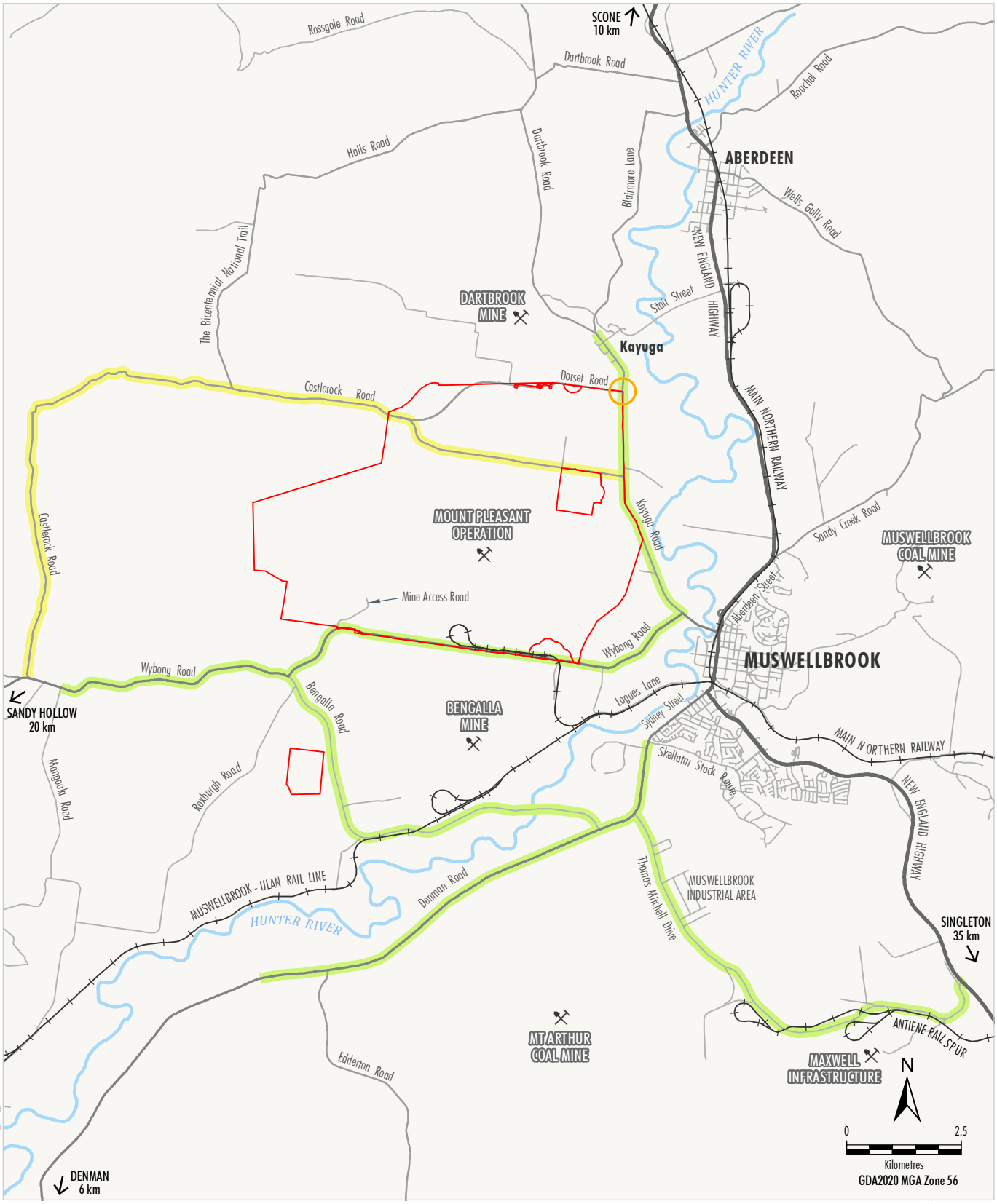
No items were found with a high risk rating. Items identified with a medium risk rating included unmarked crests, lack of linemarking, improperly connected W beam guard rails, and trees in the clear zone. Items identified with a low risk rating included poor drainage, lack of linemarking, no advance warning with reduced sight distance, damaged seal, and culverts in the clear zone.

A Road Safety Audit (TTPP, 2024) was previously undertaken for the full length of Castlerock Road and the intersection of Dorset Road and Kayuga Road, as required by Part B, Condition B96(b) of Development Consent SSD 10418 for the Mount Pleasant Optimisation Project. That condition required that "*any recommendations that may apply to the western portion of Castlerock Road within 1m of the site that would continue to serve public traffic*" be implemented. TTPP notes that under NSW Road Safety Auditing guidelines, recommendations are not provided in road safety audit records, hence it is the proponent's judgement whether and how issues raised in an audit are to be addressed.

Along the entire audit route, no items were found with a high risk rating. Items identified with a medium risk rating included a culvert with a significant drop, unmarked crests, and a fence post located close to the edge of the road on a curve. Items identified with a low risk rating included poor delineation, minor pavement drop offs, minor rutting, trees located near the shoulder, and damaged and faded signs.

The extent of the road safety audits conducted in 2020 and 2023 are shown in Figure 3.10.

A Road Safety Audit was also undertaken of the design of proposed remediation works at a culvert located on Wybong Road west of Logues Lane, to ensure there were no fundamental flaws in the geometric layout in relation to road safety (TTPP, 2025). That audit noted that the design plans did not indicate if guide posts and centreline marking on Wybong Road would be reinstated after the works are completed.



MAC-18-02A MOD8_RTA_203A

Source: TTPP (2024, 2020); NSW Spatial Services (2025)

LEGEND

- Mining Operation
- Railway
- Mining Lease Boundary (Mount Pleasant Operation)
- Extent of Road Safety Audit (2020)
- Extent of Road Safety Audit (2023)
- Intersection Road Safety Audit (2023)

MACHEnergy

MOUNT PLEASANT OPERATION

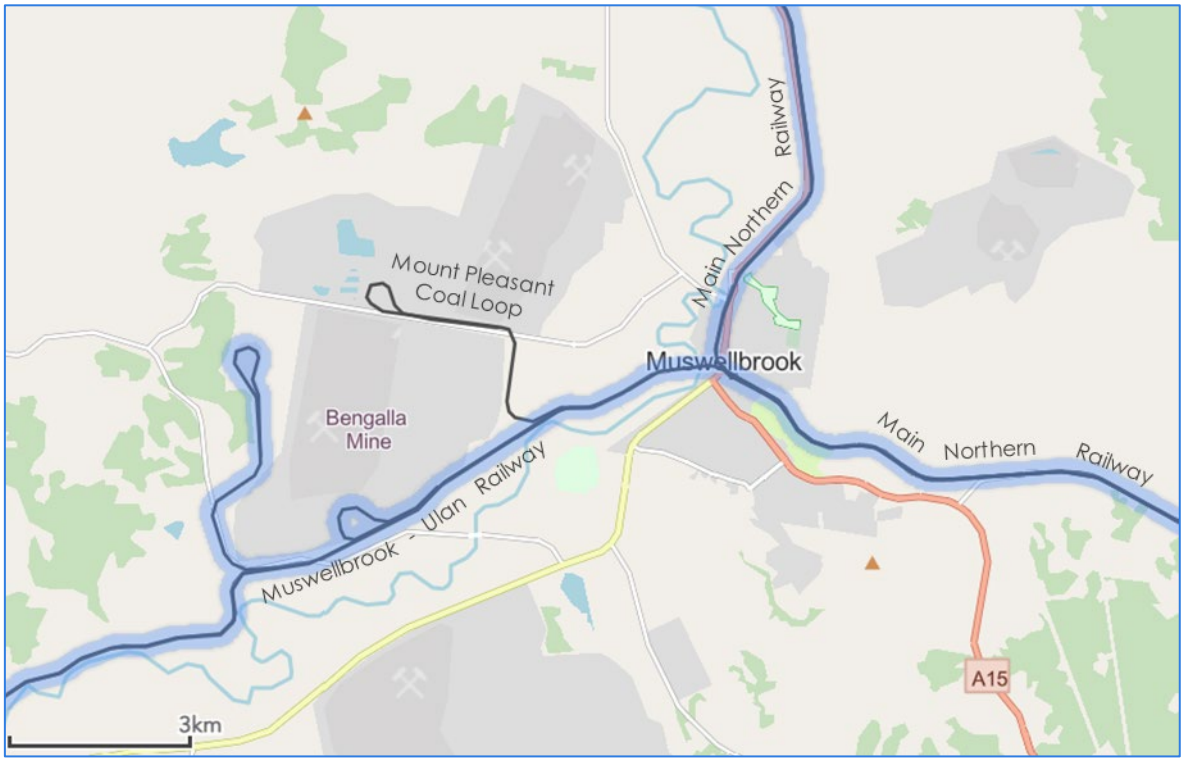
Extent of Road Safety Audits

Figure 3.10

3.9 Railway Crossings

Mount Pleasant Operation trains use the Main Northern Railway, Muswellbrook-Ulan Railway (also known as the Muswellbrook Merriwa Railway) and Mount Pleasant Coal Loop, as shown in Figure 3.11. The Australian Rail Track Corporation (ARTC) leases the Hunter Valley Coal Rail network, including the Main Northern Railway which links the coalfields to the north and the Port of Newcastle to the south, and the Muswellbrook-Ulan Railway which links the coalfields to the west with Muswellbrook. The Main Northern Railway lies to the east of the Mount Pleasant Operation, extending through Singleton to the south-east and Muswellbrook to the north. It provides the main railway connection between Sydney and Armidale, via Werris Creek, Tamworth, Muswellbrook, Newcastle and the Central Coast. The Muswellbrook-Ulan Railway lies to the south of the Mount Pleasant Operation, linking to the Main Northern Line at Muswellbrook. The Mount Pleasant Coal Loop is privately owned and connects to the Muswellbrook-Ulan Railway near Logues Lane, approximately 2.5 km from the Main Northern Line.

Figure 3.11: Railway Network



Source: ARTC (2023).

The rail/road crossings in the region and used by Mount Pleasant Operation trains and road traffic are grade separated, such that the road and rail traffic do not impede each other.

4 Modification Traffic Generation

4.1 Construction Activity

4.1.1 Construction Workforce

As described in Section 2.2 and 2.3, the workforce associated with the Modification construction activity is expected to peak at approximately 96 personnel (inclusive of some management and support staff) in 2026 and approximately six personnel in 2032, all of whom would work a day shift between 6:00 am and 5:00 pm on weekdays only.

As a robust assessment of the potential impacts of the Modification, it has been assumed that the construction workforce would all travel independently by private vehicle, and no allowance has been made for car-pooling. On this basis, the construction workforce would generate:

- 192 vehicle trips[5] per day (96 inbound and 96 outbound) in 2026; and
- 12 vehicle trips per day (6 inbound and 6 outbound) in 2032.

While this assessment is based on travel by private vehicles only, MACH may operate shuttle bus services between Muswellbrook and the Mount Pleasant Operation should the construction workforce require it. This would reduce the number of vehicle trips generated by the construction workforce compared with that assumed in this assessment. By way of comparison, one 22-seat Coaster-style shuttle bus operating at capacity would reduce the number of vehicle trips generated by the peak construction workforce from 192 to 152 vehicle trips per day (74 inbound and 74 outbound light vehicles plus two inbound and two outbound bus trips, assuming that the bus leaves the Mount Pleasant Operation after dropping off passengers in the morning, and returns in the evening prior to picking up passengers). Similarly, two buses operating at capacity would reduce the total trip generation to 112 vehicle trips per day (104 light vehicle trips and 8 bus trips).

Analysis of login and logout records at the Mount Pleasant Operation over an extended period of construction activity between May and December 2017 (prior to commencement of production) suggests that the majority of construction workers typically arrive over a period of a few hours around the start of the day, and depart over a longer period though the afternoon.

[5] *Consistent with Austroads definitions, throughout this report, a trip is a one-way movement. A vehicle which enters the Mount Pleasant Operation and departs the Mount Pleasant Operation generates two vehicle trips.*

4.1.2 Construction Visitors

Analysis of login and logout records at the Mount Pleasant Operation over an extended period of construction activity between May and December 2017 (prior to commencement of production) suggests that the number of visitor arrivals to the Mount Pleasant Operation was equivalent to 6.7% of construction worker arrivals. On this basis, construction activity at the Modification can be expected to generate approximately seven visitors per day in 2026 (construction workforce 96 personnel inclusive of some management and support staff) and less than one visitor per day in 2032 (construction workforce six personnel). Assuming each visitor travels independently, visitors would generate:

- 14 vehicle trips per day in 2026; and
- two vehicle trips per day in 2032 (assuming one visitor per day).

The number of visitor-generated trips during any one hour would be low, and the trips may occur at any time over the construction hours. For the purpose of this assessment, it has been assumed that the visitors to the Modification would arrive and depart following a similar pattern as suggested by the login and logout records of visitors during the construction period at the Mount Pleasant Operation between May and December 2017. This distribution should be considered indicative only.

4.1.3 Construction Heavy Vehicle Deliveries

Heavy vehicle deliveries associated with construction activities are expected to be of a similar magnitude as visitors as described in Section 4.1.2. On this basis, construction activity at the Modification can be expected to generate:

- 14 heavy vehicle trips per day in 2026; and
- two heavy vehicle trips per day in 2032.

The number of delivery trips during any one hour would be low, and the trips may occur at any time over the construction hours. Where practicable, heavy vehicle deliveries to the Mount Pleasant Operation are avoided during the commuter hours associated with the movement of the workforce. Deliveries would therefore generally occur after 7:30 am and before 4:30 pm. For the purpose of this assessment, it has been assumed that the deliveries for the Modification would arrive and depart during these hours only, noting that this distribution should be considered indicative only, as it may vary from day to day as delivery demands vary.

4.1.4 Total Construction Traffic Generation

Table 4.1 summarises the total traffic expected to be generated by the Modification construction activity during the peak construction stage in 2026. The total traffic expected to be generated by the construction activity would occur between 5:00 am and 7:00 pm.

Table 4.1: Modification Construction Traffic During Peak Construction 2026 (vehicles per hour)

Hour Start	Workforce Light Vehicles		Visitors Light Vehicles		Deliveries Heavy Vehicles		Total All Vehicles	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
5:00 am	19	-	1	-	-	-	20	-
6:00 am	**67**	-	**5**	-	**-**	-	**72**	-
7:00 am	10	-	1	-	-	-	11	-
8:00 am	-	-	-	-	1	-	1	-
9:00 am	-	-	-	-	1	-	1	-
10:00 am	-	-	-	1	1	1	1	2
11:00 am	-	-	-	-	1	1	1	1
12:00 pm	-	-	-	-	1	1	1	1
1:00 pm	-	-	-	1	1	1	1	2
2:00 pm	-	10	-	-	1	1	1	11
3:00 pm	-	10	-	-	-	1	-	11
4:00 pm	-	19	-	1	-	1	-	21
5:00 pm	-	**38**	-	**4**	**-**	-	-	**42**
6:00 pm	-	19	-	-	-	-	-	19
Daily[A]	**96**	**96**	**7**	**7**	**7**	**7**	**110**	**110**

[A] *Vehicles per day.*

Construction activity during the peak construction stage is therefore expected to generate 220 vehicle trips per day. Peak hours for the construction-generated vehicle trips would be between 6:00 am and 7:00 am, and between 5:00 pm and 6:00 pm.

Table 4.2 summarises the total traffic expected to be generated by the Modification construction activity during 2032.

Table 4.2: Modification Construction Traffic in 2032 (vehicles per hour)

Hour Start	Workforce Light Vehicles		Visitors Light Vehicles		Deliveries Heavy Vehicles		Total All Vehicles	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
5:00 am	1	-	-	-	-	-	1	-
6:00 am	**4**	**-**	**1**	**-**	**-**	**-**	**5**	**-**
7:00 am	1	-	-	-	-	-	1	-
8:00 am	-	-	-	-	1	-	1	-
9:00 am	-	-	-	-	-	-	-	-
10:00 am	-	-	-	-	-	1	-	1
11:00 am	-	-	-	-	-	-	-	-
12:00 pm	-	-	-	-	-	-	-	-
1:00 pm	-	-	-	-	-	-	-	-
2:00 pm	-	1	-	-	-	-	-	1
3:00 pm	-	1	-	-	-	-	-	1
4:00 pm	-	1	-	-	-	-	-	1
5:00 pm	**-**	**2**	**-**	**1**	**-**	**-**	**-**	**3**
6:00 pm	-	1	-	-	-	-	-	1
Daily[A]	**6**	**6**	**1**	**1**	**1**	**1**	**8**	**8**

[A] *Vehicles per day.*

Construction activity during 2032 is therefore expected to generate 16 vehicle trips per day. Peak hours for construction-generated vehicle trips would be between 6:00 am and 7:00 am, and between 5:00 pm and 6:00 pm.

4.2 Operational Activity

4.2.1 Operational Workforce

The total operational workforce at the Mount Pleasant Operation is expected to be at its peak of 575 personnel (555 personnel for traffic assessment purposes) during the extended life of the mine. Based on the operational workforce employed at the time of the traffic surveys of approximately 380 FTE workers, the Modification would result in an additional 175 FTE operational workers compared with the surveyed conditions in 2020.

As a result of the shift arrangements, the number of additional workers attending the Mount Pleasant Operation on any one day is fewer than the additional FTE workforce. Table 4.3 summarises the spread of the total additional workers by shift, and the number that may be present on a typical weekday.

Table 4.3: Modification Additional Operational Workforce in 2026 and 2032 by Shift Times

Shift Times	Shift Split (%)	Total Additional Personnel	Additional Personnel Present on a Weekday
7:00 am to 5:00 pm Monday to Friday	100%	9	9
7:00 am to 4:00 pm Monday to Friday	100%	14	14
7:00 am to 7:00 pm	100%	102	51
Day 7:00 am to 7:00 pm Night 7:00 pm to 7:00 am	Day 25% Night 25% Off 50%	46	23
Day 6:00 am to 6:00 pm Night 6:00 pm to 6:00 am	Day 25% Night 25% Off 50%	4	4
Total		**175**	**101**

Based on the shift arrangements presented in Table 4.3, it is anticipated that of the additional 175 FTE personnel, approximately 101 personnel would be present on a weekday. As a robust assessment of the potential traffic generation of those workers (i.e., to ensure that potential impacts are not understated), no allowance has been made for operational workers being on leave, and no allowance has been made for car-pooling of operational workers. On this basis, the additional operational workforce of 101 personnel present on a weekday would generate 202 vehicle trips per day (101 inbound and 101 outbound). The operational workforce would typically travel in light vehicles.

The distribution of the arrivals and departures of the additional workforce would relate the shift start and end times presented in Table 4.3, with operational workers arriving before the start of their shift and departing after the end of their shift.

4.2.2 Operational Visitors

Analysis of login records for visitors over the operational period during which the ATC surveys (Section 3.4) were conducted indicates that over the surveyed weekdays, an average of 10 visitors logged in to the Mount Pleasant Operation per day for every 100 personnel present. Based on the forecast additional operational workforce of 101 personnel present on a weekday in 2026 and 2032 compared with conditions captured in the February 2020 traffic surveys, the Modification can be expected to generate an additional 10 visitors per day. Assuming each visitor travels in a separate vehicle, they would generate an additional 20 vehicle trips per day.

Visitors would typically be spread throughout the day, primarily during daylight hours. It has been assumed that the operational visitors would arrive and depart following a similar pattern as suggested by analysis of visitor login and logout records at the Mount Pleasant Operation over an extended period between 9 July 2019 and 29 November 2019, and assuming each visitor travels in a separate vehicle. As the arrival and departure pattern of visitors may vary from day to day, this distribution should be considered indicative only.

4.2.3 Operational Heavy Vehicle Deliveries

Operational activity at the Mount Pleasant Operation requires deliveries of consumables such as diesel, coolant, oil, grease and explosives. The number of deliveries required to meet the demand for consumables at the time of the traffic surveys is presented in Table 4.4.

Table 4.4: Annual Number of Deliveries of Consumables in 2020

Consumable	Vehicle Type	Annual Deliveries
Diesel	B-double	692
Coolant	Rigid	7
Oil	Semitrailer	47
Grease	Rigid	18
Explosives	B-double	549
Total		**1,313**

Table 4.4 indicates that at the time of the traffic surveys in 2020, operational activities at the Mount Pleasant Operation required an average of approximately 25 deliveries per week.

With the increase in production from approximately 8.5 Mtpa at the time of the traffic surveys to 12.5 Mtpa with the Modification, it is anticipated that there would be a proportional increase in the demand for consumables. This would result in an average increase of approximately 12 deliveries per week, or less than two additional deliveries per day.

Deliveries may occur throughout the week, and would typically occur during daylight hours. As a robust assessment, and allowing for the arrival and departure of each delivery vehicle, it has been assumed that on a busy day, the Modification may result in four additional deliveries occurring on any one day, generating eight additional heavy vehicle trips per day above those captured in the 2020 traffic surveys.

Where practicable, heavy vehicle deliveries to the Mount Pleasant Operation are avoided during the commuter hours associated with the movement of the workforce. Deliveries would therefore generally be expected to occur after 7:30 am and before 4:30 pm.

4.2.4 Total Operational Traffic Generation

Table 4.5 summarises the additional traffic expected to be generated by operational activity at the Modification during 2026 and 2032, compared with surveyed conditions in 2020. The total traffic expected to be generated by the Modification operational activity would occur between 5:00 am and 8:00 pm.

Table 4.5: Modification Additional Operational Traffic 2026 and 2032 (vehicles per hour)

Hour Start	Workforce Light Vehicles		Visitors Light Vehicles		Deliveries Heavy Vehicles		Total All Vehicles	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
5:00 am	12	-	3	-	-	-	15	-
6:00 am	**52**	**12**	**1**	**-**	**-**	**-**	**53**	**12**
7:00 am	-	25	1	1	-	-	1	26
8:00 am	-	-	1	-	1	-	2	-
9:00 am	-	-	1	-	-	1	1	1
10:00 am	-	-	1	1	1	-	2	1
11:00 am	-	-	1	-	-	1	1	1
12:00 pm	-	-	-	1	1	-	1	1
1:00 pm	-	-	1	1	-	1	1	2
2:00 pm	-	-	-	1	1	-	1	1
3:00 pm	-	-	-	1	-	1	-	2
4:00 pm	-	14	-	1	-	-	-	15
5:00 pm	12	9	-	2	-	-	12	11
6:00 pm	**25**	**12**	**-**	**1**	**-**	**-**	**25**	**13**
7:00 pm	-	29	-	-	-	-	-	29
Daily[A]	**101**	**101**	**10**	**10**	**4**	**4**	**115**	**115**

[A] *Vehicles per day.*

Modification operational activity is therefore expected to generate an additional 230 vehicle trips per day in 2026 and 2032 compared with surveyed conditions in 2020. Peak hours for the additional operational vehicle trips would be between 6:00 am and 7:00 am, and between 6:00 pm and 7:00 pm.

4.3 Total Additional Modification Traffic Generation

The total forecast additional traffic generated as a result of the Modification during the peak construction stage (nominally in 2026) (above surveyed 2020 traffic) is presented in Table 4.6.

Table 4.6: Total Additional Modification Traffic in 2026 (vehicles per hour)

Hour Start	Light Vehicles		Heavy Vehicles		Total Vehicles		
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Total
5:00 am	35	-	-	-	35	-	35
6:00 am	125	12	-	-	125	12	137
7:00 am	12	26	-	-	12	26	38
8:00 am	1	-	2	-	3	-	3
9:00 am	1	-	1	1	2	1	3
10:00 am	1	2	2	1	3	3	6
11:00 am	1	-	1	2	2	2	4
12:00 pm	-	1	2	1	2	2	4
1:00 pm	1	2	1	2	2	4	6
2:00 pm	-	11	2	1	2	12	14
3:00 pm	-	11	-	2	-	13	13
4:00 pm	-	35	-	1	-	36	36
5:00 pm	12	53	-	-	12	53	65
6:00 pm	25	32	-	-	25	32	57
7:00 pm	-	29	-	-	-	29	29
Daily[A]	**214**	**214**	**11**	**11**	**225**	**225**	**450**

[A] *Vehicles per day.*

The total forecast additional traffic generated as a result of the Modification during 2032 (above surveyed 2020 traffic) is presented in Table 4.7.

Table 4.7: Total Additional Modification Traffic in 2032 (vehicles per hour)

Hour Start	Light Vehicles		Heavy Vehicles		Total Vehicles		
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Total
5:00 am	16	-	-	-	16	-	16
6:00 am	58	12	-	-	58	12	70
7:00 am	2	26	-	-	2	26	28
8:00 am	1	-	2	-	3	-	3
9:00 am	1	-	-	1	1	1	2
10:00 am	1	1	1	1	2	2	4
11:00 am	1	-	-	1	1	1	2
12:00 pm	-	1	1	-	1	1	2
1:00 pm	1	1	-	1	1	2	3
2:00 pm	-	2	1	-	1	2	3
3:00 pm	-	2	-	1	-	3	3
4:00 pm	-	16	-	-	-	16	16
5:00 pm	12	14	-	-	12	14	26
6:00 pm	25	14	-	-	25	14	39
7:00 pm	-	29	-	-	-	29	29
Daily[A]	**118**	**118**	**5**	**5**	**123**	**123**	**246**

[A] *Vehicles per day.*

4.4 Total Mount Pleasant Operation Traffic with Modification

The total two-way traffic forecast to be generated by the Mount Pleasant Operation with the Modification in 2026 and 2032 is summarised in Table 4.8 and Table 4.9 respectively. Table 4.8 and Table 4.9 indicate that with the Modification, the peak hours for traffic generated by the Mount Pleasant Operation would occur between 6:00 am and 7:00 am, and between 6:00 pm and 7:00 pm during both 2026 and 2032. As these would represent the times at which the Mount Pleasant Operation would have its greatest impact on the road network, they have been adopted as the peak hours for assessment of the traffic impacts of the Modification.

Table 4.8: Total Mount Pleasant Operation Traffic with Modification in 2026 (vehicles per hour)

Hour Start	Surveyed 2020		Modification Additional		Total Vehicles		
	Light	Heavy	Light	Heavy	Light	Heavy	Total
5:00 am	106	18	35	0	141	18	159
6:00 am	**109**	**19**	**137**	**0**	**246**	**19**	**265**
7:00 am	50	14	38	0	88	14	101
8:00 am	24	10	1	2	25	12	37
9:00 am	28	11	1	2	29	13	42
10:00 am	28	11	3	3	31	14	45
11:00 am	22	6	1	3	23	9	32
12:00 pm	25	10	1	3	26	13	39
1:00 pm	23	7	3	3	26	10	36
2:00 pm	36	11	11	3	47	14	61
3:00 pm	34	7	11	2	45	9	54
4:00 pm	69	7	35	1	104	8	113
5:00 pm	59	6	65	0	124	6	130
6:00 pm	**74**	**10**	**57**	**0**	**131**	**10**	**141**
7:00 pm	23	3	29	0	52	3	55
Daily[A]	**734**	**154**	**428**	**22**	**1,162**	**176**	**1,338**

[A] *Vehicles per day.*

Table 4.9: Total Mount Pleasant Operation Traffic with Modification in 2032 (vehicles per hour)

Hour Start	Surveyed 2020		Modification Additional		Total Vehicles		
	Light	Heavy	Light	Heavy	Light	Heavy	Total
5:00 am	106	18	16	0	122	18	140
6:00 am	**109**	**19**	**70**	**0**	**179**	**19**	**198**
7:00 am	50	14	28	0	78	14	91
8:00 am	24	10	1	2	25	12	37
9:00 am	28	11	1	1	29	12	41
10:00 am	28	11	2	2	30	13	43
11:00 am	22	6	1	1	23	7	30
12:00 pm	25	10	1	1	26	11	37
1:00 pm	23	7	2	1	25	8	33
2:00 pm	36	11	2	1	38	12	50
3:00 pm	34	7	2	1	36	8	44
4:00 pm	69	7	16	0	85	7	93
5:00 pm	59	6	26	0	85	6	91
6:00 pm	**74**	**10**	**39**	**0**	**113**	**10**	**123**
7:00 pm	23	3	29	0	52	3	55
Daily[A]	**734**	**154**	**236**	**10**	**970**	**164**	**1,134**

[A] *Vehicles per day.*

5 Baseline Future Traffic Conditions

This section describes the expected changes to traffic conditions in the region with approved and planned developments and growth in traffic compared with the surveyed traffic conditions. These are the conditions which are expected to occur without the Modification, and thus their cumulative impacts form the baseline conditions against which the Modification can be assessed.

5.1 Mount Pleasant Operation

This section discusses the future traffic generation of the Mount Pleasant Operation in the Modification assessment years, under Development Consent DA 92/97 conditions. Should the Modification not proceed, the Mount Pleasant Operation can be expected to operate with extraction of up to 10.5 Mtpa until 22 December 2026. Until that time, its workforce and extraction rate are expected to remain higher than at the time of the traffic surveys, so its traffic generation is likely to be higher than that surveyed during the traffic survey program described in Section 3.4.

5.1.1 Baseline 2026

Should the Modification not proceed, the total workforce at the Mount Pleasant Operation is expected to be less in 2026 than the existing 700 FTE personnel. For the purpose of this assessment, is assumed that a workforce of approximately 560 FTE personnel would be retained in 2026 under baseline conditions, representing an increase of 180 FTE personnel above the surveyed conditions in 2020. Production at the Mount Pleasant Operation may be up to 10.5 Mtpa, compared with the production rate of 8.54 Mtpa at the time of the traffic surveys.

Applying the same assumptions as described in Section 4.2 for the Modification operational workforce, under baseline conditions in 2026, of the additional 180 FTE personnel, approximately 106 workers would be present on any weekday above those present during the traffic surveys.

Applying the same assumptions as described in Section 4.2 for the Modification, the Mount Pleasant Operation can be expected to generate the following trips in addition to those captured during the 2020 surveys:

- 212 vehicle trips per day (106 inbound and 106 outbound) by the workforce;
- 22 vehicle trips per day (11 inbound and 11 outbound) by visitors; and
- average 3 additional heavy vehicle deliveries (six trips) per week.

Table 5.1 summarises the additional traffic expected to be generated by operational activity at the Mount Pleasant Operation during 2026 under Development Consent DA 92/97, should the Modification not proceed.

Table 5.1: Baseline Additional Mount Pleasant Operation Traffic 2026 (vehicles per hour)

Hour Start	Workforce Light Vehicles		Visitors Light Vehicles		Deliveries Heavy Vehicles		Total All Vehicles	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
5:00 am	19	-	4	-	-	-	23	-
6:00 am	50	12	1	-	-	-	51	12
7:00 am	-	25	1	-	-	-	1	25
8:00 am	-	-	1	-	1	-	2	-
9:00 am	-	-	1	-	-	1	1	1
10:00 am	-	-	1	1	1	-	2	1
11:00 am	-	-	1	1	-	1	1	2
12:00 pm	-	-	-	1	1	-	1	1
1:00 pm	-	-	-	1	-	1	-	2
2:00 pm	-	-	-	1	-	-	-	1
3:00 pm	-	-	-	1	-	-	-	1
4:00 pm	-	14	-	1	-	-	-	15
5:00 pm	12	15	-	2	-	-	12	17
6:00 pm	25	12	-	2	-	-	25	14
7:00 pm	-	28	-	-	-	-	-	28
Daily[A]	**106**	**106**	**11**	**11**	**3**	**3**	**120**	**120**

[A] *Vehicles per day.*
Traffic in this table is additional above 2020 surveyed traffic.

For clarity, under baseline conditions, the total daily trip generation of the Mount Pleasant Operation in 2026 is forecast to be a total of 968 light and 160 heavy vehicle trips per day, comprising:

- 734 light and 154 heavy vehicle trips per day surveyed in 2020 (Table 3.4), and
- 234 light and six heavy vehicle trips per day due to additional workforce and activity in 2026 (Table 5.1).

Table 5.2 summarises the forecast distribution of this additional traffic (Table 5.1) onto the road network during the peak hours and typical weekday.

Table 5.2: Baseline Change to Mount Pleasant Operation Average Weekday Traffic in 2026

Road and Location	6:00 am to 7:00 am (vehicles per hour)		6:00 pm to 7:00 pm (vehicles per hour)		Daily (vehicles per day)	
	Light	Heavy	Light	Heavy	Light	Heavy
Mount Pleasant Operation Access Road	63	0	39	0	234	6
Bengalla Road Wybong Road to Denman Road	47	0	30	0	182	6
Denman Road Golden Highway to Bengalla Road	3	0	2	0	14	0
Denman Road Bengalla Road to Thomas Mitchell Drive	44	0	28	0	168	6
Denman Road Thomas Mitchell Drive to Muswellbrook	26	0	16	0	96	4
Kayuga Road Wybong Road to Kayuga	12	0	7	0	42	0
New England Highway Thomas Mitchell Drive to Singleton	18	0	12	0	72	2
Thomas Mitchell Drive Denman Road to New England Highway	18	0	12	0	72	2
Wybong Road Kayuga Road to Mount Pleasant Operation	12	0	7	0	42	0
Wybong Road Mount Pleasant Operation to Bengalla Road	51	0	32	0	192	6
Wybong Road Bengalla Road to Golden Highway	4	0	2	0	10	0

In this table, changes are from 2020 surveyed traffic.

5.1.2 Baseline 2032

Under Development Consent DA 92/97, mining activity at the Mount Pleasant Operation would cease on 22 December 2026, and the generated traffic captured by the traffic survey program would be removed from the road network thereafter. Some traffic would be expected to continue to be generated as a result of decommissioning and rehabilitation activity. The volume of traffic that would be generated by these activities under baseline conditions in 2032 would be small compared to that generated by the Mount Pleasant Operation during the traffic surveys, and has not been considered further for the purpose of this assessment.

Based on the surveyed midblock traffic volumes during the Mount Pleasant Operation's peak hours, and the expected distribution of Mount Pleasant Operation traffic (GHD, 2017), the resulting changes to two-way traffic on the surrounding network in 2032 compared with those surveyed in 2020 have been estimated and are presented in Table 5.3.

Table 5.3: Baseline Change to Mount Pleasant Operation Average Weekday Traffic 2032

Road and Location	6:00 am to 7:00 am (vehicles per hour)		6:00 pm to 7:00 pm (vehicles per hour)		Daily (vehicles per day)	
	Light	Heavy	Light	Heavy	Light	Heavy
Mount Pleasant Operation Access Road	-109	-19	-74	-10	-734	-154
Bengalla Road Wybong Road to Denman Road	-85	-19	-57	-10	-567	-154
Denman Road Golden Highway to Bengalla Road	-6	-1	-3	0	-39	-16
Denman Road Bengalla Road to Thomas Mitchell Drive	-79	-18	-54	-10	-528	-138
Denman Road Thomas Mitchell Drive to Muswellbrook	-45	-10	-30	-6	-301	-76
Kayuga Road Wybong Road to Kayuga	-20	0	-14	0	-134	0
New England Highway Thomas Mitchell Drive to Singleton	-34	-8	-24	-4	-227	-62
Thomas Mitchell Drive Denman Road to New England Highway	-34	-8	-24	-4	-227	-62
Wybong Road Kayuga Road to Mount Pleasant Operation	-20	0	-14	0	-134	0
Wybong Road Mount Pleasant Operation to Bengalla Road	-89	-19	-60	-10	-600	-154
Wybong Road Bengalla Road to Golden Highway	-4	0	-3	0	-33	0

In this table, changes are from 2020 surveyed traffic.

5.2 Developments in the Region

Other projects in the region may impact on future traffic conditions on those roads serving the Mount Pleasant Operation. Key proposed or approved projects that may potentially interact with, or have potential cumulative impacts with, the traffic generated by the Modification have been identified with reference to the NSW Planning Portal, and are listed in Table 5.4. The projects are identified as being relevant in accordance with the *Cumulative Impact Assessment Guidelines for State Significant Projects* (Department of Planning, Industry and Environment, 2022). Projects have been identified with reference to potential changes in conditions in the region from the time of the traffic surveys in 2020.

Table 5.4: Relevant Projects for Cumulative Impact Assessment

Project	Overview	Status Summary	Report Section
Changes to Existing Projects (intensity of operations may change)			
Maxwell Underground Mine	SSD 9526 – underground mining to produce high quality coals primarily for the steel industry using existing and proposed new infrastructure. Extract and process up to 8 Mtpa ROM coal, mine life to 30 June 2047.	Approved 2020, construction commenced May 2022, operations not fully commenced	C.1
Mangoola Coal Continued Operations Project	SSD 8642 – extension of open cut mining at Mangoola Coal to a new mining area immediately north of the existing operation. Mine life to 31 December 2030.	Approved 2021, construction commenced December 2021, mining commenced December 2022	C.2
Bengalla Continuation Project	SSD 5170 – extract and process up to 15 Mtpa of ROM coal, mine life to 28 February 2039.	Approved 2015, operational	C.3
Dartbrook Mine	DA 231-7-200 Mod 7 – underground mining, extract and process up to 6 Mtpa ROM coal, mine life to 5 December 2027.	In care and maintenance, mining activity may recommence	C.4
Mt Arthur Coal Mine	MP 09_0062 – open cut mining up to 32 Mtpa ROM coal, mine life to 30 June 2030; MP 06-0091 – underground mining up to 8 Mtpa ROM coal, mine life to 31 December 2030.	Open cut operational, Modification 2 approved April 2025, closure planned 2030.	C.5
Former Drayton Mine	06-0202 – extract and process up to 8 Mtpa ROM coal, mine life to 31 December 2017.	Ceased operating in 2016, in care and maintenance from 2016 to 2022	C.6
Liddell Power Station	Former coal fired power station.	Closure occurred in April 2023	C.7
Bayswater Power Station	Existing coal fired power station.	Operational, planned closure 2030 to 2033	C.7
Approved Projects (approved under EP&A Act but not yet started)			
Maxwell Solar Farm	SSD 9820 – development of a 25 MW solar farm and associated infrastructure.	Approved 2020, not commenced	C.8
Mount Pleasant Optimisation Project	SSD 10418 – extend the life of the open cut operation by mining deeper coal seams, using existing and proposed new infrastructure. Extend mine life to 22 December 2048.	Approved 2022	C.9
Liddell Battery and Bayswater Ancillary Works	SSD 8889679 – construct and operate a Battery Energy Storage System (BESS), decouple Liddell and Bayswater power stations, facilitate improved performance of Bayswater Power Station.	Approved, not commenced	C.10
Muswellbrook Battery Energy Storage System (BESS)	SSD 29704663 – development of a 150 MW / 300 MWh battery energy storage facility with associated infrastructure.	Approved July 2023	C.11
Bowmans Creek Wind Farm Stage 1	SSD 10315 – construction and operation of a wind farm with up to 60 wind turbines and associated infrastructure.	Approved 2024, not commenced	C.12

Project	Overview	Status Summary	Report Section
Muswellbrook Solar Farm	SSD-46543209 – development of a solar PV generation facility and associated infrastructure.	Approved May 2025, not commenced	C.13
Projects Under Assessment (exhibited and currently under assessment)			
Dartbrook Mine Modification 8	DA231-07-2000-Mod-8 - proposed extension of mine life for six years	Requested information Jully 2025.	C.4
Emerging Development Proposals (potentially relevant)			
Muswellbrook Pumped Hydro Energy Storage Project	SSI-76014961 – pumped hydro power station, operational life up to 100 years.	SEARs issued 2024	C.14
Upper Hunter BESS	SSD-61707209 – 400 MW BESS and associated infrastructure.	SEARs issued July 2025	C.15
Upper Hunter South Solar Farm	SSD-65996959 – construction and operation of a solar PV energy generating facility and associated infrastructure including transmission connection works and BESS.	On exhibition November-December 2025	C.16
Denman BESS	SSD-76189216 – construction, operation and decommissioning of a BESS and ancillary infrastructure.	On exhibition November-December 2025	C.17
Kayuga Solar Farm	SSD-69489708 – construction and operation of a 80-100 MW solar farm and BESS.	SEARs issued May 2024	C.17
Bowmans Creek Wind Farm Stage 2	SSD-73123714 – construction and operation of a 120 MW wind farm with 21 wind turbines and associated infrastructure.	SEARs issued May 2025	C.18
Edderton Solar Project	SSD-69965958 – construction and operation of a 350 MW solar photovoltaic energy generating facility and BESS.	SEARs issued May 2024	C.19

Each of the projects in Table 5.4 have been reviewed and are discussed in Appendix C. The resulting application of the potential cumulative impacts of developments assumed in this assessment is summarised in Table 5.5.

Table 5.5: Consideration of Other Developments in Modification Assessment Years

Development	Surveyed 2020	Modification Peak Construction 2026	Modification Operational 2032
Mount Pleasant Operation (no Modification, no Mount Pleasant Optimisation Project)	Operational traffic accounted for in surveyed traffic volumes.	Additional workforce traffic.	Cessation of mining, removal of existing operational traffic.
Maxwell Underground Mine	No activity.	Operational traffic.	
Mangoola Coal	Operational traffic accounted for in surveyed traffic volumes.		Rehabilitation traffic accounted for in surveyed traffic volumes.
Bengalla Mine	Operational traffic accounted for in surveyed traffic volumes.	Additional workforce traffic.	
Dartbrook Mine	Care and maintenance activity accounted for in surveyed traffic volumes.	Operational, with negligible overlap, not	Care and maintenance activity accounted for in surveyed traffic volumes.

Development	Surveyed 2020	Modification Peak Construction 2026	Modification Operational 2032
		accounted for in this assessment.	
Mt Arthur Coal Mine	Operational traffic accounted for in surveyed traffic volumes.	Additional approved Modification 2 operational heavy vehicle traffic above that accounted for in the surveyed traffic volumes.	Cessation of mining, removal of existing operational traffic, and addition of traffic for rehabilitation activities.
Former Drayton Mine	Care and maintenance activity accounted for in surveyed traffic volumes.	No activity.	
Liddell and Bayswater Power Stations	Operational traffic accounted for in surveyed traffic volumes.	Cessation of activity at Liddell, not accounted for in this assessment.	Closure activities at Bayswater possible, not accounted for in this assessment.
Maxwell Solar Project	No activity.	Operational, with negligible traffic generation.	
Mount Pleasant Optimisation Project	Not relevant as the Modification will not coincide with Mount Pleasant Optimisation Project, not accounted for in this assessment.		
Liddell Battery and Bayswater Ancillary Works	No activity.	Additional Liddell Battery construction traffic.	Operational traffic accounted for in traffic surveys.
Muswellbrook BESS	No activity.	Construction traffic, with negligible overlap, not accounted for in this assessment.	Operational, with negligible traffic generation, not accounted for in this assessment.
Bowmans Creek Wind Farm Stage 1	No activity.	Additional peak construction traffic accounted for in this assessment.	Operational, with negligible traffic generation, not accounted for in this assessment.
Muswellbrook Solar Farm	No activity.	Construction traffic, with negligible overlap, not accounted for in this assessment.	Operational, with negligible traffic generation, not accounted for in this assessment.
Muswellbrook Pumped Hydro Energy Storage Project	No activity.	Subject to future assessment and approval, not accounted for in this assessment.	
Upper Hunter BESS	No activity.	Subject to future assessment and approval, not accounted for in this assessment.	
Upper Hunter South Solar Farm	No activity.	Subject to future assessment and approval, not accounted for in this assessment.	
Denman BESS	No activity.	Subject to future assessment and approval, not accounted for in this assessment.	
Kayuga Solar Farm	No activity.	Subject to future assessment and approval, not accounted for in this assessment.	
Bowmans Creek Wind Farm Stage 2	No activity.	Subject to future assessment and approval, not accounted for in this assessment.	
Edderton Solar Project	No activity.	Subject to future assessment and approval, not accounted for in this assessment.	

The resulting cumulative changes in peak hourly and daily traffic volumes as a result of the above changes to developments in the region as discussed in Sections 5.1 and 5.2 are summarised in:

- Table 5.6 to Table 5.8 for 2026; and
- Table 5.9 to Table 5.11 for 2032.

These changes are relative to the traffic conditions as surveyed in 2020, and are presented for the sections of roads expected to be used by Mount Pleasant Operation traffic.

Table 5.6: Average Weekday 6:00 am to 7:00 am Baseline Changes to Traffic Due to Developments from 2020 to 2026 (vehicles per hour)

Road and Location	Mount Pleasant		Maxwell		Bengalla		Mt Arthur		Drayton		Liddell		Bowmans		Total		
	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Total
Mount Pleasant Operation Access Road	63	0	0	0	0	0	0	0	0	0	0	0	0	0	63	0	63
Bengalla Road Wybong Road to Bengalla Mine	42	0	0	0	14	0	0	0	0	0	0	0	0	0	56	0	56
Bengalla Road Bengalla Mine to Denman Road	42	0	0	0	36	2	0	0	0	0	0	0	0	0	78	2	80
Denman Road Golden Highway to Bengalla Road	1	0	7	0	3	0	0	1	0	0	0	0	0	0	11	1	12
Denman Road Bengalla Road to Thomas Mitchell Drive	41	0	7	0	33	2	0	1	0	0	0	0	0	0	81	3	84
Denman Road Thomas Mitchell Drive to Muswellbrook	25	0	1	0	20	0	0	12	0	0	0	0	0	0	46	12	58
Kayuga Road Wybong Road to Kayuga	16	0	0	0	14	0	0	0	0	0	0	0	0	0	30	0	30
New England Highway Thomas Mitchell Drive to Singleton	16	0	46	3	13	2	0	5	-4	0	40	1	38	6	149	17	166
Thomas Mitchell Drive Denman Road to Mt Arthur Coal Access	16	0	8	0	13	2	0	11	0	0	0	0	0	0	37	13	50
Thomas Mitchell Drive Bayswater Access to Maxwell Access	16	0	8	0	13	2	0	10	0	0	0	0	0	0	37	12	49
Thomas Mitchell Drive Maxwell Access to New England Highway	16	0	90	6	13	2	0	10	-7	-1	0	0	0	0	112	17	129
Wybong Road Mount Pleasant Operation to Kayuga Road	16	0	0	0	14	0	0	0	0	0	0	0	0	0	30	0	30
Wybong Road Mount Pleasant Operation to Bengalla Road	47	0	0	0	14	0	0	0	0	0	0	0	0	0	61	0	61
Wybong Road Bengalla Road to Golden Highway	5	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5

Table 5.7: Average Weekday 6:00 pm to 7:00 pm Baseline Changes to Traffic Due to Developments from 2020 to 2026 (vehicles per hour)

Road and Location	Mount Pleasant		Maxwell		Bengalla		Mt Arthur		Drayton		Liddell		Bowmans		Total		
	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Total
Mount Pleasant Operation Access Road	39	0	0	0	0	0	0	0	0	0	0	0	0	0	39	0	39
Bengalla Road Wybong Road to Bengalla Mine	26	0	0	0	1	0	0	0	0	0	0	0	0	0	27	0	27
Bengalla Road Bengalla Mine to Denman Road	26	0	0	0	2	0	0	0	0	0	0	0	0	0	28	0	28
Denman Road Golden Highway to Bengalla Road	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	2
Denman Road Bengalla Road to Thomas Mitchell Drive	25	0	0	0	2	0	0	1	0	0	0	0	0	0	27	1	28
Denman Road Thomas Mitchell Drive to Muswellbrook	15	0	0	0	1	0	0	12	0	0	0	0	0	0	16	12	28
Kayuga Road Wybong Road to Kayuga	10	0	0	0	1	0	0	0	0	0	0	0	0	0	11	0	11
New England Highway Thomas Mitchell Drive to Singleton	10	0	4	0	1	0	0	4	-1	0	40	1	38	6	92	11	103
Thomas Mitchell Drive Denman Road to Mt Arthur Coal Access	10	0	0	0	1	0	0	11	0	0	0	0	0	0	11	11	22
Thomas Mitchell Drive Bayswater Access to Maxwell Access	10	0	0	0	1	0	0	8	0	0	0	0	0	0	11	8	19
Thomas Mitchell Drive Maxwell Access to New England Highway	10	0	8	0	1	0	0	8	-1	0	0	0	0	0	18	8	26
Wybong Road Mount Pleasant Operation to Kayuga Road	10	0	0	0	1	0	0	0	0	0	0	0	0	0	11	0	11
Wybong Road Mount Pleasant Operation to Bengalla Road	29	0	0	0	1	0	0	0	0	0	0	0	0	0	30	0	30
Wybong Road Bengalla Road to Golden Highway	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3

Table 5.8: Average Weekday Daily Baseline Changes to Traffic Due to Developments in 2026 (vehicles per day)

Road and Location	Mount Pleasant		Maxwell		Bengalla		Mt Arthur		Drayton		Liddell		Bowmans		Total		
	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Total
Mount Pleasant Operation Access Road	234	6	0	0	0	0	0	0	0	0	0	0	0	0	234	6	240
Bengalla Road Wybong Road to Bengalla Mine	162	6	0	0	28	0	0	0	0	0	0	0	0	0	190	6	196
Bengalla Road Bengalla Mine to Denman Road	162	6	0	0	72	16	0	0	0	0	0	0	0	0	234	22	256
Denman Road Golden Highway to Bengalla Road	8	0	28	0	4	0	0	14	-6	0	0	0	0	0	34	14	48
Denman Road Bengalla Road to Thomas Mitchell Drive	154	6	28	0	68	16	0	14	-6	0	0	0	0	0	244	36	280
Denman Road Thomas Mitchell Drive to Muswellbrook	92	4	12	16	40	0	0	79	0	-2	0	0	0	0	144	97	241
Kayuga Road Wybong Road to Kayuga	58	0	0	0	28	0	0	0	0	0	0	0	0	0	86	0	86
New England Highway Thomas Mitchell Drive to Singleton	62	2	190	32	28	16	0	25	-39	-7	80	16	76	66	397	150	547
Thomas Mitchell Drive Denman Road to Mt Arthur Coal Access	62	2	40	16	28	16	0	65	-6	-2	0	0	0	0	124	97	221
Thomas Mitchell Drive Bayswater Access to Maxwell Access	62	2	40	16	28	16	0	48	-6	-2	0	0	0	0	124	80	204
Thomas Mitchell Drive Maxwell Access to New England Highway	62	2	374	64	28	16	0	48	-76	-14	0	0	0	0	388	116	504
Wybong Road Mount Pleasant Operation to Kayuga Road	58	0	0	0	28	0	0	0	0	0	0	0	0	0	86	0	86
Wybong Road Mount Pleasant Operation to Bengalla Road	176	6	0	0	28	0	0	0	0	0	0	0	0	0	204	6	210
Wybong Road Bengalla Road to Golden Highway	14	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	14

Table 5.9: Average Weekday 6:00 am to 7:00 am Baseline Changes to Traffic Due to Developments from 2020 to 2032 (vehicles per hour)

Road and Location	Mount Pleasant		Maxwell		Bengalla		Mt Arthur		Drayton		Total		
	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Total
Mount Pleasant Operation Access Road	-109	-19	0	0	0	0	0	0	0	0	-109	-19	-128
Bengalla Road Wybong Road to Bengalla Mine	-76	-19	0	0	14	0	0	0	0	0	-62	-19	-81
Bengalla Road Bengalla Mine to Denman Road	-76	-19	0	0	36	2	0	0	0	0	-40	-17	-57
Denman Road Golden Highway to Bengalla Road	-4	-1	7	0	3	0	-13	-1	0	0	-7	-2	-9
Denman Road Bengalla Road to Thomas Mitchell Drive	-72	-18	7	0	33	2	-13	-1	0	0	-45	-17	-62
Denman Road Thomas Mitchell Drive to Muswellbrook	-43	-10	1	0	20	0	-133	-32	0	0	-155	-42	-197
Kayuga Road Wybong Road to Kayuga	-26	0	0	0	14	0	0	0	0	0	-12	0	-12
New England Highway Thomas Mitchell Drive to Singleton	-29	-8	46	3	13	2	-76	-22	-4	0	-50	-25	-75
Thomas Mitchell Drive Denman Road to Mt Arthur Coal Access	-29	-8	8	0	13	2	-141	-31	0	0	-149	-37	-186
Thomas Mitchell Drive Bayswater Access to Maxwell Access	-29	-8	8	0	13	2	-76	-22	0	0	-84	-28	-112
Thomas Mitchell Drive Maxwell Access to New England Highway	-29	-8	90	6	13	2	-76	-22	-7	-1	-9	-23	-32
Wybong Road Mount Pleasant Operation to Kayuga Road	-26	0	0	0	14	0	0	0	0	0	-12	0	-12
Wybong Road Mount Pleasant Operation to Bengalla Road	-83	-19	0	0	14	0	0	0	0	0	-69	-19	-88
Wybong Road Bengalla Road to Golden Highway	-7	0	0	0	0	0	0	0	0	0	-7	0	-7

Table 5.10: Average Weekday 6:00 pm to 7:00 pm Baseline Changes to Traffic Due to Developments from 2020 to 2032 (vehicles per hour)

Road and Location	Mount Pleasant		Maxwell		Bengalla		Mt Arthur		Drayton		Total		
	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Total
Mount Pleasant Operation Access Road	-74	-10	0	0	0	0	0	0	0	0	-74	-10	-84
Bengalla Road Wybong Road to Bengalla Mine	-52	-10	0	0	1	0	0	0	0	0	-51	-10	-61
Bengalla Road Bengalla Mine to Denman Road	-52	-10	0	0	2	0	0	0	0	0	-50	-10	-60
Denman Road Golden Highway to Bengalla Road	-3	0	0	0	0	0	-11	0	0	0	-14	0	-14
Denman Road Bengalla Road to Thomas Mitchell Drive	-49	-10	0	0	2	0	-11	0	0	0	-58	-10	-68
Denman Road Thomas Mitchell Drive to Muswellbrook	-29	-6	0	0	1	0	-114	-24	0	0	-142	-30	-172
Kayuga Road Wybong Road to Kayuga	-18	0	0	0	1	0	0	0	0	0	-17	0	-17
New England Highway Thomas Mitchell Drive to Singleton	-20	-4	4	0	1	0	-67	-16	-1	0	-83	-20	-103
Thomas Mitchell Drive Denman Road to Mt Arthur Coal Access	-20	-4	0	0	1	0	-124	-23	0	0	-143	-27	-170
Thomas Mitchell Drive Bayswater Access to Maxwell Access	-20	-4	0	0	1	0	-67	-16	0	0	-86	-20	-106
Thomas Mitchell Drive Maxwell Access to New England Highway	-20	-4	8	0	1	0	-67	-16	-1	0	-79	-20	-99
Wybong Road Mount Pleasant Operation to Kayuga Road	-18	0	0	0	1	0	0	0	0	0	-17	0	-17
Wybong Road Mount Pleasant Operation to Bengalla Road	-56	-10	0	0	1	0	0	0	0	0	-55	-10	-65
Wybong Road Bengalla Road to Golden Highway	-4	0	0	0	0	0	0	0	0	0	-4	0	-4

Table 5.11: Average Weekday Daily Baseline Changes to Traffic Due to Developments from 2020 to 2032 (vehicles per day)

Road and Location	Mount Pleasant		Maxwell		Bengalla		Mt Arthur		Drayton		Total		
	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Total
Mount Pleasant Operation Access Road	-734	-154	0	0	0	0	0	0	0	0	-734	-154	-888
Bengalla Road Wybong Road to Bengalla Mine	-507	-154	0	0	28	0	0	0	0	0	-479	-154	-633
Bengalla Road Bengalla Mine to Denman Road	-507	-154	0	0	72	16	0	0	0	0	-435	-138	-573
Denman Road Golden Highway to Bengalla Road	-26	-16	28	0	4	0	-84	-21	-6	0	-84	-37	-121
Denman Road Bengalla Road to Thomas Mitchell Drive	-481	-138	28	0	68	16	-84	-21	-6	0	-475	-143	-618
Denman Road Thomas Mitchell Drive to Muswellbrook	-287	-76	12	16	40	0	-879	-263	0	-2	-1114	-325	-1439
Kayuga Road Wybong Road to Kayuga	-180	0	0	0	28	0	0	0	0	0	-152	0	-152
New England Highway Thomas Mitchell Drive to Singleton	-194	-62	190	32	28	16	-493	-175	-39	-7	-508	-196	-704
Thomas Mitchell Drive Denman Road to Mt Arthur Coal Access	-194	-62	40	16	28	16	-915	-252	-6	-2	-1,047	-284	-1,331
Thomas Mitchell Drive Bayswater Access to Maxwell Access	-194	-62	40	16	28	16	-493	-175	-6	-2	-625	-207	-832
Thomas Mitchell Drive Maxwell Access to New England Highway	-194	-62	374	64	28	16	-493	-175	-76	-14	-361	-171	-532
Wybong Road Mount Pleasant Operation to Kayuga Road	-180	0	0	0	28	0	0	0	0	0	-152	0	-152
Wybong Road Mount Pleasant Operation to Bengalla Road	-554	-154	0	0	28	0	0	0	0	0	-526	-154	-680
Wybong Road Bengalla Road to Golden Highway	-47	0	0	0	0	0	0	0	0	0	-47	0	-47

5.3 Renewable Energy Zone Developments

It is understood that in recent years, proponents of renewable energy projects in the Central West Orana and New England Renewable Energy Zones (REZs) have requested use of local roads to transport oversize and/or overmass (OSOM) components, in response to existing physical restrictions and limitations on the State road network in the Muswellbrook Local Government Area (LGA) that have created barriers to the movement of OSOM vehicles and the development of REZs in the central west and north of NSW. In response to the potential number and extended timing of such OSOM movements, MSC and TfNSW are seeking a strategic outcome for use of those local roads required to support the transition to renewable energy, as well as addressing existing issues regarding OSOM vehicle movements.

The Central West Orana (CWO) REZ route requires use of Denman Bridge on Golden Highway, however due to the vertical height restrictions of the bridge, approximately 30% of OSOM loads will require an alternative route. Bengalla Road and Wybong Road (west) have been nominated by TfNSW and Energy Co., based on those roads being used as an alternative to the State road network in the event of planned or unplanned closures in this area and for other OSOM vehicles that cannot use Denman Bridge.

The New England REZ route uses New England Highway to travel north-south past Muswellbrook, however vertical height and width restrictions at the underpass through Bridge Street in Muswellbrook prevent the movement of some OSOM vehicles. This would be resolved with completion of the Muswellbrook Bypass (refer to Section 5.4.1), however this is not expected until 2027 while access for the REZ is required prior to that. The TfNSW proposed New England REZ route utilises part of the CWO REZ route along Bengalla Road, and then deviates onto Wybong Road (east), Kayuga Road, Stair Street, and the private road through Dartbrook Mine prior to re-joining New England Highway north of Muswellbrook.

The NSW Government has announced that Bengalla Road and Wybong Road between Bengalla Road and Golden Highway will be reclassified from local to state owned (NSW Government, 2024), which will facilitate transport of wind turbine componentry to the New England REZ (MSC, 2024). As state roads, maintenance will be funded by TfNSW. The Muswellbrook Bypass is also anticipated to necessitate reclassification of Thomas Mitchell Drive and other significant roads that are currently used by OSOM vehicles due to the restrictions on the State road network. Guidance regarding improvements that may be required would be sought from the *Muswellbrook Mine Affected Roads Network Plan Review* (Bitzios Consulting and Northrop [Bitzios], 2020) (refer to Section 5.4.2).

These matters have not yet been resolved, however it can broadly anticipated that some OSOM vehicle movements associated with REZ projects may occur along routes used for access for the Mount Pleasant Operation, notably Bengalla Road, Wybong Road and Kayuga Road. Quantitative forecasts of the OSOM demands resulting from REZ projects are not available, and the potential impacts of the Modification cumulative with the OSOM movements is discussed in Section 6.11.3.

5.4 Road Network Changes

5.4.1 Muswellbrook Bypass

The NSW Government has committed full funding for the provision of a bypass of Muswellbrook. Early work activities commenced in February 2023, additional geotechnical investigations were completed in April 2025, and utility relocation work is expected to start in October 2025. An Expression of Interest is expected to be released in the coming months to engage with potential contractors for the major construction work (TfNSW, 2025a).

A Review of Environmental Factors (REF) (TfNSW, 2025b) has been prepared regarding amendments to the construction footprint in certain areas to assist with construction staging and access requirements. Construction impacts for the proposed modification would mostly be in accordance with those described in the project REF (TfNSW, 2021). Any road maintenance or improvements required during construction with the proposed modification would result in operational benefits for road users. Otherwise, no other changes to operational traffic impacts are anticipated from the proposed modification.

Construction of the Muswellbrook Bypass is expected to commence in 2027. On opening, it is expected to remove up to 4,800 vehicles per day (including about 1,900 heavy vehicles) from New England Highway through Muswellbrook.

The Muswellbrook Bypass will connect to New England Highway at full grade separated interchanges at the southern end north of Thomas Mitchell Drive, at the northern end north of Sandy Creek Road, and mid-length at Coal Road to the east of Muswellbrook. It would be constructed with a single lane in each direction and a wide centreline treatment. Bridges would be provided over the bypass at the southern connection; over Muscle Creek Road and the Main Northern Railway; over Muscle Creek; over Coal Road; and over Sandy Creek Road, Sandy Creek, and the Main Northern Railway (TfNSW, 2021). Arcadis (2018) confirms that south of Muscle Creek Road, the average weekday traffic on New England Highway is forecast to increase from 10,400 vehicles per day (including 2,610 heavy vehicles) in 2024 to 11,600 vehicles per day (including 3,150 heavy vehicles) in 2034. These volumes would be unaffected by the Muswellbrook Bypass.

As the Muswellbrook Bypass would connect to New England Highway north of Thomas Mitchell Drive, it would not impact the routes used by vehicles travelling to and from Mount Pleasant Operation via Thomas Mitchell Drive, which would approach and depart to the south. Mount Pleasant Operation vehicles travelling to or from locations to the north of Muswellbrook (e.g. Scone and Aberdeen) would be unlikely to use the Muswellbrook Bypass, as the route via Coal Road would be less direct than continuing on New England Highway to access the Mount Pleasant Operation west of Muswellbrook town centre.

The Muswellbrook Bypass would therefore not impact traffic travelling to or from Mount Pleasant Operation, nor on those parts of New England Highway north of Muswellbrook and south of Thomas Mitchell Drive currently used by Mount Pleasant Operation traffic. The Muswellbrook Bypass would reduce traffic volumes on New England Highway through Muswellbrook town, improving conditions for those Mount Pleasant Operation drivers travelling to and from the north via Bengalla Road, Denman Road and through the Muswellbrook town centre.

Broadly, while the Muswellbrook Bypass can be expected to reap significant benefits by removing conflicts between local and through traffic in the town centre, removing heavy vehicles from the town centre and reducing congestion for through traffic on New England Highway, its direct impacts on the roads to the west of Muswellbrook and directly serving the Mount Pleasant Operation are expected to be minimal.

5.4.2 Muswellbrook Mine Affected Roads Network Plan Review

MSC's *Muswellbrook Mine Affected Roads Network Plan Review* (Bitzios, 2020) reviews and updates MSC's original *Mine Affected Road Network Plan* (Cardno, 2015) and was adopted by MSC on 19 May 2020. The assessment of options for the road network recommended key strategies to provide a road network that accommodates existing and future demands, including (option names are as presented in Bitzios [2020]):

- a Western Corridor connecting Golden Highway near Edderton Road with New England Highway south of Aberdeen, formed via:
  - upgrades to Edderton Road and retaining the northern deviation of Edderton Road to Denman Road (rather than reinstating the existing alignment following completion of mining at Mt Arthur Coal Mine);
  - a new link between Denman Road at the Edderton Road northern deviation and Bengalla Road, crossing the Hunter River and the railway line (Option W1);
  - connecting Wybong Road near Overton Road to Kayuga Road then east via a new bridge over the Hunter River and upgraded Burtons Lane to New England Highway north of Sandy Creek Road (Option W7); and
  - connecting Castlerock Road to Dorset Road to offset the closure of Dorset Road (i.e. Mount Pleasant Operation's Northern Link Road);

- an Inner West Link created by connecting Bengalla Road to Wybong Road west of the rail line via Overton Road (Option 2B), which would then connect with the Option W7 link to New England Highway described above;
- upgrading the Wybong network including closure of Wybong Post Office Road west of the Wybong Community Hall and upgrading of Yarraman Road between Wybong Post Office Road and Wybong Road (Option W5), upgrading of Wybong Road between Sandy Hollow and Reedy Creek Road to collector standard (Option W6), manage Wybong Road between Sandy Hollow and Bengalla Road as an over-size over-mass route, and widen sections of Wybong Road to a consistent and acceptable standard; and
- improving other infrastructure including upgrading of the Hunter River bridge at Denman and Denman bypass, and reclassification of Thomas Mitchell Drive as a State road.

The Western Corridor envisaged by the *Muswellbrook Mine Affected Roads Network Plan Review* (Bitzios, 2020) would form a western bypass route around Muswellbrook for traffic between Golden Highway and Denman Road (south of Muswellbrook), and New England Highway (north of Muswellbrook). The Inner West Link is intended to improve travel efficiency between Thomas Mitchell Drive and the mines, and provide a western local bypass of Muswellbrook town. Construction of the Inner West Link between Bengalla Road and Wybong Road via Overton Road may be impacted by the now-completed rail spur for the Mount Pleasant Operation, which has a rail over road overpass at Wybong Road and a rail over road bridge at Overton Road (Section 2.1). The link from Wybong Road to New England Highway (Option W7) is noted to travel through a flood plain, with potential impacts on the flow of flood water and may have some property impacts. These aspects have not yet been investigated. Similarly, the Inner West Link between Bengalla Road and Wybong Road (Option 2B) is noted to include road and bridge ramping in a flood plain area.

Even considering the high-level nature of the *Muswellbrook Mine Affected Roads Network Plan Review* (Bitzios, 2020) strategies, it is evident that further investigation of the recommended strategies would be required if any were to proceed to construction. Refinement of the options to address these and other constraints are beyond the scope of this study, which assumes that the connectivity of the road network in the local area would remain in its current state, with the known changes planned as a result of the approved Mount Pleasant Operation (Section 2.1) and other mining operations in the region (Section 5.2).

5.4.3 Cumulative Impacts of Road Network Changes

In the absence of detailed forecasts being available for the impacts of the Muswellbrook Bypass and possible changes to the road network described in the *Muswellbrook Mine Affected Roads Network Plan Review* (Bitzios, 2020), the implications of the possible changes are discussed in Section 6.11.2.

5.5 Background Traffic Growth

Regardless of the status of specific developments, other changes in traffic may be expected as a result of general growth or changes in population or travel behaviour. In preparing the *Muswellbrook Mine Affected Roads Plan,* Cardno (2015) considered forecasts of background traffic growth on roads in the Muswellbrook region, taking into consideration advice from Roads and Maritime Services (RMS) Assets Branch and with reference to the study for the Muswellbrook Bypass prepared by Hyder (2008). The Hyder study applied a marginal through traffic growth of 1.45% per annum on New England Highway between 2007 and 2020, and 1% until 2037.

On that basis, the resulting background growth rates applied for the purpose of modelling future traffic volumes on the road network for the *Muswellbrook Mine Affected Roads Stage 1 Road Network Plan* (Cardno, 2015) were:

- Thomas Mitchell Drive 1.45% per annum for 20 years (2015 to 2035), reducing to 1% per annum thereafter; and
- all other local roads 1% per annum for 20 years (2015 to 2035) and 0.9% per annum thereafter.

The study of options for the Muswellbrook Bypass (RMS, 2018) applied the following future growth to all vehicles were:

- 1.1% per annum between 2024 (assumed opening date of the Muswellbrook Bypass) and 2034; and
- 1% per annum thereafter to 2044 (10 to 20 years after assumed opening date).

The growth rate applied prior to 2024 is not explicitly stated, and used historical growth rates together with consideration of background population growth and higher growth rates from heavy vehicle through traffic. Rates over that period appear to be between 1.0% and 1.1% per annum.

On balance, and considering that the higher growth rate on Thomas Mitchell Drive is inclusive of mine-generated traffic that has been separately considered (refer to Section 5.2), an overall growth rate of 1% per annum has been applied to the surveyed traffic on the public roads for the purpose of this assessment. This growth rate has been applied to total surveyed traffic, i.e., including traffic generated by the Mount Pleasant Operation and the various other mines discussed in Section 5.2, for which development-specific changes have also been applied. Considering the high proportional contribution these mines make to total traffic demands on the roads to the west of Muswellbrook, this will tend to overestimate the total future traffic volumes.

5.6 Baseline Traffic Forecasts

Table 5.12 to Table 5.14 summarise the forecast peak hourly and daily traffic volumes at the surveyed locations under baseline conditions. For clarity, these forecasts assume that the Mount Pleasant Operation continues to operate under its currently approved conditions (Section 5.1), cumulative with the potential changes to developments (Section 5.2) and general background growth in traffic (Section 5.5).

These tables include average weekday forecasts for those locations at which ATC surveys were conducted during the traffic survey program (Section 3.4). At locations where ATCs were not conducted, the forecasts are based on the conditions surveyed at the intersections during the traffic survey program, with adjustments made to reflect the results of the ATC surveys at the nearest ATC.

Table 5.12: Baseline AM Peak Hour Two-Way Traffic Forecasts at Survey Locations in 2026 and 2032 (vehicles per hour)

Road and Location	Surveyed 2020		Development Changes 2020 to 2026		Growth 2020 to 2026		Total 2026 6:00 am to 7:00 am			Development Changes 2020 to 2032		Growth 2020 to 2032		Total 2032 6:00 am to 7:00 am		
	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Total	Light	Heavy	Light	Heavy	Light	Heavy	Total
Mount Pleasant Operation Access Road[A]	109	19	63	0	0	0	172	19	191	-109	-19	0	0	0	0	0
Bengalla Road south-east of Wybong Road[A]	186	36	61	0	11	2	258	38	296	-71	-19	24	4	139	21	160
Bengalla Road north of Denman Road[B]	354	22	83	2	22	1	459	25	484	-49	-17	45	3	350	8	358
Denman Road east of Bengalla Road[B]	599	48	84	3	37	3	720	54	774	-52	-17	76	6	623	37	660
Denman Road west of Bengalla Road[B]	291	26	13	1	18	2	322	29	351	-9	-2	37	3	319	27	346
Kayuga Road north of Wybong Road[B]	62	0	26	0	4	0	92	0	92	-6	0	8	0	64	0	64
Wybong Road north of Bengalla Road[A]	145	19	65	0	9	1	219	20	239	-75	-19	19	2	89	2	91
Wybong Road west of Kayuga Road[B]	59	1	26	0	4	0	89	1	90	-6	0	7	0	60	1	61

[A] *Average weekday February 2020.*
[B] *Surveyed Wednesday 27 November 2019.*

Table 5.13: Baseline PM Peak Hour Two-Way Traffic Forecasts at Survey Locations in 2026 and 2032 (vehicles per hour)

Road and Location	Surveyed 2020		Development Changes 2020 to 2026		Growth 2020 to 2026		Total 2026 6:00 pm to 7:00 pm			Development Changes 2020 to 2032		Growth 2020 to 2032		Total 2032 6:00 pm to 7:00 pm		
	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Total	Light	Heavy	Light	Heavy	Light	Heavy	Total
Mount Pleasant Operation Access Road[A]	74	10	39	0	0	0	113	10	123	-74	-10	0	0	0	0	0
Bengalla Road south-east of Wybong Road[A]	139	20	31	0	9	1	179	21	200	-56	-10	18	2	101	12	113
Bengalla Road north of Denman Road[B]	265	21	32	0	16	1	313	22	335	-55	-10	34	3	244	14	258
Denman Road east of Bengalla Road[B]	492	40	30	1	30	2	552	43	595	-63	-10	62	5	491	35	526
Denman Road west of Bengalla Road[B]	345	22	2	1	21	1	368	24	392	-14	0	44	3	375	25	400
Kayuga Road north of Wybong Road[C]	95	1	8	0	6	0	109	1	110	-13	0	12	0	94	1	95
Wybong Road north of Bengalla Road[C]	110	15	33	0	7	1	150	16	166	-59	-10	14	2	65	7	72
Wybong Road west of Kayuga Road[B]	81	0	8	0	5	0	94	0	94	-13	0	10	0	78	0	78

[A] *Average weekday February 2020.*
[B] *Estimated from 5:00 pm to 6:00 pm intersection survey Wednesday 27 November 2019 and average weekday February 2020 5:00 pm to 7:00 pm ATC survey on Bengalla Road.*
[C] *Estimated from 5:00 pm to 6:00 pm intersection survey Wednesday 27 November 2019 and average weekday February 2020 5:00 pm to 7:00 pm ATC survey on Wybong Road.*

Table 5.14: Baseline Daily Two-Way Traffic Forecasts at Survey Locations in 2026 and 2032 (vehicles per day)

Road and Location	Surveyed 2020		Development Changes 2020 to 2026		Growth 2020 to 2026		Total 2026			Development Changes 2020 to 2032		Growth 2020 to 2032		Total 2032		
	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Total	Light	Heavy	Light	Heavy	Light	Heavy	Total
Mount Pleasant Operation Access Road[A]	734	154	234	6	0	0	968	160	1,128	-734	-154	0	0	0	0	0
Bengalla Road south-east of Wybong Road[A]	1635	375	210	6	101	23	1,946	404	2,350	-539	-154	207	48	1,303	269	1,572
Bengalla Road north of Denman Road[B]	2,599	425	254	22	160	26	3,013	473	3,486	-495	-138	330	54	2,434	341	2,775
Denman Road east of Bengalla Road[B]	5,789	913	264	36	356	56	6,409	1,005	7,414	-518	-143	734	116	6,005	886	6,891
Denman Road west of Bengalla Road[B]	3,462	525	46	14	213	32	3,721	571	4,292	-93	-37	439	67	3,808	555	4,363
Kayuga Road north of Wybong Road[C]	1,007	65	70	0	62	4	1,139	69	1,208	-106	0	128	8	1,029	73	1,102
Wybong Road north of Bengalla Road[C]	1,146	203	220	6	71	13	1,437	222	1,659	-572	-154	145	26	719	75	794
Wybong Road west of Kayuga Road[B]	855	46	70	0	53	3	978	49	1,027	-106	0	108	6	857	52	909

[A] *Average weekday February 2020.*
[B] *Estimated from 6:00am to 6:00 pm survey results Wednesday 27 November 2019 and 24-hour ATC survey results on Bengalla Road.*
[C] *Estimated from 6:00am to 6:00 pm survey results Wednesday 27 November 2019 and 24-hour ATC survey results on Wybong Road.*

6 Impacts of the Modification

6.1 Modification Changes from Baseline Conditions

Table 6.1 presents a summary of the total peak hour and daily trip generation of the Mount Pleasant Operation as surveyed in 2020, under baseline conditions (no Modification) in 2026 and 2032, and with the Modification in 2026 and 2032.

Table 6.1: Summary of Mount Pleasant Operation Trip Generation

	6:00 am to 7:00 am (vehicles per hour)		6:00 pm to 7:00 pm (vehicles per hour)		Daily (vehicles per day)	
	Light	Heavy	Light	Heavy	Light	Heavy
Surveyed 2020	109	19	74	10	734	154
Baseline – No Modification						
2026	172	19	113	10	968	160
2032	0	0	0	0	0	0
With Modification						
2026	246	19	131	10	1162	176
2032	179	19	113	10	970	164
Effect of the Modification on Trip Generation Compared with Baseline Conditions						
2026	74	0	18	0	194	16
2032	179	19	113	10	970	164
Effect of the Modification on Trip Generation Compared with Surveyed Conditions 2020						
2026	137	0	57	0	428	22
2032	70	0	39	0	236	10

6.2 Distribution of Modification Traffic

6.2.1 Construction Workforce

The majority of the construction workforce would reside in Muswellbrook, with a small proportion likely to reside in Scone or Aberdeen.

Table 6.2 summarises the expected residential distribution of the construction workforce and the routes those workers are likely to use when approaching and departing the Modification. These generally assume that drivers will use the shortest route available, noting that some alternative routes exist and may be used by some drivers.

Table 6.2: Construction Workforce Residential Locations and Travel Routes

Residential Location	Percent of Workforce	Travel Route
Muswellbrook	90	Wybong Road – Bengalla Road – Denman Road (East)
Scone, Aberdeen and North	10	Wybong Road – Kayuga Road – Blairmore Lane or Dartbrook Road – New England Highway

As described in Section 4.1.1, a shuttle bus may be used to transport construction workers from Muswellbrook, however as a robust assessment of the potential traffic generation of the Modification, this assessment has assumed all construction workers travel by private vehicle. Should a bus service be provided, it would use the same route to and from Muswellbrook as shown in Table 6.2.

6.2.2 Operational Workforce

Table 6.3 summarises the expected residential distribution of the operational workforce and the routes those workers are likely to use when approaching and departing the Mount Pleasant Operation. These generally assume that drivers will use the shortest route available, noting that some alternative routes exist and may be used by some drivers.

Table 6.3: Operational Workforce Residential Locations and Travel Routes

Residential Location	Percent of Workforce	Travel Route
Muswellbrook	40	Wybong Road – Bengalla Road – Denman Road (East)
Singleton and Lower Hunter	30	Wybong Road – Bengalla Road – Denman Road – Thomas Mitchell Drive – New England Highway (South)
Scone, Aberdeen and North	20	Wybong Road – Kayuga Road – Blairmore Lane or Dartbrook Road – New England Highway
Sandy Hollow, Merriwa and West	5	Wybong Road (West)
Denman, Jerrys Plains	5	Wybong Road – Bengalla Road – Denman Road (West)

With regard to access routes to and from Scone, Aberdeen and the north, drivers may use either Blairmore Lane or Dartbrook Road to travel between New England Highway and Kayuga Road. Residents of Aberdeen are more likely to use Blairmore Lane, as it is the most direct, while residents of Scone and farther north may choose to use either route. Blairmore Lane offers a slightly shorter route for those drivers, although the travel time differences are expected to be marginal between the two routes.

6.2.3 Construction and Operational Deliveries and Visitors

Table 6.4 presents the expected primary sources of construction and operational visitor and delivery trips, and the routes the delivery and visitor vehicles would use to access the Mount Pleasant Operation. Use of these routes is consistent with the existing SAMP, which requires that all heavy vehicles access the Mount Pleasant Operation via Bengalla Road.

Table 6.4: Construction and Operational Visitor and Delivery Sources and Travel Routes

Location	Percent	Travel Route
Muswellbrook	50	Wybong Road – Bengalla Road – Denman Road (East)
Singleton and Lower Hunter	40	Wybong Road – Bengalla Road – Denman Road – Thomas Mitchell Drive – New England Highway (South)
Denman	10	Wybong Road – Bengalla Road – Denman Road (West)

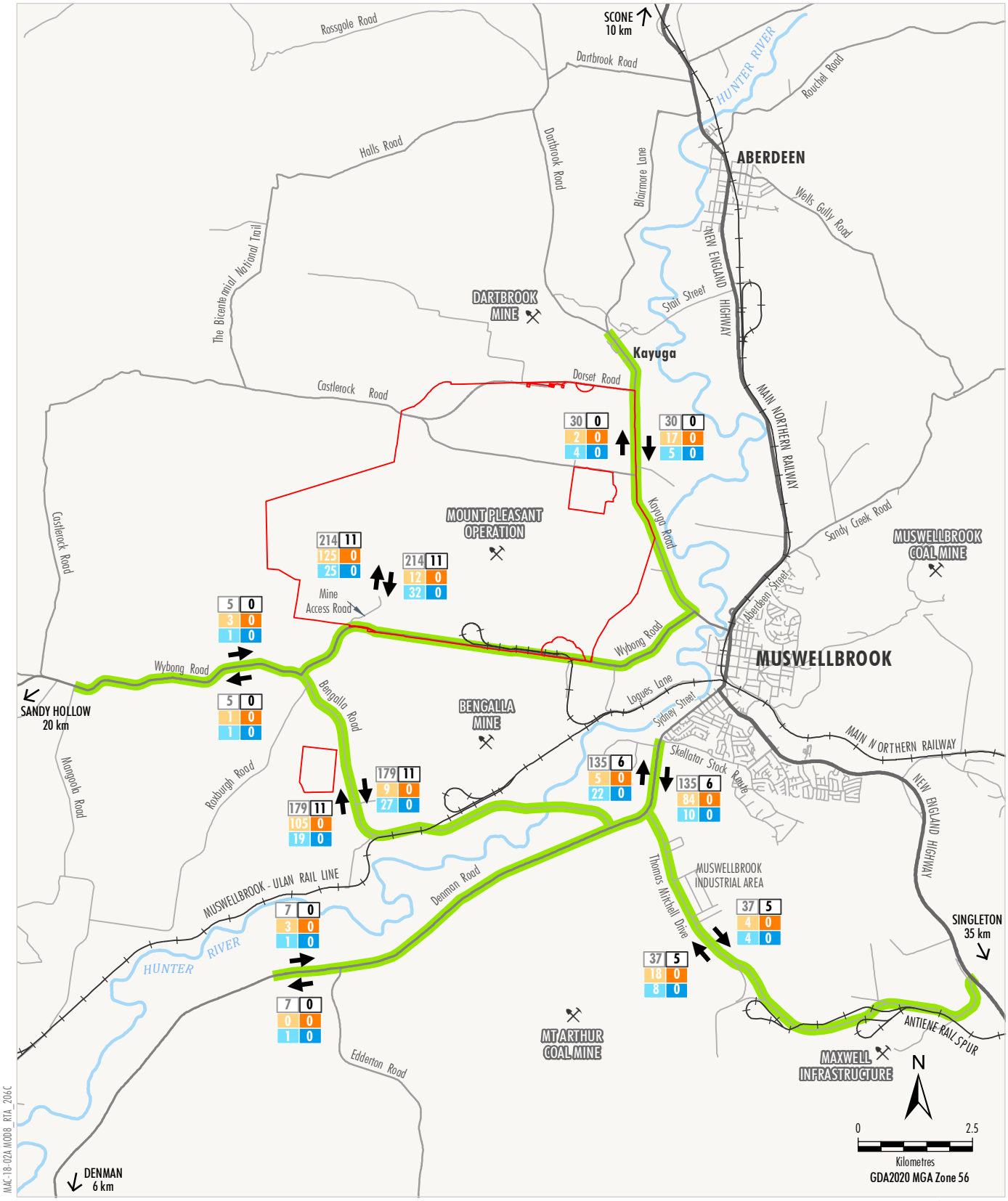
6.2.4 Total Modification Traffic on the Road Network

Taking into consideration the traffic forecast to be generated by the Modification (Section 4) and its distribution on the road network (Sections 6.2.1 to 6.2.3), the forecast additional contribution of the Modification to future traffic on the road network has been determined and is summarised in Table 6.5 and Figure 6.1 for 2026 and Table 6.6 and Figure 6.2 for 2032.

Table 6.5: Modification Traffic on the Road Network in 2026

Road and Location	6:00 am to 7:00 am (vehicles per hour)		6:00 pm to 7:00 pm (vehicles per hour)		Daily (vehicles per day)	
	Light	Heavy	Light	Heavy	Light	Heavy
Mount Pleasant Operation Access Road	137	0	57	0	428	22
Bengalla Road Wybong Road to Denman Road	114	0	46	0	358	22
Denman Road Golden Highway to Bengalla Road	3	0	2	0	14	0
Denman Road Bengalla Road to Thomas Mitchell Drive	111	0	44	0	344	22
Denman Road Thomas Mitchell Drive to Muswellbrook	89	0	32	0	270	12
Kayuga Road Wybong Road to Kayuga	19	0	9	0	60	0
New England Highway Thomas Mitchell Drive to Singleton	22	0	12	0	74	10
Thomas Mitchell Drive Denman Road to New England Highway	22	0	12	0	74	10
Wybong Road Kayuga Road to Mount Pleasant Operation	19	0	9	0	60	0
Wybong Road Mount Pleasant Operation to Bengalla Road	118	0	48	0	368	22
Wybong Road Bengalla Road to Golden Highway	4	0	2	0	10	0

In this table, Modification traffic is traffic generated by the Mount Pleasant Operation above 2020 surveyed traffic.



Source: TTPP (2024, 2020); NSW Spatial Services (2025)

LEGEND

- Mining Operation
- Railway
- Mining Lease Boundary (Mount Pleasant Operation)
- Workforce Travel Route

TRAFFIC VOLUMES

Light | Heavy (including buses)

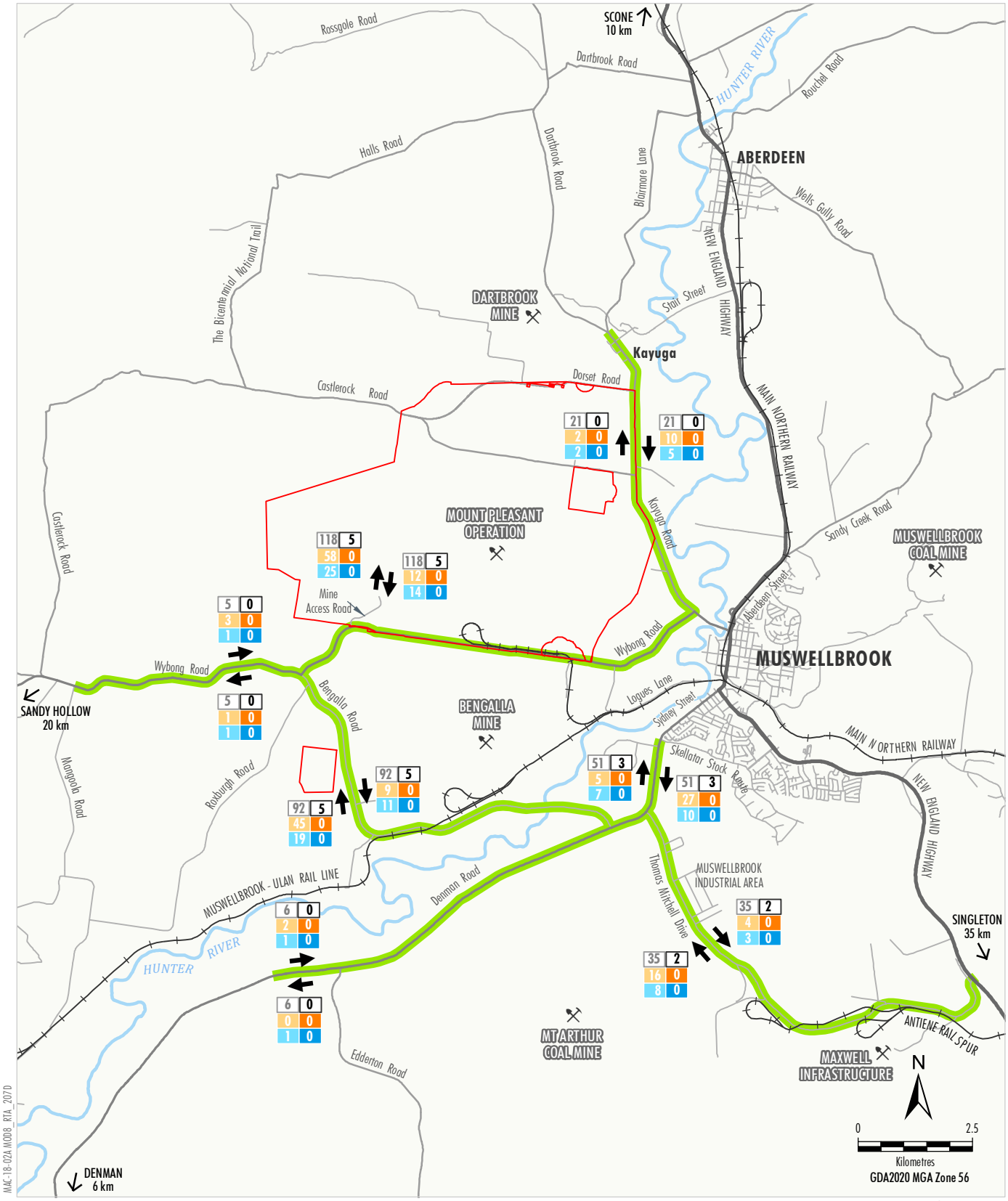
- Daily
- AM Peak (6.00 am to 7.00 am)
- PM Peak (6.00 pm to 7.00 pm)

MACHEnergy

MOUNT PLEASANT OPERATION

Additional Modification-generated Traffic 2026
(Above 2020 Surveyed Traffic)

Figure 6.1



Source: TTPP (2024, 2020); NSW Spatial Services (2025)

LEGEND

- Mining Operation
- Railway
- Mining Lease Boundary (Mount Pleasant Operation)
- Workforce Travel Route

TRAFFIC VOLUMES

Light	Heavy (including buses)	
		Daily
		AM Peak (6.00 am to 7.00 am)
		PM Peak (6.00 pm to 7.00 pm)

MACHEnergy

MOUNT PLEASANT OPERATION

Additional Modification-generated Traffic 2032 (Above 2020 Surveyed Traffic)

Figure 6.2

Table 6.6: Modification Traffic on the Road Network in 2032

Road and Location	6:00 am to 7:00 am (vehicles per hour)		6:00 pm to 7:00 pm (vehicles per hour)		Daily (vehicles per day)	
	Light	Heavy	Light	Heavy	Light	Heavy
Mount Pleasant Operation Access Road	70	0	39	0	236	10
Bengalla Road Wybong Road to Denman Road	54	0	30	0	184	10
Denman Road Golden Highway to Bengalla Road	2	0	2	0	12	0
Denman Road Bengalla Road to Thomas Mitchell Drive	52	0	28	0	172	10
Denman Road Thomas Mitchell Drive to Muswellbrook	32	0	17	0	102	6
Kayuga Road Wybong Road to Kayuga	12	0	7	0	42	0
New England Highway Thomas Mitchell Drive to Singleton	20	0	11	0	70	4
Thomas Mitchell Drive Denman Road to New England Highway	20	0	11	0	70	4
Wybong Road Kayuga Road to Mount Pleasant Operation	12	0	7	0	42	0
Wybong Road Mount Pleasant Operation to Bengalla Road	58	0	32	0	194	10
Wybong Road Bengalla Road to Golden Highway	4	0	2	0	10	0

In this table, Modification traffic is traffic generated by the Mount Pleasant Operation above 2020 surveyed traffic.

6.3 Future Traffic Volumes

The future two-way peak hourly and daily traffic volumes on the average weekday have been forecast for future years with and without the Modification. These forecasts are presented in Table 6.7 to Table 6.9, which include the cumulative impacts of expected changes at the other major developments in the region (Section 5.2), and background traffic growth (Section 5.5). For ease of reference, the tables also compare the forecast future volumes with those under baseline conditions without the Modification (Section 5.6).

Table 6.7: Baseline and Modification AM Peak Hour Traffic on Road Network 6:00 am to 7:00 am (vehicles per hour)

Road and Location	Baseline 2026			Modification 2026			Baseline 2032			Modification 2032		
	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total
Mount Pleasant Operation Access Road	172	19	191	246	19	265	0	0	0	179	19	198
Bengalla Road south-east of Wybong Road	258	38	296	325	38	363	139	21	160	278	40	318
Bengalla Road north of Denman Road	459	25	484	526	25	551	350	8	358	489	27	516
Denman Road east of Bengalla Road	720	54	774	787	54	841	623	37	660	754	55	809
Denman Road west of Bengalla Road	322	29	351	322	29	351	319	27	346	327	28	355
Kayuga Road north of Wybong Road	92	0	92	99	0	99	64	0	64	96	0	96
Wybong Road north of Bengalla Road	219	20	239	286	20	306	89	2	91	236	21	257
Wybong Road west of Kayuga Road	89	1	90	96	1	97	60	1	61	92	1	93

Table 6.8: Baseline and Modification PM Peak Hour Traffic on Road Network 6:00 pm to 7:00 pm (vehicles per hour)

Road and Location	Baseline 2026			Modification 2026			Baseline 2032			Modification 2032		
	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total
Mount Pleasant Operation Access Road	113	10	123	131	10	141	0	0	0	113	10	123
Bengalla Road south-east of Wybong Road	179	21	200	195	21	216	101	12	113	188	22	210
Bengalla Road north of Denman Road	313	22	335	329	22	351	244	14	258	331	24	355
Denman Road east of Bengalla Road	552	43	595	568	43	611	491	35	526	754	55	809
Denman Road west of Bengalla Road	368	24	392	368	24	392	375	25	400	380	25	405
Kayuga Road north of Wybong Road	109	1	110	111	1	112	94	1	95	115	1	116
Wybong Road north of Bengalla Road	150	16	166	166	16	182	65	7	72	157	17	174
Wybong Road west of Kayuga Road	94	0	94	96	0	96	78	0	78	99	0	99

Table 6.9: Baseline and Modification Daily Traffic on Road Network (vehicles per day)

Road and Location	Baseline 2026			Modification 2026			Baseline 2032			Modification 2032		
	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total
Mount Pleasant Operation Access Road	968	160	1,128	1,162	176	1,338	0	0	0	970	164	1,134
Bengalla Road south-east of Wybong Road	1,946	404	2,350	2,122	420	2,542	1,303	269	1,572	2,054	433	2,487
Bengalla Road north of Denman Road	3,013	473	3,486	3,189	489	3,678	2,434	341	2,775	3,185	505	3,690
Denman Road east of Bengalla Road	6,409	1,005	7,414	6,585	1,021	7,606	6,005	886	6,891	754	55	809
Denman Road west of Bengalla Road	3,721	571	4,292	3,721	571	4,292	3,808	555	4,363	3,859	571	4,430
Kayuga Road north of Wybong Road	1,139	69	1,208	1,157	69	1,226	1,029	73	1,102	1,205	73	1,278
Wybong Road north of Bengalla Road	1,437	222	1,659	1,613	238	1,851	719	75	794	1,513	239	1,752
Wybong Road west of Kayuga Road	978	49	1,027	996	49	1,045	857	52	909	1,033	52	1,085

6.4 Road Network Efficiency

The capacity of a road is the number of vehicles that can be accommodated on the road infrastructure before it fails to function as it was intended. Austroads (2020a) defines capacity as the maximum sustainable hourly rate at which vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under the prevailing roadway, traffic and control conditions. The capacity of a single traffic lane is affected by factors such as the pavement width and restricted lateral clearances, the presence of heavy vehicles and grades.

Austroads (2020a) provides guidelines for the assessment of the capacity and performance of two-lane, two-way rural roads that, in turn, refer to the *Highway Capacity Manual* (HCM) (Transportation Research Board, 2016). Level of Service (LoS) represents road users' perceptions of the quality of service provided by a road link, and describes operational conditions in terms of factors such as speed and travel time, freedom to manoeuvre, traffic interruptions, comfort, convenience and safety. Levels of Service are designated A through F, with LoS A providing the best traffic conditions, with no restriction on desired travel speed or overtaking. LoS B to D describes progressively worse traffic conditions. LoS E occurs when traffic conditions are at or close to capacity, and there is virtually no freedom to select desired speeds or to manoeuvre in the traffic stream. The service flow rate for LoS E is taken as the capacity of a lane or roadway. In rural situations, LoS C is generally considered to be acceptable. At LoS C, most vehicles are travelling in platoons, and travel speeds are curtailed. At LoS D, platooning increases significantly, and the demand for passing is high, but the capacity to do so is low. The LoS experienced by drivers on two-way rural roads is dependent on the drivers' expectations regarding the road. The target for acceptable conditions is generally accepted as LoS D.

Three classes of road are defined in the HCM. Class I roads are those on which motorists expect to travel at relatively high speeds, and most often serve long-distance trips or provide connecting links between facilities that serve long-distance trips. Class II roads are those on which motorists do not necessarily expect to travel at high speeds, and may function as access routes to Class I facilities, serve as scenic or recreational routes or pass through rugged terrain. Class III roads serve moderately developed areas, and may be portions of a Class I or Class II highway that pass through small towns or developed recreational areas, where local traffic mixes with through traffic, and the density of unsignalised roadside access points increases.

On Class I roads, LoS is defined in terms of Percent Time Spent Following (PTSF) and Average Travel Speed (ATS), with the worst of these criteria being adopted as the LoS. On Class II roads, LoS is defined only in terms of PTSF. The PTSF is a measure of the level of opportunities to overtake, and is estimated from the demand traffic volumes, the directional distribution of that traffic, and the percentage of no-passing zones. On Class III roads, LoS is defined in terms of Percent of Free-Flow Speed (PFFS), which is the ratio of ATS to the free-flow speed,

representing the ability of vehicles to travel at or near the posted speed limit. The LoS criteria for two-lane roads are as shown in Table 6.10.

Table 6.10: Level of Service Criteria for Two-Lane, Two-Way Roads

Level of Service	Class I		Class II	Class III
	Average Travel Speed (km/h)	Percent Time Spent Following (%)	Percent Time Spent Following (%)	Percent Free-Flow Speed (%)
A	> 90	≤ 35	≤ 40	> 91.7
B	> 80 – 90	> 35 – 50	> 40 – 55	> 83.3 – 91.7
C	> 70 – 80	> 50 – 65	> 55 – 70	> 75.0 – 83.3
D	> 60 – 70	> 65 – 80	> 70 – 85	> 66.7 – 75.0
E	≤ 60	≥ 80	≥ 85	≤ 66.7

Source: Austroads (2020a).

For the purpose of this review, the surveyed Mount Pleasant Operation access routes have all been considered as Class II routes. It is noted however that given the function of these roads, notably Denman Road and Bengalla Road, as the primary access route for several mining operations, drivers are likely to expect a higher level of congestion particularly at shift change times compared with that on a typical Class II road is a rural setting. The delays experienced at intersections are considered to have a greater effect on drivers than midblock delays.

It is noted that this assessment assumes a speed limit of 70 km/h applies on the Mount Pleasant Operation Access Road, which is the lower limit of the HCM method and so results should be considered indicative only as the operating speed is estimated to be below 70 km/h. Similarly, while the assessment has included Denman Road east of Bengalla Road, that length of road is limited to approximately 800 m between Bengalla Road and Thomas Michell Drive, and has auxiliary turn lanes at both intersections. The calculated midblock LoS only applies to the distance clear of the auxiliary turn lanes.

Table 6.11 summarises the LoS during the AM and PM peak hours respectively in 2026 and 2032 with and without the Modification. Without the Modification, the Mount Pleasant Operation would cease operating and there would be negligible traffic on the Mount Pleasant Operation Access Road in 2032.

Table 6.11: Peak Hour Midblock Levels of Service

Road and Location	Inbound to Mount Pleasant Operation		Outbound from Mount Pleasant Operation	
	6:00 am to 7:00 am	6:00 pm to 7:00 pm	6:00 am to 7:00 am	6:00 pm to 7:00 pm
2026 Baseline No Modification (With Modification)				
Mount Pleasant Operation Access Road	C (C)	A (A)	A (A)	A (B)
Bengalla Road south-east of Wybong Road	B (C)	A (A)	A (A)	B (B)
Bengalla Road north of Denman Road	D (D)	B (B)	A (A)	B (B)
Denman Road east of Bengalla Road	D (D)	B (B)	B (B)	D (D)
Denman Road west of Bengalla Road	B (B)	B (B)	B (B)	C (C)
Kayuga Road north of Wybong Road	B (B)	A (A)	A (A)	B (B)
Wybong Road north of Bengalla Road	B (C)	A (A)	A (A)	B (B)
Wybong Road west of Kayuga Road	B (B)	B (A)	A (A)	A (A)
2032 Baseline No Modification (With Modification)				
Mount Pleasant Operation Access Road	n/a (C)	n/a (A)	n/a (A)	n/a (A)
Bengalla Road south-east of Wybong Road	A (C)	A (A)	A (A)	A (B)
Bengalla Road north of Denman Road	C (D)	A (B)	A (A)	B (C)
Denman Road east of Bengalla Road	D (D)	B (B)	B (B)	C (D)
Denman Road west of Bengalla Road	B (B)	B (B)	B (B)	C (C)
Kayuga Road north of Wybong Road	B (B)	A (A)	A (A)	B (B)
Wybong Road north of Bengalla Road	A (B)	A (A)	B (A)	A (B)
Wybong Road west of Kayuga Road	A (B)	B (B)	A (A)	A (A)

The results in Table 6.11 demonstrate that with the Modification, the forecast midblock LoS would generally be satisfactory in 2026 and 2032, noting that the forecast LoS D in the peak flow direction on Denman Road east of Bengalla Road and on Bengalla Road north of Denman Road would occur with or without the Modification. During the outbound PM peak hour, the PTSF would be near the top of the range for LoS C without the Modification, and at the bottom of the range for LoS D with the Modification, with the incremental increase in PTSF being low.

6.5 Intersection Performance

The operating characteristics of the surveyed intersections have been assessed using SIDRA INTERSECTION 10, an analysis program that determines characteristics of intersection operating conditions including the degree of saturation, average delays, and intersection LoS. The degree of saturation, or x-value, is the ratio of the arrival rate of vehicles to the capacity. The average delay, expressed in seconds per vehicle, is measured over all movements at signalised intersections, and over the movement with the highest average delay at roundabout and priority intersections. Average vehicle delay is the commonly used measure of intersection performance defined by TfNSW. Table 6.12 shows the criteria adopted by TfNSW for assessing the intersection LoS.

Table 6.12: Intersection Level of Service Criteria

Level of Service	Average Delay per Vehicle (seconds per vehicle)	Traffic Signals, Roundabout	Give Way & Stop Sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

Adapted from TfNSW (2024)

As the intersections are under priority control, the reported average delay is for the movement with the highest average delay per vehicle.

Table 6.13 and Table 6.14 summarise the peak hour operating characteristics of the surveyed intersections under surveyed conditions in 2020, under baseline conditions in 2026 and 2032, and with the Modification in 2026 and 2032. Detailed results are presented in Appendix B.

The results of the intersection surveys during the Mount Pleasant Operation peak hour 4:00 pm to 5:00 pm were adjusted to indicative conditions during the Modification peak hour 6:00 pm to 7:00 pm using the results of the ATC surveys. Indicative results for 2020 are provided for the intersection of Thomas Mitchell Drive with Denman Road, based on the results of the 2018 and 2021 surveys of that intersection (TTPP, 2019 and 2023), and considering the 2020 surveyed conditions.

Table 6.13: AM Peak Hour Intersection Operating Conditions

Site[A]	Intersection	2020			2026 Baseline No Modification			2026 With Modification			2032 Baseline No Modification			2032 With Modification		
		DoS[B]	AD[C]	LoS	DoS[B]	AD[C]	LoS	DoS[B]	AD[C]	LoS	DoS[B]	AD[C]	LoS	DoS[B]	AD[C]	LoS
D	Mount Pleasant Operation Access Road and Wybong Road	0.04	8.0	A	0.07	8.0	A	0.11	8.3	A	-	-	-	0.07	8.0	A
E	Wybong Road and Kayuga Road	0.02	7.1	A	0.04	7.1	A	0.04	7.1	A	0.03	7.1	A	0.04	7.1	A
F	Wybong Road and Bengalla Road	0.07	9.7	A	0.10	10.2	A	0.16	11.0	A	0.05	9.2	A	0.11	10.4	A
G	Bengalla Road and Denman Road	0.15	13.9	A	0.21	15.5	B	0.27	17.9	B	0.14	13.8	A	0.23	16.6	B
-	Denman Road and Thomas Mitchell Drive	0.26[D]	13.3[D]	A[D]	0.30	14.1	B	0.34	15.9	B	0.19	11.2	A	0.20	12.7	A
-	Thomas Mitchell Drive and New England Highway	0.21	12.8	A	0.25	15.3	B	0.25	15.3	B	0.23	12.7	A	0.23	13.1	A

[A] *Refer to Figure 3.1.*
[B] *Degree of saturation.*
[C] *Seconds per vehicle for movement with the highest average delay per vehicle.*
[D] *Based on intersection design prior to upgrade.*

Table 6.14: PM Peak Hour Intersection Operating Conditions

Site[A]	Intersection	2020			2026 Baseline No Modification			2026 With Modification			2032 Baseline No Modification			2032 With Modification		
		DoS[B]	AD[C]	LoS	DoS[B]	AD[C]	LoS	DoS[B]	AD[C]	LoS	DoS[B]	AD[C]	LoS	DoS[B]	AD[C]	LoS
D	Mount Pleasant Operation Access Road and Wybong Road	0.07	8.5	A	0.08	8.1	A	0.10	8.1	A	-	-	-	0.08	8.1	A
E	Wybong Road and Kayuga Road	0.05	7.1	A	0.05	7.1	A	0.05	7.1	A	0.05	7.1	A	0.05	7.1	A
F	Wybong Road and Bengalla Road	0.07	8.8	A	0.09	9.0	A	0.10	9.0	A	0.04	9.0	A	0.09	9.1	A
G	Bengalla Road and Denman Road	0.15	14.4	A	0.18	14.8	B	0.19	15.9	B	0.13	15.9	B	0.19	15.3	B
-	Denman Road and Thomas Mitchell Drive	0.31[D]	13.1[D]	A[D]	0.37	14.2	A	0.38	14.6	B	0.19	11.5	A	0.21	12.6	A
-	Thomas Mitchell Drive and New England Highway	0.27	13.4	A	0.33	15.1	B	0.33	15.1	B	0.24	13.1	A	0.24	13.2	A

[A] *Refer to Figure 3.1.*
[B] *Degree of saturation.*
[C] *Seconds per vehicle for movement with the highest average delay per vehicle.*
[D] *Based on intersection design prior to upgrade.*

Review of the results in Table 6.13 and Table 6.14 indicate that in 2026 and 2032, the intersections can be expected to operate at satisfactory levels of service during the Modification peak hours, with spare capacity and acceptable delays to vehicles. The Modification would have negligible impact on the delays experienced by drivers and the level of service they experience at the key intersections. No additional intersection capacity would be required to accommodate the Modification traffic.

6.6 Intersection Designs

The forecast long-term peak hour traffic demands at the key intersections have been compared against the major road treatments required by Austroads (2020b).

The general minimum preferred treatment at rural road intersections in greenfields developments are Basic Left-turn (BAL) and Basic Right-turn (BAR) treatments. The rural BAL treatment on the major road has a widened shoulder, which assists turning vehicles to move further off the through carriageway, making it easier for through vehicles to pass. The rural BAR treatment features a widened shoulder on the major road that allows through vehicles, having slowed, to pass to the left of turning vehicles. The BAL treatment on the minor road allows turning movements to occur from a single lane, with a shoulder that is too narrow to be used by left-turning vehicles, so as to prevent vehicles from standing two abreast at the holding line. These design features are preferred to safely manage the movement of vehicles in the high-speed rural environment.

Auxiliary lane treatments have short lengths of auxiliary lane provided to improve safety, especially on high speed roads. The Auxiliary Right-turn (AUR) treatment on the major road is created by the use of a short lane with standard painted stripes, where the median lane is shared between through and right-turning vehicles, and the auxiliary kerbside lane allows through vehicles to pass a vehicle which has slowed to turn right. AUR treatments are not used in NSW, rather a channelised right-turn treatment with a short turn bay known as a Channelised Right-turn (Short Lane Type) (CHR[S]) treatment may be used. This is a modification of the channelised treatment described below.

Auxiliary Left-turn (AUL) treatments on the major and minor road are normal indented turn lanes, used only by vehicles turning left. The auxiliary lane treatment on the major road is safer than a basic treatment, however the channelised treatment described below is preferred where practicable, as the risk of collisions is lower. Consequently, Austroads (2020b) indicates that a Channelised Left-turn (CHL) treatment should be used wherever practicable. The AUL treatment on the minor road is less safe than a basic or channelised treatment, and while it is included in the warrants, it is not recommended. Austroads (2020b) indicates that a BAL or CHL treatment should be used wherever practicable.

Channelised treatments on the major road are CHL and Channelised Right-turn (CHR) treatments for left and right turns from the major road respectively. The channelised "CH" treatments separate conflicting vehicle paths by raised or painted medians and/or islands, and often use auxiliary lanes in conjunction with channelisation. The CHR treatment on the major road provides a continuous lane for through vehicles only, and an auxiliary turn lane for right-turning vehicles only. CHL treatments on the major or minor road provide a separate left-turn "slip" lane, separated from the adjacent lane by a painted or raised island. Channelised treatments are preferred over auxiliary lane treatments where practicable, as the risk of collisions is lower.

The existing treatments at the key intersections expected to be used by Modification-generated traffic have been compared against those treatments warranted for the forecast long-term demands as set out in Austroads (2020b) for greenfields developments. The results are summarised in Table 6.15.

Table 6.15: Intersection Major Road Turn Treatment Warrants with Modification

Intersection	Existing Treatment	6:00 am to 7:00 am Warrant Treatment		6:00 pm to 7:00 pm Warrant Treatment	
		2026	2032	2026	2032
Mount Pleasant Operation Access Road and Wybong Road	AUL BAR	BAL BAR	BAL BAR	BAL BAR	BAL BAR
Wybong Road and Kayuga Road	- -	BAL BAR	BAL BAR	BAL BAR	BAL BAR
Wybong Road and Bengalla Road	AUL CHR	BAL CHR(S)	BAL CHR(S)	BAL BAR	BAL BAR
Bengalla Road and Denman Road	AUL(S) CHR	BAL CHR	BAL CHR	BAL CHR	BAL CHR

Table 6.15 indicates that the existing main road treatments at the intersections generally meet or exceed those required by application of the Austroads (2020b) warrants. The existing layout of the intersection of Kayuga Road with Wybong Road does not include formalised widened shoulders on either side of Kayuga Road. These minimum desirable treatments are warranted by the existing traffic demands at the intersection, not as a direct result of Modification traffic.

6.7 Oversize and Overmass Vehicles

Consistent with the existing Traffic Management Plan for the Mount Pleasant Operation (MACH, 2024c), the movement of any oversize or overmass vehicles associated with the Modification will conform with the relevant permits obtained in accordance with *Additional Access Conditions Oversize and overmass heavy vehicles and loads* (RMS, 2020), and any other licences and escorts as required by the regulatory authorities.

6.8 Railway Level Crossings

As a component of the Modification, the increase in ROM coal production from 10.5 Mtpa to 12.5 Mtpa from 2026 would increase the transport of product coal, with an increase in the annual and average daily train movements. There would be no increase in the maximum daily train movements of nine laden trains per day for the approved Mount Pleasant Operation.

Between the Mount Pleasant Operation and the Main Northern Railway, all road and rail crossings are grade separated, so there is no potential for increased rail traffic to impact road network operations. Once Modification-generated trains are on the Main Northern Railway to Newcastle, the Modification's additional contribution to total rail traffic would not be significant, thus the potential impacts on delays experienced by road-based traffic would be negligible.

Furthermore, there is a very limited number of railway level crossings between Muswellbrook and Newcastle, and with only one exception (on Shamrock Street which provides access only to the Hunter Wetlands National Park), all those crossings are actively-controlled, with boom gates and flashing lights for the road traffic. These active controls warn motorists that a train is approaching the level crossing and the boom gates prevent vehicles from entering the crossing when a train is approaching, and so offer the highest level of safety at level crossings. The addition of an average of one laden train per day generated by the Modification is therefore expected to have minimal impact on both delays to road traffic and safety at railway levels crossings.

6.9 Road Safety Implications

The road crash history of the roads serving the Mount Pleasant Operation (Section 3.7) did not identify any causation factors associated with the existing road network that may be exacerbated by increased traffic demands.

The Road Safety Audits of existing conditions on the Mount Pleasant Operation access routes, Castlerock Road and the intersection of Dorset Road and Kayuga Road did not highlight any particular road safety concerns regarding the basic road alignment or width characteristics of the routes. No high risk items were identified. The majority of the medium risk and low risk items identified in the audit relate to a lack of road linemarking, signage or guide posts and protection barriers to roadside structures, together with some need for pavement or drainage improvements.

6.10 Mitigation Measures

The foregoing assessment suggests that the existing road network can satisfactorily accommodate the forecast traffic demands resulting from the Modification without any specific additional road upgrade requirements.

The existing Drivers' Code of Conduct for the Mount Pleasant Operation appropriately identifies those routes that may and may not be used by all traffic travelling to and from the Mount Pleasant Operation. All Modification vehicular access would be consistent with the Drivers' Code of Conduct requirements, which will be reviewed and amended from time to time.

The effectiveness of the Drivers' Code of Conduct would continue to be reviewed and monitored by MACH, with more appropriate procedures implemented if the original traffic management practices are proven to not be adequate.

The existing layout of the intersection of Wybong Road with Kayuga Road does not meet current Austroads standards with regard to major road treatments that would be provided for a greenfields rural road intersection. Based on Austroads (2020b), the existing demands at the intersection warrant its upgrading to include BAR and BAL treatments in Kayuga Road, i.e., widened shoulders. With the Modification traffic, the forecast demands would also warrant BAR and BAL treatments in Kayuga Road, thus the Modification itself would not trigger a need for further upgrading of the intersection.

6.11 Implications of Road Network Changes

As discussed in Section 5.4, future changes to the connectivity of the road network in the region may include construction of the Muswellbrook Bypass, and changes to local access roads suggested by the *Muswellbrook Mine Affected Roads Network Review Plan*. Detailed forecasts of the potential implications of these possible changes are not available at the time of writing, however the broad implications of the possible changes on the findings of this report have been considered and are discussed below.

Should these road network changes occur, all roads and intersections would be designed to accommodate the anticipated traffic demands resulting from those road network changes.

6.11.1 Muswellbrook Bypass

The Muswellbrook Bypass is not expected to have a significant direct impact on the routes used by Modification-generated traffic. Those Modification-generated vehicles assumed herein to travel to and from New England Highway north of Muswellbrook (i.e., Scone and Aberdeen) would continue to use Kayuga Road and Blairmore Lane or Dartbrook Road, with the northern end of the Muswellbrook Bypass expected to join New England Highway south of Aberdeen. Similarly, those Modification vehicles assumed herein to travel to and from New England Highway south of Muswellbrook (i.e. Singleton and Lower Hunter) would continue to use Thomas Mitchell Drive, with the southern end of the Muswellbrook Bypass expected to join New England Highway north of Thomas Mitchell Drive.

As the Muswellbrook Bypass would primarily serve those vehicles currently travelling through Muswellbrook along New England Highway, and is expected to pass to the east of Muswellbrook, its impact on general traffic conditions to the west of Muswellbrook would likely be minimal.

6.11.2 Muswellbrook Mine Affected Roads Network Plan

Considering the high-level nature of these strategies, and assuming that the constraints on their construction are able to be overcome, the potential implications of construction of the recommended strategy envisaged in the *Muswellbrook Mine Affected Roads Network Plan Review* (Bitzios, 2020) (primarily the Western Corridor and Inner West Link) are broadly expected to be as described below.

The Western Corridor and Inner West Link are intended to form a western bypass route around Muswellbrook for traffic between Golden Highway at Jerrys Plains, and New England Highway north of Muswellbrook. In the immediate vicinity of the Mount Pleasant Operation, the recommended plan includes a new link between Denman Road and Bengalla Road, a new link between Bengalla Road and Wybong Road via Overton Road, and a new link between Wybong Road near Overton Road to New England Highway to the east of the Mount Pleasant Operation via a new bridge over the Hunter River and an upgraded Burtons Lane (Bitzios, 2020).

The review's key network recommendations refer to a link north from Wybong Road to Dorset Road as part of the Western Corridor, however this is not reflected in the road network plan, or triggers and priorities contained in the report, and appears to relate to a previously proposed route which is no longer being considered.

It is unclear from the review what preferred route the Western Corridor traffic would follow between the intersection of the new link at Bengalla Road (northern end of Option W1) and the new link from Wybong Road near Overton Road (southern end of Option W7). Between these points, traffic may follow either Bengalla Road and the Inner West Link (Option 2B) or the existing (and longer-term realigned) Bengalla Road and Wybong Road past the Mount Pleasant Operation. The review states (Bitzios, 2020) "there is the potential to utilise the realigned Bengalla Link Road as part of a western corridor linking Denman Road to New England Highway" however the preferred route is not clarified.

The Western Corridor and Inner West Link would form an alternative route for traffic currently using Wybong Road and Kayuga Road to travel between New England Highway north of Muswellbrook (e.g., Scone and Aberdeen) and destinations to the west and south-west, including to and from Mangoola Coal, Bengalla Mine, Mount Pleasant Operation, Denman, and locations farther west along Golden Highway.

Bitzios (2020) indicates that the Inner West Link between Bengalla Road and Wybong Road would reduce traffic demands on Wybong Road west of Overton Road. Although not stated in the review, it is assumed that this is due to the likely diversion of traffic travelling between Bengalla Mine and New England Highway north of Muswellbrook currently using Aberdeen Street – Kayuga Road – Wybong Road – Bengalla Road. That traffic may divert to the Inner West Link and Bengalla Road to Bengalla Mine, which would likely offer reduced travel time.

It is unlikely that vehicles currently using Wybong Road west of Overton Road to access Mangoola Coal and destinations farther to the west would divert from Wybong Road as the Inner West Link would be less direct. Mount Pleasant Operation and Modification traffic would also continue to use that part of Wybong Road west of Overton Road should the Inner West Link be constructed.

Construction of the Inner West Link has the potential to increase the use of Wybong Road west of Overton Road by existing Mount Pleasant Operation traffic from Muswellbrook that is currently using Bengalla Road to avoid use of Kayuga Bridge. The extent to which this occurs would depend on the travel time savings offered by the new route, which may vary between those employees who reside in the northern part of Muswellbrook and those who reside in the south.

The overall impact of the Inner West Link would be to alter the forecast traffic volumes on Wybong Road to the east and west of the Mount Pleasant Operation from those anticipated in this assessment, with some increased demand from some sources, and decreased demand from other sources. If the Inner West Link were to be constructed, a portion of the Modification-generated traffic assumed herein to use Kayuga Road would likely use the Inner West Link instead to travel between the Mount Pleasant Operation and New England Highway. The Modification's traffic on Kayuga Road, Blairmore Lane and Dartbrook Road would be reduced in that scenario.

Similarly, the portion of the Inner West Link envisaged between Wybong Road and Denman Road via Overton Road has the potential to form an alternative route for Mount Pleasant Operation and Modification traffic travelling to and from the southern parts of the town of Muswellbrook. This assessment assumes that these vehicles would use Wybong Road – Bengalla Road – Denman Road to access Muswellbrook. The net effect of this would be to reduce the Modification-generated traffic volumes on Bengalla Road between Wybong Road and the Inner West Link Road below those forecast herein, and increase traffic on Wybong Road between the Mount Pleasant Operation access and the Inner West Link.

Traffic would also likely be reduced on Bengalla Road west of Denman Road, and on Denman Road between the new link road opposite the proposed Edderton Road northern deviation and Bengalla Road.

Some traffic currently using Thomas Mitchell Drive to travel between destinations to the south along New England Highway south and the western region of Muswellbrook (including Mangoola Coal and Bengalla Mine) may instead use the Western Corridor (realigned Edderton Road) to travel to and from the south via Golden Highway. This would result in some reduction of traffic using Thomas Mitchell Drive below that forecast in this assessment.

Should the Inner West Link proceed, it is therefore likely that a higher proportion of traffic travelling to and from the Mount Pleasant Operation would use Wybong Road east of the Mount Pleasant Operation Access Road. It is expected the final design of the Inner West Link would be based on assessment of such potential changes to traffic flows and would identify any road and intersection upgrades required to support the Inner West Link.

Overall, this assessment has demonstrated that the existing road network can adequately accommodate the Mount Pleasant Operation and Modification traffic without implementation of the recommended road network changes presented in the *Muswellbrook Mine Affected Roads Network Plan Review* (Bitzios, 2020). Aspects of that plan require further investigation, and would generally result in dispersion of traffic on to more routes than assumed herein. The Modification is not reliant upon implementation of any of the road changes, so should further investigation of the feasibility of several aspects of those changes determine that they cannot proceed, no changes to the Modification as proposed would be required.

6.11.3 OSOM Access for Renewable Energy Zone Developments

As discussed in Section 5.3, existing restrictions on the Denman Bridge have resulted in Bengalla Road and Wybong Road (west) being identified as an alternative route for up to 30% of OSOM vehicle movements associated with the CWO REZ, and in the event of planned or unplanned closures. Similarly, height restrictions on north-south access through Muswellbrook via New England Highway will restrict access for OSOM vehicle movements until such time as the Muswellbrook Bypass is completed. OSOM vehicle access for the New England REZ has been proposed via Bengalla Road, Wybong Road (east), Kayuga Road, Stair Street, and the private Dartbrook Mine road to join New England Highway.

Regardless of the outcome of possible reclassification of the alternative routes, it can be anticipated that some OSOM vehicle movements associated with REZ projects may occur along routes that are used for access for the Mount Pleasant Operation. Prior to December 2026, any OSOM vehicle movements on Mount Pleasant Operation routes would be expected to interact with traffic generated by the approved Mount Pleasant Operation. After that time, any interaction would be with Modification-generated traffic, noting that completion of the Muswellbrook Bypass (expected 2027) would mitigate the need for some of the OSOM vehicles to use the Modification access routes.

Quantitative forecasts of the OSOM demands resulting from REZ projects are not available, nor are details regarding the nature of the OSOM demands.

OSOM vehicle movements associated with the REZ projects would be subject to the usual permit and associated requirements before using the roads in the vicinity of the Mount Pleasant Operation.

Shift times at Mount Pleasant Operation, together with those of Mangoola Coal and Bengalla Mine are offset from each other, but distinct periods of higher demand on the road network during the combined travel periods by the workforce are evident.

While the movement of OSOM vehicles for the REZ developments is outside the control of MACH, it would be reasonable to assume that such movements would be avoided during the peak periods for the movement of the workforces for the various mines, which is consistent with the MACH's requirements for its own OSOM vehicle movements as outlined in the Traffic Management Plan. It would be expected that use would be made of staging areas for OSOM vehicles to avoid using the access roads during those peak periods.

Where an OSOM vehicle movement for the REZ developments is expected to result in delays to other vehicles and/or prevent vehicles from passing on any of the access roads to the Mount Pleasant Operation, it is considered reasonable that MACH be advised of the expected timing of restricted access on the roads. This would allow for non-essential travel during that period to be delayed and/or drivers to be advised of alternative routes where available.

7 Conclusions

This study has examined the likely road transport implications of the Modification to the Mount Pleasant Operation. It is concluded that no specific measures or upgrades are required to mitigate the impacts of the development on the capacity, safety and efficiency of the road network as a result of the changed road traffic conditions associated with the Modification. The existing Traffic Management Plan and Drivers' Code of Conduct for the Mount Pleasant Operation provides appropriate guidance for all vehicles accessing the site and would apply to Modification-generated traffic. With the Modification, the Traffic Management Plan and Drivers' Code of Conduct would continue to be reviewed and more appropriate procedures implemented if the existing practices are proven not to be efficient.

With the forecast changes in traffic in the region related to the cumulative effects of the Modification, other developments and background growth, future midblock levels of service experienced by drivers on the key access roads for the Modification would remain satisfactory, and the key intersections which would be used by Modification traffic are expected to operate at good levels of service with short delays and spare capacity without requiring upgrading.

The main road treatments at the existing intersections expected to be used by Modification-generated traffic generally meet or exceed those required by application of the Austroads warrants for greenfields intersection design. The intersection of Kayuga Road with Wybong Road does not include formalised widened shoulders on either side of Kayuga Road, which would be warranted under existing traffic demands.

Previous road safety audits on the access routes used by Mount Pleasant Operation traffic and on Castlerock Road did not identify any high risk items. Most medium and low risk items identified in the audits relate to a lack of road linemarking, signage or guide posts and protection barriers to roadside structures, together with some need for pavement or drainage improvements to improve existing road safety conditions.

The planned construction of the Muswellbrook Bypass to the east of Muswellbrook would primarily serve those vehicles currently travelling through Muswellbrook along New England Highway and is not expected to make a significant impact to general traffic conditions on the Modification access routes to the west of Muswellbrook. The Mount Pleasant Northern Link Road would generally not be used by Mount Pleasant Operation or Modification-related traffic and would have negligible impact on general traffic conditions on the Modification access roads, providing only local area access. The alternative alignments of the Mount Pleasant Northern Link Road would have negligible impact on travel times for local traffic using that road.

This assessment has demonstrated that the existing road network can adequately accommodate the Modification traffic without implementation of the recommended road network changes presented in the *Muswellbrook Mine Affected Roads Network Plan Review* (Bitzios, 2020). Aspects of that plan require further investigation, and would generally result in dispersion of traffic on to more routes than assumed in this assessment. The Modification is not reliant upon implementation of any of the road changes, so should further investigation of the feasibility of several aspects of those changes determine that they cannot proceed, no changes to the Modification as proposed would be required.

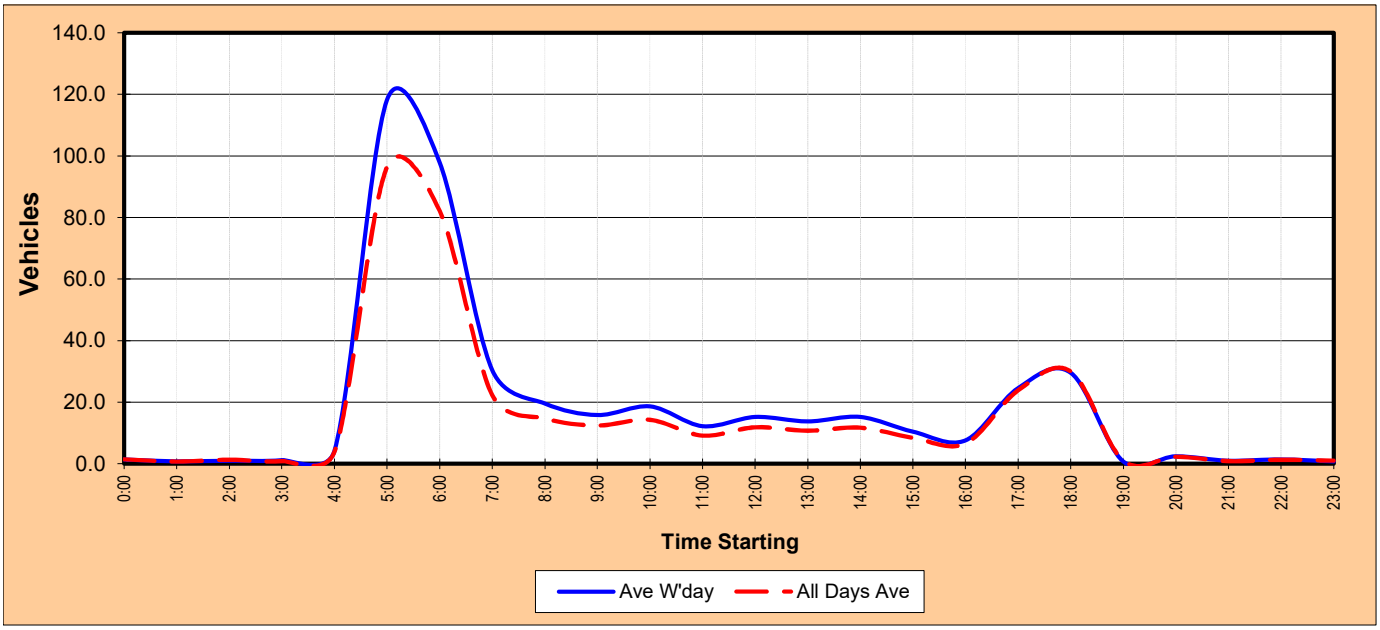
Appendix A

Traffic Surveys

Road	Mt Pleasant Operation Main Access Rd
Location	Off Wybong Rd
Suburb	Muswellbrook
Site No.	8552_1
Start Date	Tuesday 11/02/2020
Direction	Northbound

Average Weekday	444
All Day Average	369
Weekday Heavy's	19.6%
All Day Heavy's	19.3%

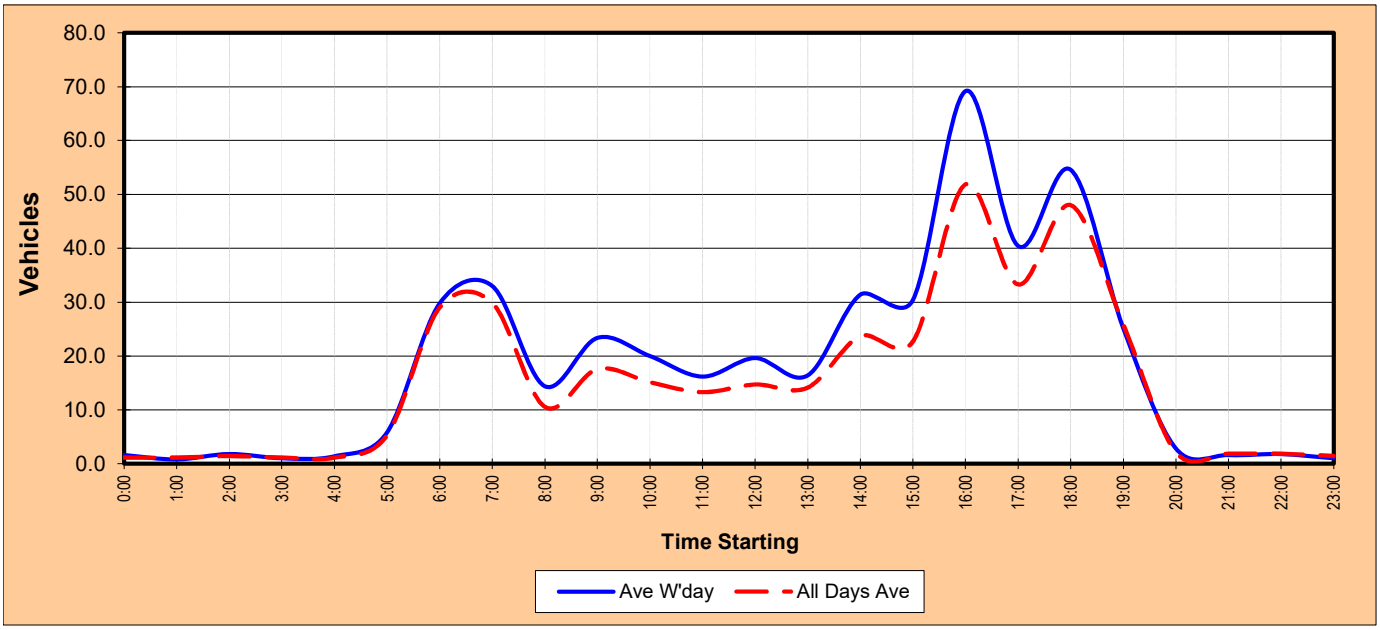
Starting Time	Day of Week							Ave W'day	All Days Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	17-Feb	11-Feb	12-Feb	13-Feb	14-Feb	15-Feb	16-Feb		
AM Peak	109	115	130	127	110	47	42		
PM Peak	27	30	30	29	32	30	32		
0:00	1	3	1	1	1	1	2	1	1
1:00	0	1	0	2	1	1	0	1	1
2:00	2	0	2	0	1	2	2	1	1
3:00	0	3	0	3	0	0	0	1	1
4:00	3	2	5	5	6	3	3	4	4
5:00	109	115	130	127	110	42	42	118	96
6:00	86	111	110	90	92	47	39	98	82
7:00	35	23	25	38	31	3	1	30	22
8:00	16	15	24	29	14	3	2	20	15
9:00	18	20	18	12	11	5	3	16	12
10:00	14	18	21	21	19	4	3	19	14
11:00	8	13	16	14	10	2	1	12	9
12:00	13	14	22	14	13	4	3	15	12
13:00	11	10	23	12	13	2	4	14	11
14:00	11	16	14	23	12	5	1	15	12
15:00	6	15	9	15	7	4	3	10	8
16:00	5	6	9	9	9	5	3	8	7
17:00	25	26	29	22	21	20	24	25	24
18:00	27	30	30	29	32	30	32	30	30
19:00	1	0	0	0	3	1	2	1	1
20:00	2	2	3	3	2	3	1	2	2
21:00	0	1	2	2	0	0	1	1	1
22:00	1	1	3	0	2	1	1	1	1
23:00	0	2	1	0	1	1	2	1	1
Total	**394**	**447**	**497**	**471**	**411**	**189**	**175**	**444**	**369**
% Heavies	**20.6%**	**20.6%**	**19.9%**	**20.0%**	**17.0%**	**19.0%**	**15.4%**	**19.6%**	**19.3%**



Road	Mt Pleasant Operation Main Access Rd
Location	Off Wybong Rd
Suburb	Muswellbrook
Site No.	8552_1
Start Date	Tuesday 11/02/2020
Direction	Southbound

Average Weekday	444
All Day Average	368
Weekday Heavy's	15.0%
All Day Heavy's	14.2%

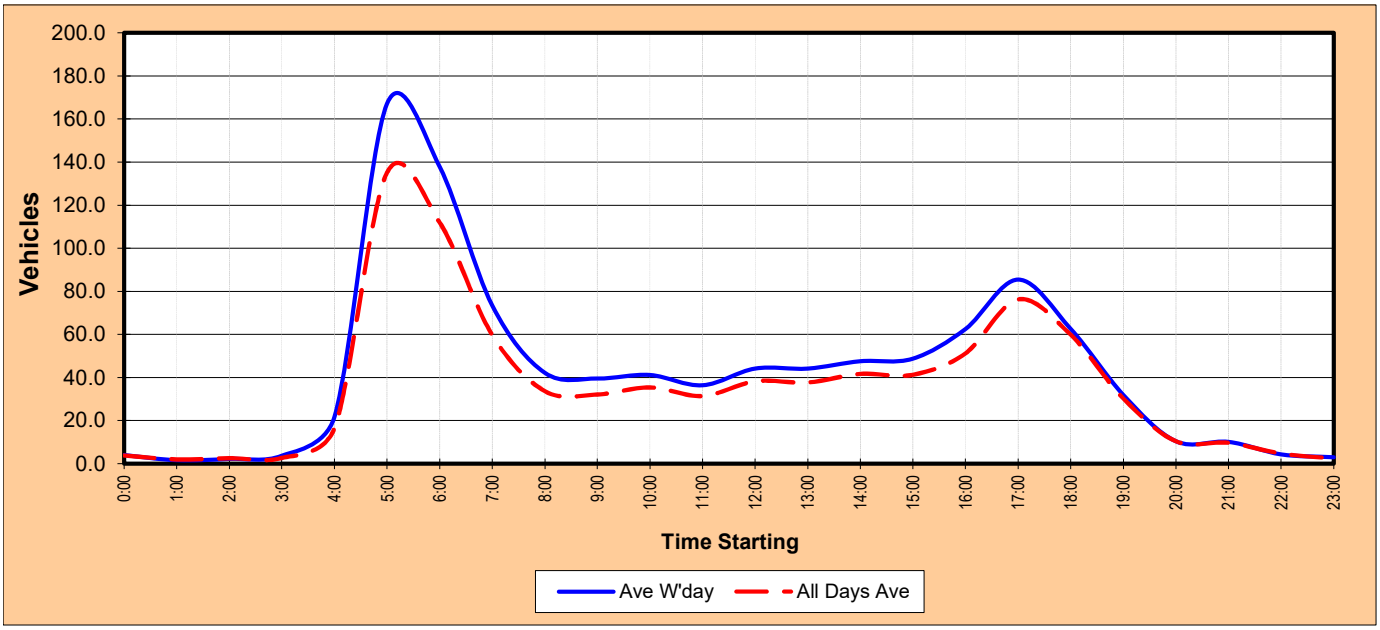
Starting Time	Day of Week							Ave W'day	All Days Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	17-Feb	11-Feb	12-Feb	13-Feb	14-Feb	15-Feb	16-Feb		
AM Peak	**44**	**39**	**30**	**34**	**37**	**28**	**32**		
PM Peak	**56**	**75**	**80**	**90**	**58**	**32**	**32**		
0:00	1	1	2	1	3	0	0	2	1
1:00	2	1	0	1	0	2	2	1	1
2:00	1	1	2	1	4	1	0	2	1
3:00	1	0	2	1	1	1	2	1	1
4:00	3	0	2	1	1	0	1	1	1
5:00	5	10	7	3	4	6	2	6	5
6:00	38	25	27	34	25	22	32	30	29
7:00	25	39	30	34	37	28	16	33	30
8:00	17	9	18	20	8	0	2	14	11
9:00	44	23	15	14	21	4	2	23	18
10:00	31	13	20	21	15	5	1	20	15
11:00	19	8	19	15	20	7	5	16	13
12:00	13	20	25	24	16	1	4	20	15
13:00	13	8	14	28	19	14	3	16	14
14:00	17	24	35	29	52	6	3	31	24
15:00	29	33	27	33	30	4	3	30	23
16:00	43	75	80	90	58	8	9	69	52
17:00	18	52	64	44	24	12	19	40	33
18:00	56	70	69	48	30	31	32	55	48
19:00	8	30	22	32	34	32	23	25	26
20:00	3	3	4	1	3	0	1	3	2
21:00	1	2	2	2	1	2	3	2	2
22:00	1	1	4	1	2	2	2	2	2
23:00	1	0	1	2	1	3	2	1	1
Total	**390**	**448**	**491**	**480**	**409**	**191**	**169**	**444**	**368**
% Heavies	**16.4%**	**12.3%**	**16.7%**	**15.4%**	**14.2%**	**11.0%**	**6.5%**	**15.0%**	**14.2%**



Road	Bengalla Rd
Location	South Of Wybong Rd
Suburb	Muswellbrook
Site No.	8552_3
Start Date	Tuesday 11/02/2020
Direction	Northbound

Average Weekday	1026
All Day Average	871
Weekday Heavy's	19.2%
All Day Heavy's	18.1%

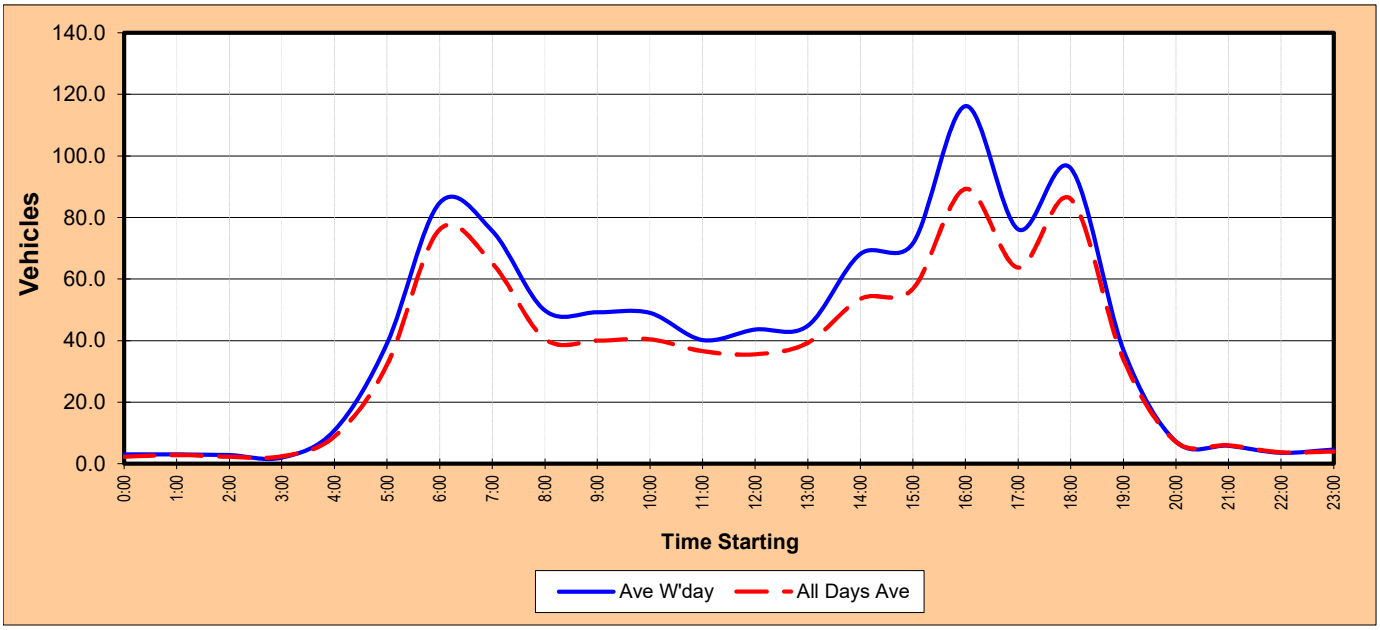
Starting Time	Day of Week							Ave W'day	All Days Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	17-Feb	11-Feb	12-Feb	13-Feb	14-Feb	15-Feb	16-Feb		
AM Peak	182	156	179	178	140	53	59		
PM Peak	86	77	95	84	85	57	51		
0:00	1	6	5	4	4	4	3	4	4
1:00	2	1	1	3	1	5	1	2	2
2:00	6	2	2	0	1	4	3	2	3
3:00	5	4	2	6	2	0	0	4	3
4:00	30	19	21	18	21	5	2	22	17
5:00	182	156	179	178	140	52	59	167	135
6:00	153	156	146	113	121	53	42	138	112
7:00	66	72	66	90	73	28	23	73	60
8:00	36	32	51	49	43	13	12	42	34
9:00	32	34	41	52	39	16	11	40	32
10:00	33	44	44	44	41	25	17	41	35
11:00	27	28	47	38	42	16	22	36	31
12:00	37	52	46	50	36	27	20	44	38
13:00	45	47	52	37	40	19	24	44	38
14:00	47	44	51	53	43	29	25	48	42
15:00	38	49	52	55	50	21	24	49	41
16:00	53	62	62	71	65	19	27	63	51
17:00	86	77	95	84	85	56	51	85	76
18:00	55	52	70	69	67	57	49	63	60
19:00	16	31	37	41	35	21	31	32	30
20:00	14	10	8	11	9	10	11	10	10
21:00	1	10	13	15	12	8	9	10	10
22:00	4	2	3	7	6	4	7	4	5
23:00	2	2	4	0	7	1	1	3	2
Total	**971**	**992**	**1098**	**1088**	**983**	**493**	**474**	**1026**	**871**
% Heavies	**19.2%**	**19.8%**	**19.0%**	**19.4%**	**18.5%**	**12.4%**	**12.0%**	**19.2%**	**18.1%**



Road	Bengalla Rd
Location	South Of Wybong Rd
Suburb	Muswellbrook
Site No.	8552_3
Start Date	Tuesday 11/02/2020
Direction	Southbound

Average Weekday	984
All Day Average	829
Weekday Heavy's	18.1%
All Day Heavy's	17.2%

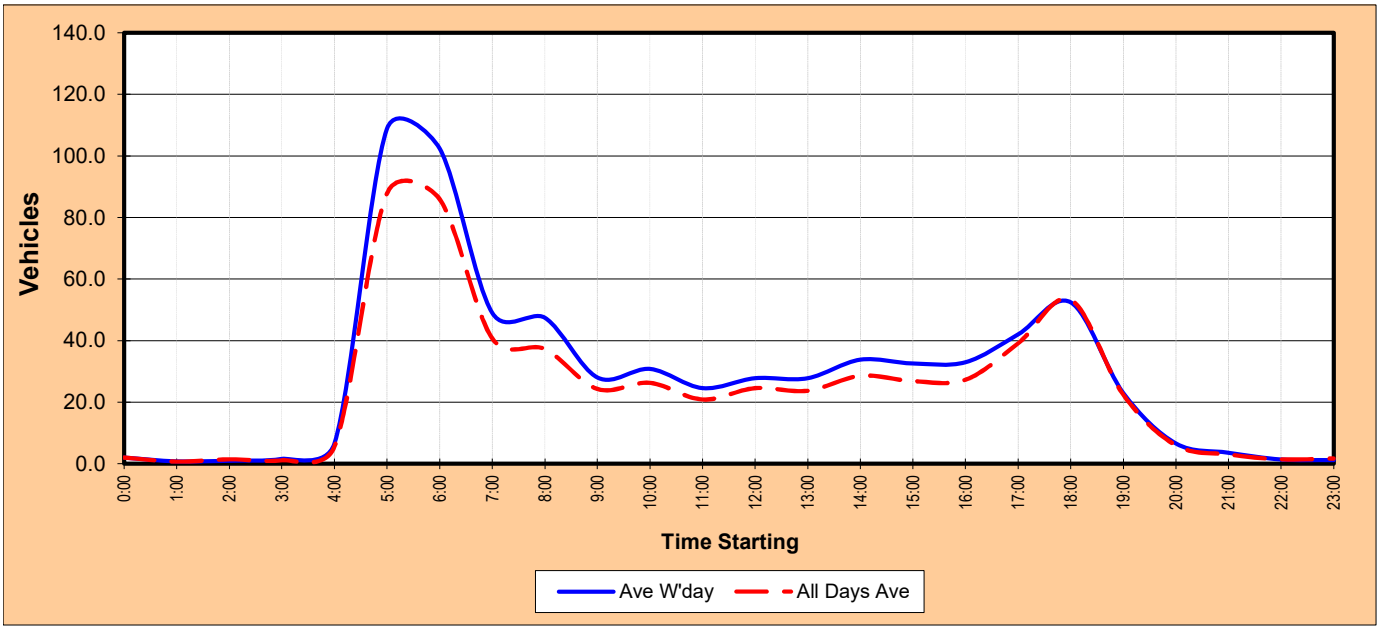
Starting Time	Day of Week							Ave W'day	All Days Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	17-Feb	11-Feb	12-Feb	13-Feb	14-Feb	15-Feb	16-Feb		
AM Peak	**82**	**81**	**86**	**99**	**84**	**52**	**57**		
PM Peak	**101**	**125**	**136**	**126**	**101**	**66**	**56**		
0:00	1	3	4	3	4	1	0	3	2
1:00	4	2	3	5	1	4	1	3	3
2:00	3	2	2	2	5	2	0	3	2
3:00	2	0	4	2	2	3	4	2	2
4:00	15	8	11	9	11	5	3	11	9
5:00	35	31	52	42	35	15	15	39	32
6:00	82	73	86	99	84	52	57	85	76
7:00	67	81	68	81	81	48	30	76	65
8:00	51	39	45	60	54	25	10	50	41
9:00	64	47	43	40	52	14	20	49	40
10:00	61	48	30	62	44	25	13	49	40
11:00	46	30	33	43	49	28	27	40	37
12:00	46	41	45	45	41	14	17	44	36
13:00	37	29	39	62	57	35	16	45	39
14:00	55	53	76	67	90	21	13	68	54
15:00	64	67	70	69	88	16	24	72	57
16:00	93	125	136	126	101	18	26	116	89
17:00	73	93	91	73	51	22	43	76	64
18:00	101	113	109	90	67	66	56	96	86
19:00	25	43	43	38	37	25	27	37	34
20:00	6	8	7	8	7	2	12	7	7
21:00	4	10	4	5	6	6	7	6	6
22:00	2	2	6	3	5	4	4	4	4
23:00	5	3	6	6	3	4	1	5	4
Total	**942**	**951**	**1013**	**1040**	**975**	**455**	**426**	**984**	**829**
% Heavies	**18.2%**	**16.8%**	**18.7%**	**19.7%**	**17.2%**	**12.3%**	**11.5%**	**18.1%**	**17.2%**



Road	Wybong Rd
Location	Btw Bengalla Rd & Mt Pl Acess
Suburb	Muswellbrook
Site No.	8552_2
Start Date	Tuesday 11/02/2020
Direction	Eastbound

Average Weekday	688
All Day Average	592
Weekday Heavy's	11.3%
All Day Heavy's	10.5%

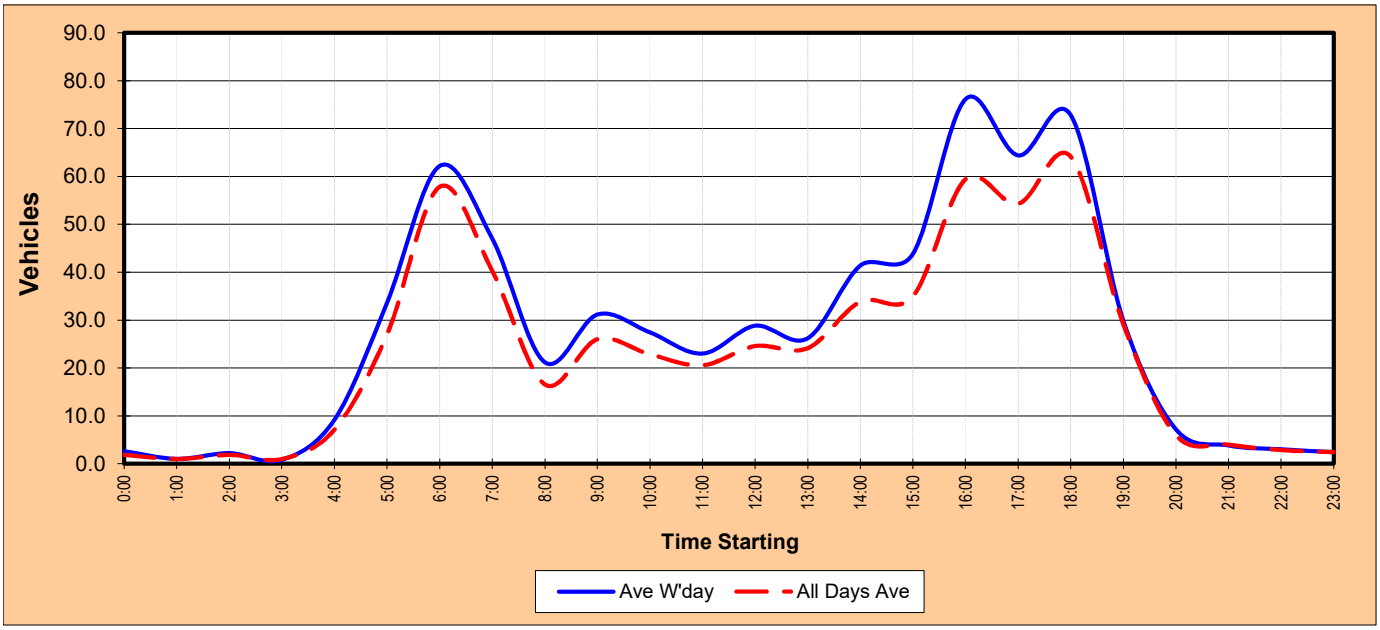
Starting Time	Day of Week							Ave W'day	All Days Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	17-Feb	11-Feb	12-Feb	13-Feb	14-Feb	15-Feb	16-Feb		
AM Peak	**100**	**111**	**121**	**120**	**98**	**45**	**45**		
PM Peak	**56**	**56**	**47**	**55**	**55**	**57**	**54**		
0:00	1	4	2	2	1	1	3	2	2
1:00	0	1	1	1	1	1	0	1	1
2:00	1	1	2	0	1	3	2	1	1
3:00	0	3	1	4	0	0	0	2	1
4:00	6	4	10	7	6	3	3	7	6
5:00	100	105	121	120	98	36	35	109	88
6:00	91	111	113	99	98	45	45	102	86
7:00	43	51	48	56	47	21	19	49	41
8:00	37	46	54	59	41	16	8	47	37
9:00	32	28	24	33	23	16	14	28	24
10:00	25	37	30	34	28	20	10	31	26
11:00	20	19	24	28	32	11	12	25	21
12:00	22	32	39	25	21	18	15	28	25
13:00	32	22	29	26	30	15	12	28	24
14:00	23	34	38	39	35	13	18	34	29
15:00	22	36	35	38	32	9	16	33	27
16:00	23	31	31	46	34	13	13	33	27
17:00	34	56	45	37	38	37	27	42	39
18:00	56	49	47	55	55	57	54	52	53
19:00	12	15	35	25	28	15	27	23	22
20:00	5	4	5	9	10	4	5	7	6
21:00	1	7	5	4	1	1	2	4	3
22:00	0	3	2	1	1	1	2	1	1
23:00	0	1	2	0	3	3	3	1	2
Total	**586**	**700**	**743**	**748**	**664**	**359**	**345**	**688**	**592**
% Heavies	**10.4%**	**10.1%**	**12.1%**	**12.3%**	**11.4%**	**6.7%**	**6.1%**	**11.3%**	**10.5%**



Road	Wybong Rd
Location	Btw Bengalla Rd & Mt Pl Acess
Suburb	Muswellbrook
Site No.	8552_2
Start Date	Tuesday 11/02/2020
Direction	Westbound

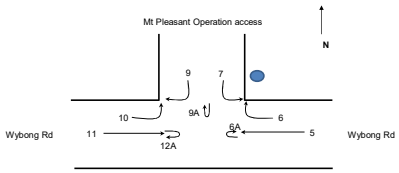
Average Weekday	661
All Day Average	564
Weekday Heavy's	18.9%
All Day Heavy's	17.3%

Starting Time	Day of Week							Ave W'day	All Days Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	17-Feb	11-Feb	12-Feb	13-Feb	14-Feb	15-Feb	16-Feb		
AM Peak	**65**	**59**	**58**	**68**	**61**	**49**	**45**		
PM Peak	**71**	**94**	**100**	**88**	**69**	**45**	**40**		
0:00	2	4	2	1	4	0	0	3	2
1:00	2	2	0	1	0	1	1	1	1
2:00	2	1	2	2	4	2	0	2	2
3:00	0	0	2	1	1	1	2	1	1
4:00	9	9	10	8	10	2	2	9	7
5:00	38	28	40	31	31	12	9	34	27
6:00	65	59	58	68	61	49	45	62	58
7:00	43	51	44	48	49	25	22	47	40
8:00	19	15	25	30	17	5	5	21	17
9:00	45	28	25	23	35	14	12	31	26
10:00	40	22	28	25	22	12	11	27	23
11:00	24	13	25	19	34	15	14	23	21
12:00	21	34	35	33	21	13	15	29	25
13:00	24	18	20	43	26	27	11	26	24
14:00	25	32	44	43	63	14	16	41	34
15:00	38	45	36	47	53	13	13	44	35
16:00	52	80	92	88	69	15	20	76	59
17:00	37	69	100	66	50	24	34	64	54
18:00	71	94	87	72	40	45	40	73	64
19:00	10	41	26	35	38	24	30	30	29
20:00	5	11	6	5	9	2	4	7	6
21:00	2	5	2	5	5	4	5	4	4
22:00	1	1	4	3	6	2	3	3	3
23:00	3	0	4	3	2	3	2	2	2
Total	**578**	**662**	**717**	**700**	**650**	**324**	**316**	**661**	**564**
% Heavies	**17.3%**	**16.8%**	**20.2%**	**22.6%**	**17.2%**	**9.6%**	**8.5%**	**18.9%**	**17.3%**



austraffic

Client : TTPP
Job : Muswellbrook ATC
Day/Date : Wednesday, 27 November 2019
Survey Location : Mount Pleasant Operation access & Wybong Road
Weather : Fine

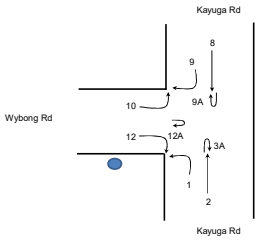


Time Period	Movement 5			Movement 6			Movement 6A			Movement 7			Movement 9			Movement 9A			Movement 10			Movement 11			Movement 12A			Total of all Movements
	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	
6:00 - 6:15	15	0	15	1	0	1	0	0	0	2	0	2	6	0	6	0	0	0	18	2	20	1	0	1	0	0	0	45
6:15 - 6:30	9	0	9	3	0	3	0	0	0	1	0	1	5	0	5	0	0	0	26	3	29	1	0	1	0	0	0	48
6:30 - 6:45	5	0	5	5	0	5	0	0	0	0	0	0	1	0	1	0	0	0	25	0	25	2	0	2	0	0	0	38
6:45 - 7:00	2	1	3	2	0	2	0	0	0	1	0	1	6	0	6	0	0	0	14	1	15	14	1	15	0	0	0	42
7:00 - 7:15	6	0	6	2	0	2	0	0	0	9	0	9	17	1	18	0	0	0	5	0	5	13	0	13	0	0	0	53
7:15 - 7:30	5	0	5	1	0	1	0	0	0	1	0	1	5	0	5	0	0	0	4	0	4	8	2	10	0	0	0	26
7:30 - 7:45	5	1	6	1	0	1	0	0	0	0	0	0	2	0	2	0	0	0	6	1	7	5	0	5	0	0	0	21
7:45 - 8:00	5	1	6	1	0	1	0	0	0	1	0	1	1	0	1	0	0	0	3	4	7	6	1	7	0	0	0	23
8:00 - 8:15	2	0	2	1	0	1	0	0	0	1	0	1	1	1	2	0	0	0	5	1	6	4	1	5	0	0	0	17
8:15 - 8:30	2	0	2	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	1	8	2	10	0	0	0	14
8:30 - 8:45	3	0	3	0	0	0	0	0	0	1	0	1	4	0	4	0	0	0	3	0	3	9	1	10	0	0	0	21
8:45 - 9:00	2	1	3	1	0	1	0	0	0	1	1	2	2	5	7	0	0	0	3	0	3	2	1	3	0	0	0	19
9:00 - 9:15	8	0	8	2	0	2	0	0	0	2	0	2	2	1	3	0	0	0	2	2	4	4	0	4	0	0	0	23
9:15 - 9:30	3	0	3	1	0	1	0	0	0	0	0	0	4	1	5	0	0	0	7	0	7	5	0	5	0	0	0	21
9:30 - 9:45	6	0	6	3	0	3	0	0	0	1	0	1	6	0	6	0	0	0	5	1	6	4	2	6	0	0	0	28
9:45 - 10:00	2	0	2	2	0	2	0	0	0	2	0	2	1	0	1	0	0	0	6	4	10	10	1	11	0	0	0	28
10:00 - 10:15	2	0	2	2	0	2	0	0	0	0	0	0	4	0	4	0	0	0	4	1	5	1	0	1	0	0	0	14
10:15 - 10:30	1	1	2	2	0	2	0	0	0	3	1	4	2	2	4	0	0	0	2	1	3	5	0	5	0	0	0	20
10:30 - 10:45	1	0	1	0	0	0	0	0	0	3	0	3	2	0	2	0	0	0	6	1	7	2	0	2	0	0	0	15
10:45 - 11:00	3	0	3	3	0	3	0	0	0	0	0	0	1	2	3	0	0	0	4	0	4	4	0	4	0	0	0	17
11:00 - 11:15	4	1	5	1	0	1	0	0	0	0	0	0	5	1	6	0	0	0	3	2	5	5	0	5	0	0	0	22
11:15 - 11:30	4	2	6	0	1	1	0	0	0	0	0	0	1	1	2	0	0	0	2	0	2	4	0	4	0	0	0	15
11:30 - 11:45	3	1	4	0	0	0	0	0	0	3	0	3	5	1	6	0	0	0	2	0	2	3	0	3	0	0	0	18
11:45 - 12:00	3	0	3	1	0	1	0	0	0	2	0	2	2	1	3	0	0	0	4	2	6	2	0	2	0	0	0	17
12:00 - 12:15	1	0	1	0	0	0	0	0	0	3	0	3	3	2	5	0	0	0	2	1	3	3	0	3	0	0	0	15
12:15 - 12:30	6	0	6	1	0	1	0	0	0	2	0	2	5	1	6	0	0	0	3	2	5	3	1	4	0	0	0	24
12:30 - 12:45	10	0	10	0	0	0	0	0	0	0	0	0	4	2	6	0	0	0	4	0	4	3	3	6	0	0	0	26
12:45 - 13:00	2	0	2	0	0	0	0	0	0	1	1	2	5	0	5	0	0	0	0	0	0	4	0	4	0	0	0	13
13:00 - 13:15	3	2	5	1	0	1	0	0	0	2	1	3	3	2	5	0	0	0	5	2	7	0	1	1	0	0	0	22
13:15 - 13:30	5	0	5	0	0	0	0	0	0	1	0	1	6	1	7	0	0	0	2	1	3	4	0	4	0	0	0	20
13:30 - 13:45	2	1	3	1	0	1	0	0	0	2	2	4	4	0	4	0	0	0	3	2	5	7	0	7	0	0	0	24
13:45 - 14:00	4	0	4	2	0	2	0	0	0	2	0	2	2	0	2	0	0	0	2	1	3	5	0	5	0	0	0	18
14:00 - 14:15	3	1	4	2	0	2	0	0	0	1	0	1	2	1	3	0	0	0	3	0	3	5	0	5	0	0	0	18
14:15 - 14:30	6	0	6	1	0	1	0	0	0	0	0	0	2	2	4	0	0	0	4	2	6	4	0	4	0	0	0	21
14:30 - 14:45	3	0	3	2	0	2	0	0	0	0	1	1	6	2	8	0	0	0	4	3	7	3	1	4	0	0	0	25
14:45 - 15:00	1	3	4	0	0	0	0	2	2	2	0	2	2	1	3	0	0	0	2	1	3	7	0	7	0	0	0	21
15:00 - 15:15	3	1	4	2	0	2	0	0	0	2	0	2	6	1	7	0	0	0	0	0	0	8	0	8	0	0	0	23
15:15 - 15:30	4	2	6	0	0	0	0	0	0	3	0	3	5	0	5	0	0	0	1	0	1	6	0	6	0	0	0	21
15:30 - 15:45	4	0	4	1	0	1	0	0	0	0	0	0	3	0	3	0	0	0	1	0	1	11	0	11	0	0	0	20
15:45 - 16:00	4	2	6	0	0	0	0	0	0	1	0	1	5	0	5	0	0	0	5	1	6	6	0	6	0	0	0	24
16:00 - 16:15	6	0	6	1	0	1	0	0	0	6	0	6	19	2	21	0	0	0	0	0	0	3	0	3	0	0	0	37
16:15 - 16:30	2	0	2	0	0	0	0	0	0	4	0	4	15	1	16	0	0	0	1	1	2	10	0	10	0	0	0	34
16:30 - 16:45	5	0	5	0	0	0	0	0	0	4	0	4	13	2	15	0	0	0	1	0	1	7	0	7	0	0	0	32
16:45 - 17:00	6	0	6	1	0	1	0	0	0	2	0	2	15	1	16	0	0	0	1	0	1	9	0	9	0	0	0	35
17:00 - 17:15	6	0	6	1	0	1	0	0	0	3	0	3	18	1	19	0	0	0	3	0	3	2	0	2	0	0	0	34
17:15 - 17:30	6	0	6	1	0	1	0	0	0	0	0	0	5	0	5	0	0	0	3	0	3	6	1	7	0	0	0	22
17:30 - 17:45	8	0	8	1	0	1	0	0	0	0	0	0	9	2	11	0	0	0	14	0	14	2	0	2	0	0	0	36
17:45 - 18:00	8	1	9	1	0	1	0	0	0	0	0	0	8	0	8	0	0	0	4	0	4	5	0	5	0	0	0	27
Total	209	22	231	54	1	55	0	2	2	76	7	83	250	41	291	0	0	0	228	43	271	245	19	264	0	0	0	1197
AM Peak	22	1	23	12	0	12	0	0	0	11	0	11	29	1	30	0	0	0	70	4	74	30	1	31	0	0	0	181
PM Peak	19	0	19	2	0	2	0	0	0	16	0	16	62	6	68	0	0	0	3	1	4	29	0	29	0	0	0	138

Peak Hour Volume Determination	
6:00 - 7:00	173
6:15 - 7:15	181
6:30 - 7:30	159
6:45 - 7:45	142
7:00 - 8:00	123
7:15 - 8:15	87
7:30 - 8:30	75
7:45 - 8:45	75
8:00 - 9:00	71
8:15 - 9:15	77
8:30 - 9:30	84
8:45 - 9:45	91
9:00 - 10:00	100
9:15 - 10:15	91
9:30 - 10:30	90
9:45 - 10:45	77
10:00 - 11:00	66
10:15 - 11:15	74
10:30 - 11:30	69
10:45 - 11:45	72
11:00 - 12:00	72
11:15 - 12:15	65
11:30 - 12:30	74
11:45 - 12:45	82
12:00 - 13:00	78
12:15 - 13:15	85
12:30 - 13:30	81
12:45 - 13:45	79
13:00 - 14:00	84
13:15 - 14:15	80
13:30 - 14:30	81
13:45 - 14:45	82
14:00 - 15:00	85
14:15 - 15:15	90
14:30 - 15:30	90
14:45 - 15:45	85
15:00 - 16:00	88
15:15 - 16:15	102
15:30 - 16:30	115
15:45 - 16:45	127
16:00 - 17:00	138
16:15 - 17:15	135
16:30 - 17:30	123
16:45 - 17:45	127
17:00 - 18:00	119
AM Peak	181
PM Peak	138

austraffic

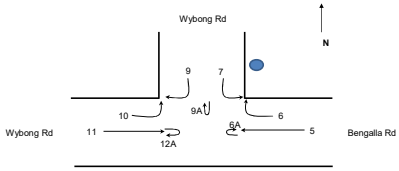
Client : TTPP
Job : Muswellbrook ATC
Day/Date : Wednesday, 27 November 2019
Survey Location : Wybong Road & Kayuga Road
Weather : Fine



Time Period	Movement 1			Movement 2			Movement 3A			Movement 8			Movement 9			Movement 9A			Movement 10			Movement 12			Movement 12A			Total of all Movements	Peak Hour Volume Determination	
	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total			
6:00 - 6:15	8	0	8	2	0	2	0	0	0	2	0	2	7	0	7	0	0	0	3	0	3	1	0	1	0	0	0	23	6:00 - 7:00	95
6:15 - 6:30	6	0	6	4	0	4	0	0	0	7	0	7	6	0	6	0	0	0	2	0	2	3	0	3	0	0	0	28	6:15 - 7:15	102
6:30 - 6:45	4	0	4	2	0	2	0	0	0	7	0	7	6	0	6	0	0	0	0	0	0	3	0	3	0	0	0	22	6:30 - 7:30	100
6:45 - 7:00	1	1	2	3	0	3	0	0	0	8	0	8	3	0	3	0	0	0	0	0	0	6	0	6	0	0	0	22	6:45 - 7:45	100
7:00 - 7:15	3	0	3	4	3	7	0	0	0	3	0	3	2	0	2	0	0	0	7	0	7	8	0	8	0	0	0	30	7:00 - 8:00	98
7:15 - 7:30	3	0	3	1	0	1	0	0	0	7	1	8	1	1	2	0	0	0	8	0	8	4	0	4	0	0	0	26	7:15 - 8:15	97
7:30 - 7:45	4	0	4	4	0	4	0	0	0	6	0	6	2	0	2	0	0	0	5	0	5	1	0	1	0	0	0	22	7:30 - 8:30	95
7:45 - 8:00	2	0	2	2	0	2	0	0	0	6	0	6	3	0	3	0	0	0	2	0	2	5	0	5	0	0	0	20	7:45 - 8:45	93
8:00 - 8:15	3	0	3	5	1	6	0	0	0	9	1	10	0	0	0	0	0	0	0	0	0	8	2	10	0	0	0	29	8:00 - 9:00	104
8:15 - 8:30	1	0	1	3	1	4	0	0	0	8	0	8	1	0	1	0	0	0	3	0	3	6	1	7	0	0	0	24	8:15 - 9:15	98
8:30 - 8:45	2	0	2	2	0	2	0	0	0	6	0	6	2	0	2	0	0	0	2	0	2	5	1	6	0	0	0	20	8:30 - 9:30	94
8:45 - 9:00	4	0	4	4	0	4	0	0	0	12	1	13	1	0	1	0	0	0	0	0	0	8	1	9	0	0	0	31	8:45 - 9:45	105
9:00 - 9:15	3	0	3	5	0	5	0	0	0	9	0	9	1	0	1	0	0	0	2	0	2	3	0	3	0	0	0	23	9:00 - 10:00	102
9:15 - 9:30	4	0	4	1	0	1	0	0	0	6	1	7	3	0	3	0	0	0	1	0	1	4	0	4	0	0	0	20	9:15 - 10:15	93
9:30 - 9:45	8	0	8	5	0	5	0	0	0	10	0	10	2	0	2	0	0	0	2	0	2	4	0	4	0	0	0	31	9:30 - 10:30	85
9:45 - 10:00	2	0	2	1	2	3	0	0	0	2	0	2	3	0	3	0	0	0	3	1	4	12	2	14	0	0	0	28	9:45 - 10:45	73
10:00 - 10:15	6	0	6	2	0	2	0	0	0	2	0	2	0	0	0	0	0	0	1	0	1	3	0	3	0	0	0	14	10:00 - 11:00	58
10:15 - 10:30	2	0	2	2	0	2	0	0	0	4	1	5	0	0	0	0	0	0	1	0	1	2	0	2	0	0	0	12	10:15 - 11:15	61
10:30 - 10:45	4	0	4	3	0	3	0	0	0	7	0	7	1	0	1	0	0	0	1	0	1	3	0	3	0	0	0	19	10:30 - 11:30	72
10:45 - 11:00	1	0	1	0	0	0	0	0	0	4	0	4	1	0	1	0	0	0	0	0	0	7	0	7	0	0	0	13	10:45 - 11:45	71
11:00 - 11:15	3	2	5	5	2	7	0	0	0	3	1	4	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	17	11:00 - 12:00	74
11:15 - 11:30	1	0	1	7	0	7	0	0	0	6	1	7	2	1	3	0	0	0	0	0	0	5	0	5	0	0	0	23	11:15 - 12:15	77
11:30 - 11:45	2	1	3	2	0	2	0	0	0	7	1	8	1	0	1	0	0	0	3	0	3	1	0	1	0	0	0	18	11:30 - 12:30	76
11:45 - 12:00	1	1	2	5	0	5	0	0	0	4	0	4	0	0	0	0	0	0	1	0	1	4	0	4	0	0	0	16	11:45 - 12:45	90
12:00 - 12:15	3	0	3	2	3	5	0	0	0	5	1	6	0	0	0	0	0	0	2	0	2	4	0	4	0	0	0	20	12:00 - 13:00	95
12:15 - 12:30	6	0	6	4	0	4	0	0	0	7	0	7	0	0	0	0	0	0	0	0	0	5	0	5	0	0	0	22	12:15 - 13:15	92
12:30 - 12:45	9	0	9	8	0	8	0	0	0	4	4	8	1	0	1	0	0	0	0	2	2	3	1	4	0	0	0	32	12:30 - 13:30	88
12:45 - 13:00	3	0	3	7	0	7	0	0	0	5	0	5	0	0	0	0	0	0	2	0	2	2	2	4	0	0	0	21	12:45 - 13:45	77
13:00 - 13:15	6	0	6	2	0	2	0	0	0	4	0	4	1	0	1	0	0	0	0	0	0	4	0	4	0	0	0	17	13:00 - 14:00	83
13:15 - 13:30	5	0	5	2	0	2	0	0	0	6	0	6	0	1	1	0	0	0	2	0	2	1	1	2	0	0	0	18	13:15 - 14:15	89
13:30 - 13:45	4	0	4	3	1	4	0	0	0	7	0	7	0	0	0	0	0	0	1	1	2	3	1	4	0	0	0	21	13:30 - 14:30	98
13:45 - 14:00	3	0	3	6	1	7	0	0	0	5	1	6	0	0	0	0	0	0	2	0	2	9	0	9	0	0	0	27	13:45 - 14:45	99
14:00 - 14:15	3	0	3	9	1	10	0	0	0	3	1	4	2	0	2	0	0	0	1	0	1	3	0	3	0	0	0	23	14:00 - 15:00	95
14:15 - 14:30	2	0	2	8	1	9	0	0	0	3	1	4	2	1	3	0	0	0	3	0	3	6	0	6	0	0	0	27	14:15 - 15:15	106
14:30 - 14:45	2	0	2	4	1	5	0	0	0	6	1	7	3	0	3	0	0	0	0	0	0	4	1	5	0	0	0	22	14:30 - 15:30	110
14:45 - 15:00	3	0	3	6	1	7	0	0	0	2	0	2	1	0	1	0	0	0	3	1	4	6	0	6	0	0	0	23	14:45 - 15:45	119
15:00 - 15:15	4	2	6	6	0	6	0	0	0	11	1	12	1	0	1	0	0	0	3	0	3	6	0	6	0	0	0	34	15:00 - 16:00	127
15:15 - 15:30	5	2	7	7	0	7	0	0	0	7	0	7	0	1	1	0	0	0	5	0	5	4	0	4	0	0	0	31	15:15 - 16:15	122
15:30 - 15:45	3	0	3	16	1	17	0	0	0	3	0	3	0	0	0	0	0	0	4	0	4	4	0	4	0	0	0	31	15:30 - 16:30	132
15:45 - 16:00	5	2	7	7	0	7	0	0	0	4	1	5	1	0	1	0	0	0	3	1	4	7	0	7	0	0	0	31	15:45 - 16:45	137
16:00 - 16:15	0	0	0	9	0	9	0	0	0	4	0	4	2	0	2	0	0	0	5	0	5	8	1	9	0	0	0	29	16:00 - 17:00	144
16:15 - 16:30	3	0	3	12	0	12	0	0	0	8	1	9	1	1	2	0	0	0	6	0	6	9	0	9	0	0	0	41	16:15 - 17:15	153
16:30 - 16:45	7	0	7	9	0	9	0	0	0	7	1	8	3	0	3	0	0	0	5	0	5	4	0	4	0	0	0	36	16:30 - 17:30	142
16:45 - 17:00	8	0	8	7	0	7	0	0	0	6	0	6	1	0	1	0	0	0	8	0	8	8	0	8	0	0	0	38	16:45 - 17:45	133
17:00 - 17:15	7	0	7	15	0	15	0	0	0	5	0	5	1	0	1	0	0	0	2	0	2	8	0	8	0	0	0	38	17:00 - 18:00	126
17:15 - 17:30	6	0	6	10	0	10	0	0	0	2	0	2	4	0	4	0	0	0	4	0	4	4	0	4	0	0	0	30	AM Peak	105
17:30 - 17:45	7	0	7	8	0	8	0	0	0	4	0	4	4	0	4	0	0	0	1	0	1	3	0	3	0	0	0	27	PM Peak	153
17:45 - 18:00	7	0	7	9	1	10	0	0	0	5	0	5	4	0	4	0	0	0	2	0	2	3	0	3	0	0	0	31		
Total	189	11	200	250	20	270	0	0	0	268	21	289	80	6	86	0	0	0	112	6	118	224	14	238	0	0	0	1201		
AM Peak	19	0	19	15	0	15	0	0	0	37	2	39	7	0	7	0	0	0	5	0	5	19	1	20	0	0	0	105		
PM Peak	25	0	25	43	0	43	0	0	0	26	2	28	6	1	7	0	0	0	21	0	21	29	0	29	0	0	0	153		

austraffic

Client : TTPP
Job : Muswellbrook ATC
Day/Date : Wednesday, 27 November 2019
Survey Location : Wybong Road & Bengalla Road
Weather : Fine

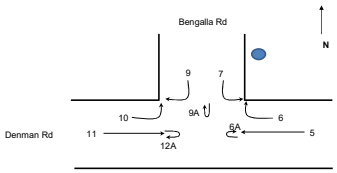


Time Period	Movement 5			Movement 6			Movement 6A			Movement 7			Movement 9			Movement 9A			Movement 10			Movement 11			Movement 12A			Total of all Movements
	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	
6:00 - 6:15	18	0	18	18	3	21	0	0	0	10	0	10	10	0	10	0	0	0	6	0	6	4	0	4	0	0	0	69
6:15 - 6:30	9	0	9	26	2	28	0	0	0	9	0	9	5	0	5	0	0	0	0	0	0	12	0	12	0	0	0	63
6:30 - 6:45	4	1	5	27	0	27	0	0	0	4	0	4	2	0	2	0	0	0	2	0	2	7	0	7	0	0	0	47
6:45 - 7:00	7	1	8	13	2	15	0	0	0	5	0	5	2	1	3	0	0	0	12	0	12	31	1	32	0	0	0	75
7:00 - 7:15	6	0	6	9	1	10	0	0	0	18	0	18	5	1	6	0	0	0	4	0	4	18	1	19	0	0	0	63
7:15 - 7:30	11	0	11	11	1	12	0	0	0	8	0	8	3	0	3	0	0	0	3	0	3	10	0	10	0	0	0	47
7:30 - 7:45	7	3	10	7	1	8	0	0	0	3	0	3	4	1	5	0	0	0	3	0	3	8	1	9	0	0	0	38
7:45 - 8:00	7	2	9	6	5	11	0	0	0	4	1	5	3	0	3	0	0	0	4	0	4	7	0	7	0	0	0	39
8:00 - 8:15	3	7	10	5	1	6	0	0	0	1	1	2	2	0	2	0	0	0	3	1	4	4	0	4	0	0	0	28
8:15 - 8:30	6	0	6	2	0	2	0	0	0	0	0	0	2	0	2	0	0	0	7	1	8	9	0	9	0	0	0	27
8:30 - 8:45	4	1	5	5	1	6	0	0	0	5	0	5	2	0	2	0	0	0	7	0	7	7	1	8	0	0	0	33
8:45 - 9:00	6	3	9	4	0	4	0	0	0	4	4	8	1	0	1	0	0	0	2	1	3	4	0	4	0	0	0	29
9:00 - 9:15	5	1	6	2	2	4	0	0	0	4	3	7	4	0	4	0	0	0	4	0	4	6	4	10	0	0	0	35
9:15 - 9:30	5	2	7	8	0	8	0	0	0	5	0	5	3	1	4	0	0	0	3	0	3	9	1	10	0	0	0	37
9:30 - 9:45	4	2	6	5	1	6	0	0	0	5	0	5	5	0	5	0	0	0	6	2	8	6	0	6	0	0	0	36
9:45 - 10:00	3	2	5	10	3	13	0	0	0	3	0	3	2	0	2	0	0	0	4	2	6	10	3	13	0	0	0	42
10:00 - 10:15	6	1	7	5	1	6	0	0	0	3	0	3	3	0	3	0	0	0	2	0	2	6	0	6	0	0	0	27
10:15 - 10:30	3	3	6	6	1	7	0	0	0	1	3	4	2	0	2	0	0	0	1	0	1	6	1	7	0	0	0	27
10:30 - 10:45	5	1	6	5	1	6	0	0	0	2	0	2	1	0	1	0	0	0	2	0	2	4	0	4	0	0	0	21
10:45 - 11:00	5	1	6	4	0	4	0	0	0	2	2	4	0	0	0	0	0	0	4	0	4	10	3	13	0	0	0	31
11:00 - 11:15	4	1	5	4	2	6	0	0	0	7	0	7	3	1	4	0	0	0	3	0	3	4	1	5	0	0	0	30
11:15 - 11:30	9	5	14	3	0	3	0	0	0	2	3	5	2	1	3	0	0	0	4	0	4	10	3	13	0	0	0	42
11:30 - 11:45	1	0	1	4	0	4	0	0	0	8	1	9	1	1	2	0	0	0	1	0	1	5	0	5	0	0	0	22
11:45 - 12:00	3	2	5	4	3	7	0	0	0	0	1	1	3	0	3	0	0	0	3	0	3	8	0	8	0	0	0	27
12:00 - 12:15	4	2	6	3	0	3	0	0	0	5	2	7	1	0	1	0	0	0	2	0	2	4	3	7	0	0	0	26
12:15 - 12:30	12	0	12	4	3	7	0	0	0	3	1	4	6	0	6	0	0	0	3	1	4	4	2	6	0	0	0	39
12:30 - 12:45	12	1	13	4	1	5	0	0	0	10	2	12	6	0	6	0	0	0	2	1	3	6	2	8	0	0	0	47
12:45 - 13:00	7	4	11	2	0	2	0	0	0	5	0	5	1	0	1	0	0	0	2	0	2	3	0	3	0	0	0	24
13:00 - 13:15	5	0	5	5	2	7	0	0	0	5	4	9	2	0	2	0	0	0	0	1	1	3	2	5	0	0	0	29
13:15 - 13:30	8	1	9	6	1	7	0	0	0	7	1	8	4	0	4	0	0	0	0	1	1	7	2	9	0	0	0	38
13:30 - 13:45	7	1	8	7	1	8	0	0	0	3	1	4	2	0	2	0	0	0	4	1	5	9	1	10	0	0	0	37
13:45 - 14:00	6	2	8	2	1	3	0	0	0	5	0	5	1	0	1	0	0	0	2	0	2	3	0	3	0	0	0	22
14:00 - 14:15	8	0	8	8	0	8	0	0	0	3	2	5	3	0	3	0	0	0	2	0	2	7	2	9	0	0	0	35
14:15 - 14:30	5	0	5	4	1	5	0	0	0	7	2	9	1	0	1	0	0	0	3	3	6	11	1	12	0	0	0	38
14:30 - 14:45	6	0	6	3	2	5	0	0	0	7	2	9	0	0	0	0	0	0	2	0	2	9	2	11	0	0	0	33
14:45 - 15:00	6	1	7	4	1	5	0	0	0	2	5	7	0	0	0	0	0	0	3	1	4	14	4	18	0	0	0	41
15:00 - 15:15	11	1	12	4	0	4	0	0	0	8	1	9	2	0	2	0	0	0	4	0	4	8	3	11	0	0	0	42
15:15 - 15:30	5	1	6	3	0	3	0	0	0	8	1	9	2	2	4	0	0	0	4	0	4	7	4	11	0	0	0	37
15:30 - 15:45	11	1	12	7	0	7	0	0	0	3	0	3	4	0	4	0	0	0	8	0	8	6	0	6	0	0	0	40
15:45 - 16:00	4	0	4	4	1	5	0	0	0	4	0	4	4	1	5	0	0	0	4	0	4	6	0	6	0	0	0	28
16:00 - 16:15	14	1	15	0	0	0	0	0	0	21	3	24	3	0	3	0	0	0	4	0	4	6	0	6	0	0	0	52
16:15 - 16:30	9	0	9	2	1	3	0	0	0	15	1	16	2	0	2	0	0	0	9	0	9	15	1	16	0	0	0	55
16:30 - 16:45	9	0	9	4	0	4	0	0	0	9	2	11	7	0	7	0	0	0	4	0	4	12	1	13	0	0	0	48
16:45 - 17:00	14	0	14	1	0	1	0	0	0	17	1	18	7	0	7	0	0	0	9	0	9	14	1	15	0	0	0	64
17:00 - 17:15	10	0	10	3	0	3	0	0	0	19	1	20	5	0	5	0	0	0	2	0	2	6	0	6	0	0	0	46
17:15 - 17:30	13	2	15	8	0	8	0	0	0	6	0	6	5	0	5	0	0	0	3	1	4	4	2	6	0	0	0	44
17:30 - 17:45	9	0	9	14	0	14	0	0	0	7	2	9	11	0	11	0	0	0	0	0	0	5	0	5	0	0	0	48
17:45 - 18:00	11	0	11	5	0	5	0	0	0	7	0	7	9	0	9	0	0	0	3	0	3	10	0	10	0	0	0	45
Total	347	57	404	300	46	346	0	0	0	299	53	352	158	10	168	0	0	0	169	17	186	384	53	437	0	0	0	1893
AM Peak	38	2	40	84	7	91	0	0	0	28	0	28	19	1	20	0	0	0	20	0	20	54	1	55	0	0	0	254
PM Peak	46	1	47	7	1	8	0	0	0	62	7	69	19	0	19	0	0	0	26	0	26	47	3	50	0	0	0	219

Peak Hour Volume Determination	
6:00 - 7:00	254
6:15 - 7:15	248
6:30 - 7:30	232
6:45 - 7:45	223
7:00 - 8:00	187
7:15 - 8:15	152
7:30 - 8:30	132
7:45 - 8:45	127
8:00 - 9:00	117
8:15 - 9:15	124
8:30 - 9:30	134
8:45 - 9:45	137
9:00 - 10:00	150
9:15 - 10:15	142
9:30 - 10:30	132
9:45 - 10:45	117
10:00 - 11:00	106
10:15 - 11:15	109
10:30 - 11:30	124
10:45 - 11:45	125
11:00 - 12:00	121
11:15 - 12:15	117
11:30 - 12:30	114
11:45 - 12:45	139
12:00 - 13:00	136
12:15 - 13:15	139
12:30 - 13:30	138
12:45 - 13:45	128
13:00 - 14:00	126
13:15 - 14:15	132
13:30 - 14:30	132
13:45 - 14:45	128
14:00 - 15:00	147
14:15 - 15:15	154
14:30 - 15:30	153
14:45 - 15:45	160
15:00 - 16:00	147
15:15 - 16:15	157
15:30 - 16:30	175
15:45 - 16:45	183
16:00 - 17:00	219
16:15 - 17:15	213
16:30 - 17:30	202
16:45 - 17:45	202
17:00 - 18:00	183
AM Peak	254
PM Peak	219

austraffic

Client : TTPP
Job : Muswellbrook ATC
Day/Date : Wednesday, 27 November 2019
Survey Location : Bengalla Road & Denman Road
Weather : Fine



Time Period	Movement 5			Movement 6			Movement 6A			Movement 7			Movement 9			Movement 9A			Movement 10			Movement 11			Movement 12A			Total of all Movements	Peak Hour Volume Determination	
	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total			
6:00 - 6:15	30	4	34	102	6	108	0	0	0	16	3	19	0	0	0	0	0	0	10	0	10	28	0	28	0	0	0	199	6:00 - 7:00	670
6:15 - 6:30	49	4	53	67	3	70	0	0	0	15	2	17	1	0	1	0	0	0	7	0	7	32	2	34	0	0	0	182	6:15 - 7:15	594
6:30 - 6:45	34	9	43	46	4	50	0	0	0	22	1	23	0	0	0	0	0	0	1	0	1	34	1	35	0	0	0	152	6:30 - 7:30	565
6:45 - 7:00	27	4	31	16	3	19	0	0	0	47	0	47	0	0	0	0	0	0	4	0	4	34	2	36	0	0	0	137	6:45 - 7:45	512
7:00 - 7:15	16	4	20	21	6	27	0	0	0	46	2	48	2	1	3	0	0	0	1	0	1	19	5	24	0	0	0	123	7:00 - 8:00	486
7:15 - 7:30	19	10	29	23	4	27	0	0	0	51	1	52	4	0	4	0	0	0	2	1	3	33	5	38	0	0	0	153	7:15 - 8:15	465
7:30 - 7:45	11	6	17	20	5	25	0	0	0	21	0	21	0	0	0	0	0	0	2	0	2	32	2	34	0	0	0	99	7:30 - 8:30	390
7:45 - 8:00	23	6	29	13	7	20	0	0	0	13	1	14	0	0	0	0	0	0	2	2	4	38	6	44	0	0	0	111	7:45 - 8:45	394
8:00 - 8:15	28	2	30	20	3	23	0	0	0	6	1	7	2	0	2	0	0	0	0	0	0	33	7	40	0	0	0	102	8:00 - 9:00	366
8:15 - 8:30	15	5	20	13	1	14	0	0	0	15	1	16	0	0	0	0	0	0	1	0	1	25	2	27	0	0	0	78	8:15 - 9:15	377
8:30 - 8:45	19	4	23	18	3	21	0	0	0	17	2	19	1	0	1	0	0	0	0	1	1	35	3	38	0	0	0	103	8:30 - 9:30	399
8:45 - 9:00	15	1	16	7	4	11	0	0	0	15	6	21	1	0	1	0	0	0	1	0	1	27	6	33	0	0	0	83	8:45 - 9:45	397
9:00 - 9:15	14	3	17	18	4	22	0	0	0	13	10	23	1	0	1	0	0	0	2	0	2	44	4	48	0	0	0	113	9:00 - 10:00	405
9:15 - 9:30	23	8	31	17	5	22	0	0	0	19	0	19	0	0	0	0	0	0	0	0	0	27	1	28	0	0	0	100	9:15 - 10:15	363
9:30 - 9:45	20	4	24	18	8	26	0	0	0	16	1	17	0	0	0	0	0	0	2	0	2	29	3	32	0	0	0	101	9:30 - 10:30	340
9:45 - 10:00	22	6	28	23	2	25	0	0	0	15	4	19	0	0	0	0	0	0	0	1	1	17	1	18	0	0	0	91	9:45 - 10:45	322
10:00 - 10:15	16	4	20	8	5	13	0	0	0	10	2	12	1	0	1	0	0	0	0	0	0	18	7	25	0	0	0	71	10:00 - 11:00	305
10:15 - 10:30	26	3	29	13	3	16	0	0	0	9	6	15	0	0	0	0	0	0	0	0	0	16	1	17	0	0	0	77	10:15 - 11:15	319
10:30 - 10:45	24	5	29	11	0	11	0	0	0	8	0	8	0	0	0	0	0	0	0	0	0	30	5	35	0	0	0	83	10:30 - 11:30	334
10:45 - 11:00	17	3	20	13	3	16	0	0	0	16	7	23	0	0	0	0	0	0	0	0	0	12	3	15	0	0	0	74	10:45 - 11:45	342
11:00 - 11:15	22	5	27	11	5	16	0	0	0	11	4	15	2	1	3	0	0	0	0	2	2	19	3	22	0	0	0	85	11:00 - 12:00	366
11:15 - 11:30	31	4	35	10	2	12	0	0	0	20	4	24	1	1	2	0	0	0	0	0	0	15	4	19	0	0	0	92	11:15 - 12:15	380
11:30 - 11:45	27	1	28	11	6	17	1	0	1	13	1	14	0	0	0	0	0	0	0	0	0	23	8	31	0	0	0	91	11:30 - 12:30	403
11:45 - 12:00	19	5	24	18	2	20	0	0	0	13	6	19	0	0	0	0	0	0	2	0	2	25	8	33	0	0	0	98	11:45 - 12:45	423
12:00 - 12:15	26	1	27	18	5	23	0	0	0	12	4	16	0	2	2	0	0	0	2	0	2	29	0	29	0	0	0	99	12:00 - 13:00	407
12:15 - 12:30	21	3	24	19	2	21	0	0	0	24	2	26	0	0	0	0	0	0	6	0	6	34	4	38	0	0	0	115	12:15 - 13:15	390
12:30 - 12:45	27	7	34	19	4	23	0	0	0	23	6	29	1	0	1	0	0	0	1	0	1	22	1	23	0	0	0	111	12:30 - 13:30	345
12:45 - 13:00	19	0	19	14	4	18	0	0	0	13	0	13	1	0	1	0	0	0	0	0	0	29	2	31	0	0	0	82	12:45 - 13:45	330
13:00 - 13:15	24	2	26	15	2	17	0	0	0	14	8	22	0	0	0	0	0	0	0	0	0	14	3	17	0	0	0	82	13:00 - 14:00	332
13:15 - 13:30	15	1	16	11	3	14	0	0	0	15	3	18	1	0	1	0	0	0	2	0	2	16	3	19	0	0	0	70	13:15 - 14:15	356
13:30 - 13:45	21	4	25	11	3	14	1	0	1	20	3	23	0	0	0	0	0	0	1	0	1	27	5	32	0	0	0	96	13:30 - 14:30	380
13:45 - 14:00	24	4	28	12	1	13	0	0	0	9	4	13	3	1	4	0	0	0	0	0	0	22	4	26	0	0	0	84	13:45 - 14:45	381
14:00 - 14:15	22	5	27	11	2	13	0	0	0	14	5	19	1	0	1	0	0	0	0	0	0	39	7	46	0	0	0	106	14:00 - 15:00	413
14:15 - 14:30	22	5	27	11	3	14	0	0	0	23	5	28	0	0	0	0	0	0	3	0	3	20	2	22	0	0	0	94	14:15 - 15:15	421
14:30 - 14:45	22	5	27	17	2	19	0	0	0	15	6	21	2	0	2	0	0	0	1	0	1	23	4	27	0	0	0	97	14:30 - 15:30	446
14:45 - 15:00	29	4	33	10	2	12	0	0	0	25	7	32	2	0	2	0	0	0	0	0	0	35	2	37	0	0	0	116	14:45 - 15:45	471
15:00 - 15:15	32	2	34	8	2	10	0	0	0	33	6	39	1	0	1	0	0	0	0	0	0	25	5	30	0	0	0	114	15:00 - 16:00	483
15:15 - 15:30	41	5	46	15	1	16	0	0	0	20	5	25	1	0	1	0	0	0	0	0	0	27	4	31	0	0	0	119	15:15 - 16:15	507
15:30 - 15:45	47	6	53	9	2	11	0	0	0	17	3	20	1	0	1	0	0	0	0	0	0	32	5	37	0	0	0	122	15:30 - 16:30	533
15:45 - 16:00	31	7	38	15	3	18	0	0	0	27	1	28	2	0	2	0	0	0	1	0	1	38	3	41	0	0	0	128	15:45 - 16:45	556
16:00 - 16:15	30	2	32	14	2	16	0	0	0	39	2	41	2	0	2	0	0	0	1	0	1	38	8	46	0	0	0	138	16:00 - 17:00	573
16:15 - 16:30	36	3	39	10	0	10	0	0	0	57	1	58	1	1	2	0	0	0	0	0	0	31	5	36	0	0	0	145	16:15 - 17:15	591
16:30 - 16:45	51	4	55	17	0	17	0	0	0	30	4	34	1	0	1	0	0	0	0	0	0	32	6	38	0	0	0	145	16:30 - 17:30	575
16:45 - 17:00	34	1	35	16	0	16	0	0	0	46	2	48	5	0	5	0	0	0	1	0	1	32	8	40	0	0	0	145	16:45 - 17:45	560
17:00 - 17:15	52	0	52	13	3	16	0	0	0	49	6	55	0	0	0	0	0	0	0	0	0	28	5	33	0	0	0	156	17:00 - 18:00	544
17:15 - 17:30	37	3	40	28	0	28	0	0	0	23	2	25	1	0	1	0	0	0	1	0	1	33	1	34	0	0	0	129	AM Peak	670
17:30 - 17:45	38	3	41	23	0	23	0	0	0	19	3	22	0	0	0	0	0	0	2	0	2	39	3	42	0	0	0	130	PM Peak	591
17:45 - 18:00	45	3	48	27	0	27	0	0	0	33	4	37	1	0	1	0	0	0	2	0	2	13	1	14	0	0	0	129		
Total	1293	190	1483	900	140	1040	2	0	2	1047	157	1204	43	7	50	0	0	0	61	7	68	1323	180	1503	0	0	0	5350		
AM Peak	140	21	161	231	16	247	0	0	0	100	6	106	1	0	1	0	0	0	22	0	22	128	5	133	0	0	0	670		
PM Peak	173	8	181	56	3	59	0	0	0	182	13	195	7	1	8	0	0	0	1	0	1	123	24	147	0	0	0	591		

Appendix B

SIDRA Results Summaries

MOVEMENT SUMMARY

Site: [1] Ex AM MPO Road (MPO Access Road)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Mount Pleasant Operation Access Road and Wybong Road
Surveyed AM Peak
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Wybong Road East															
5	T1	All MCs	24	4.3	24	4.3	0.023	0.2	LOS A	0.1	0.6	0.16	0.25	0.16	91.6
6	R2	All MCs	13	0.0	13	0.0	0.023	7.8	LOS A	0.1	0.6	0.16	0.25	0.16	66.5
Approach			37	2.9	37	2.9	0.023	2.8	NA	0.1	0.6	0.16	0.25	0.16	81.1
North: Mount Pleasant Operation Access															
7	L2	All MCs	12	0.0	12	0.0	0.038	5.6	LOS A	0.1	1.0	0.17	0.55	0.17	60.6
9	R2	All MCs	32	3.3	32	3.3	0.038	6.1	LOS A	0.1	1.0	0.17	0.55	0.17	59.7
Approach			43	2.4	43	2.4	0.038	6.0	LOS A	0.1	1.0	0.17	0.55	0.17	59.9
West: Wybong Road West															
10	L2	All MCs	78	5.4	78	5.4	0.044	8.0	LOS A	0.0	0.0	0.00	0.66	0.00	71.7
11	T1	All MCs	33	3.2	33	3.2	0.017	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			111	4.8	111	4.8	0.044	5.6	NA	0.0	0.0	0.00	0.46	0.00	78.2
All Vehicles			191	3.9	191	3.9	0.044	5.2	NA	0.1	1.0	0.07	0.44	0.07	73.6

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Organisation: TTPP - THE TRANSPORT PLANNING PARTNERSHIP | Licence: NETWORK / 1PC | Processed: Thursday, 9 October 2025 12:59:22 PM
Project: C:\Users\Penny.Dalton\OneDrive - TTPP\Projects - 23245 Mount Pleasant Modification 7\07 Modelling Files\Model\23245-251009-Mount Pleasant Mod 7.sipx

MOVEMENT SUMMARY

Site: [2] Ex PM MPO Road (MPO Access Road)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Mount Pleasant Operation Access Road and Wybong Road
PM Peak 6-7pm
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Wybong Road East															
5	T1	All MCs	68	16.9	68	16.9	0.045	0.0	LOS A	0.1	0.4	0.04	0.08	0.04	96.9
6	R2	All MCs	8	0.0	8	0.0	0.045	7.5	LOS A	0.1	0.4	0.04	0.08	0.04	69.2
Approach			77	15.1	77	15.1	0.045	0.8	NA	0.1	0.4	0.04	0.08	0.04	92.9
North: Mount Pleasant Operation Access															
7	L2	All MCs	14	0.0	14	0.0	0.065	5.7	LOS A	0.3	1.9	0.21	0.55	0.21	60.4
9	R2	All MCs	56	9.4	56	9.4	0.065	6.4	LOS A	0.3	1.9	0.21	0.55	0.21	58.1
Approach			69	7.6	69	7.6	0.065	6.2	LOS A	0.3	1.9	0.21	0.55	0.21	58.5
West: Wybong Road West															
10	L2	All MCs	16	26.7	16	26.7	0.010	8.5	LOS A	0.0	0.0	0.00	0.66	0.00	64.9
11	T1	All MCs	39	0.0	39	0.0	0.020	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			55	7.7	55	7.7	0.020	2.5	NA	0.0	0.0	0.00	0.19	0.00	86.5
All Vehicles			201	10.5	201	10.5	0.065	3.2	NA	0.3	1.9	0.09	0.27	0.09	75.9

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Organisation: TTPP - THE TRANSPORT PLANNING PARTNERSHIP | Licence: NETWORK / 1PC | Processed: Thursday, 9 October 2025 12:59:22 PM
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MOVEMENT SUMMARY

Site: [3] 2026 AM Base MPO Road (MPO Access Road)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Mount Pleasant Operation Access Road and Wybong Road
AM Peak Hour
2026 No Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Wybong Road East															
5	T1	All MCs	36	2.9	36	2.9	0.038	0.4	LOS A	0.1	1.0	0.21	0.30	0.21	90.2
6	R2	All MCs	23	0.0	23	0.0	0.038	8.0	LOS A	0.1	1.0	0.21	0.30	0.21	65.7
Approach			59	1.8	59	1.8	0.038	3.4	NA	0.1	1.0	0.21	0.30	0.21	78.7
North: Mount Pleasant Operation Access															
7	L2	All MCs	14	0.0	14	0.0	0.051	5.7	LOS A	0.2	1.4	0.21	0.55	0.21	60.4
9	R2	All MCs	42	2.5	42	2.5	0.051	6.4	LOS A	0.2	1.4	0.21	0.55	0.21	59.8
Approach			56	1.9	56	1.9	0.051	6.2	LOS A	0.2	1.4	0.21	0.55	0.21	59.9
West: Wybong Road West															
10	L2	All MCs	118	3.6	118	3.6	0.065	7.9	LOS A	0.0	0.0	0.00	0.66	0.00	72.4
11	T1	All MCs	39	2.7	39	2.7	0.020	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			157	3.4	157	3.4	0.065	6.0	NA	0.0	0.0	0.00	0.49	0.00	77.7
All Vehicles			272	2.7	272	2.7	0.065	5.5	NA	0.2	1.4	0.09	0.46	0.09	73.4

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [4] 2026 PM Base MPO Road (MPO Access Road)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Mount Pleasant Operation Access Road and Wybong Road
PM Peak Hour
2026 No Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Wybong Road East															
5	T1	All MCs	73	17.4	73	17.4	0.051	0.1	LOS A	0.1	0.7	0.07	0.12	0.07	95.5
6	R2	All MCs	14	0.0	14	0.0	0.051	7.7	LOS A	0.1	0.7	0.07	0.12	0.07	68.5
Approach			86	14.6	86	14.6	0.051	1.3	NA	0.1	0.7	0.07	0.12	0.07	89.9
North: Mount Pleasant Operation Access															
7	L2	All MCs	16	0.0	16	0.0	0.081	5.7	LOS A	0.3	2.4	0.24	0.56	0.24	60.3
9	R2	All MCs	68	7.7	68	7.7	0.081	6.5	LOS A	0.3	2.4	0.24	0.56	0.24	58.4
Approach			84	6.2	84	6.2	0.081	6.4	LOS A	0.3	2.4	0.24	0.56	0.24	58.8
West: Wybong Road West															
10	L2	All MCs	37	11.4	37	11.4	0.021	8.1	LOS A	0.0	0.0	0.00	0.66	0.00	69.6
11	T1	All MCs	42	0.0	42	0.0	0.022	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			79	5.3	79	5.3	0.022	3.8	NA	0.0	0.0	0.00	0.31	0.00	83.1
All Vehicles			249	8.9	249	8.9	0.081	3.8	NA	0.3	2.4	0.10	0.33	0.10	74.6

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [5] 2026 AM Mod MPO Road (MPO Access Road)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Mount Pleasant Operation Access Road and Wybong Road
AM Peak Hour
2026 With Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Wybong Road East															
5	T1	All MCs	36	2.9	36	2.9	0.046	0.7	LOS A	0.2	1.4	0.30	0.38	0.30	88.4
6	R2	All MCs	31	0.0	31	0.0	0.046	8.3	LOS A	0.2	1.4	0.30	0.38	0.30	64.8
Approach			66	1.6	66	1.6	0.046	4.2	NA	0.2	1.4	0.30	0.38	0.30	75.7
North: Mount Pleasant Operation Access															
7	L2	All MCs	14	0.0	14	0.0	0.053	5.7	LOS A	0.2	1.5	0.23	0.55	0.23	60.3
9	R2	All MCs	42	2.5	42	2.5	0.053	6.7	LOS A	0.2	1.5	0.23	0.55	0.23	59.7
Approach			56	1.9	56	1.9	0.053	6.4	LOS A	0.2	1.5	0.23	0.55	0.23	59.8
West: Wybong Road West															
10	L2	All MCs	193	2.2	193	2.2	0.105	7.9	LOS A	0.0	0.0	0.00	0.66	0.00	72.8
11	T1	All MCs	39	2.7	39	2.7	0.020	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			232	2.3	232	2.3	0.105	6.6	NA	0.0	0.0	0.00	0.55	0.00	76.3
All Vehicles			354	2.1	354	2.1	0.105	6.1	NA	0.2	1.5	0.09	0.52	0.09	73.0

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [6] 2026 PM Mod MPO Road (MPO Access Road)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Mount Pleasant Operation Access Road and Wybong Road
PM Peak Hour
2026 With Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Wybong Road East															
5	T1	All MCs	73	17.4	73	17.4	0.051	0.1	LOS A	0.1	0.7	0.07	0.12	0.07	95.5
6	R2	All MCs	14	0.0	14	0.0	0.051	7.7	LOS A	0.1	0.7	0.07	0.12	0.07	68.5
Approach			86	14.6	86	14.6	0.051	1.3	NA	0.1	0.7	0.07	0.12	0.07	89.9
North: Mount Pleasant Operation Access															
7	L2	All MCs	18	0.0	18	0.0	0.099	5.7	LOS A	0.4	2.9	0.24	0.56	0.24	60.3
9	R2	All MCs	85	6.2	85	6.2	0.099	6.5	LOS A	0.4	2.9	0.24	0.56	0.24	58.7
Approach			103	5.1	103	5.1	0.099	6.4	LOS A	0.4	2.9	0.24	0.56	0.24	59.0
West: Wybong Road West															
10	L2	All MCs	38	11.1	38	11.1	0.022	8.1	LOS A	0.0	0.0	0.00	0.66	0.00	69.7
11	T1	All MCs	42	0.0	42	0.0	0.022	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			80	5.3	80	5.3	0.022	3.9	NA	0.0	0.0	0.00	0.31	0.00	82.9
All Vehicles			269	8.2	269	8.2	0.099	4.0	NA	0.4	2.9	0.11	0.35	0.11	73.3

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [7] 2032 AM Mod MPO Road (MPO Access Road)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Mount Pleasant Operation Access Road and Wybong Road
AM Peak Hour
2032 With Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Wybong Road East															
5	T1	All MCs	38	2.8	38	2.8	0.039	0.4	LOS A	0.1	1.0	0.22	0.30	0.22	90.4
6	R2	All MCs	23	0.0	23	0.0	0.039	8.0	LOS A	0.1	1.0	0.22	0.30	0.22	65.8
Approach			61	1.7	61	1.7	0.039	3.3	NA	0.1	1.0	0.22	0.30	0.22	79.2
North: Mount Pleasant Operation Access															
7	L2	All MCs	14	0.0	14	0.0	0.051	5.7	LOS A	0.2	1.4	0.22	0.55	0.22	60.4
9	R2	All MCs	42	2.5	42	2.5	0.051	6.5	LOS A	0.2	1.4	0.22	0.55	0.22	59.7
Approach			56	1.9	56	1.9	0.051	6.3	LOS A	0.2	1.4	0.22	0.55	0.22	59.9
West: Wybong Road West															
10	L2	All MCs	127	3.3	127	3.3	0.070	7.9	LOS A	0.0	0.0	0.00	0.66	0.00	72.4
11	T1	All MCs	41	2.6	41	2.6	0.021	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			168	3.1	168	3.1	0.070	6.0	NA	0.0	0.0	0.00	0.50	0.00	77.6
All Vehicles			285	2.6	285	2.6	0.070	5.5	NA	0.2	1.4	0.09	0.47	0.09	73.7

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [8] 2032 PM Mod MPO Road (MPO Access Road)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Mount Pleasant Operation Access Road and Wybong Road
PM Peak Hour
2032 With Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Wybong Road East															
5	T1	All MCs	77	16.4	77	16.4	0.054	0.1	LOS A	0.1	0.7	0.07	0.12	0.07	95.7
6	R2	All MCs	14	0.0	14	0.0	0.054	7.7	LOS A	0.1	0.7	0.07	0.12	0.07	68.6
Approach			91	14.0	91	14.0	0.054	1.2	NA	0.1	0.7	0.07	0.12	0.07	90.3
North: Mount Pleasant Operation Access															
7	L2	All MCs	16	0.0	16	0.0	0.083	5.7	LOS A	0.3	2.4	0.25	0.56	0.25	60.3
9	R2	All MCs	69	7.6	69	7.6	0.083	6.6	LOS A	0.3	2.4	0.25	0.56	0.25	58.4
Approach			85	6.2	85	6.2	0.083	6.4	LOS A	0.3	2.4	0.25	0.56	0.25	58.7
West: Wybong Road West															
10	L2	All MCs	37	11.4	37	11.4	0.021	8.1	LOS A	0.0	0.0	0.00	0.66	0.00	69.6
11	T1	All MCs	45	0.0	45	0.0	0.023	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			82	5.1	82	5.1	0.023	3.7	NA	0.0	0.0	0.00	0.30	0.00	83.6
All Vehicles			258	8.6	258	8.6	0.083	3.7	NA	0.3	2.4	0.10	0.32	0.10	75.0

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [9] Ex AM Kayuga and Wybong (Kayuga and Wybong)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Kayuga Road and Wybong Road
AM Peak Hour
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Kayuga Road South															
10	L2	All MCs	16	6.7	16	6.7	0.019	7.1	LOS A	0.0	0.0	0.00	0.31	0.00	66.2
11	T1	All MCs	17	18.8	17	18.8	0.019	0.0	LOS A	0.0	0.0	0.00	0.31	0.00	74.1
Approach			33	12.9	33	12.9	0.019	3.4	NA	0.0	0.0	0.00	0.31	0.00	70.0
North: Kayuga Road North															
5	T1	All MCs	26	0.0	26	0.0	0.024	0.1	LOS A	0.1	0.6	0.08	0.26	0.08	75.0
6	R2	All MCs	18	0.0	18	0.0	0.024	6.7	LOS A	0.1	0.6	0.08	0.26	0.08	69.1
Approach			44	0.0	44	0.0	0.024	2.7	NA	0.1	0.6	0.08	0.26	0.08	72.5
West: Wybong Road															
7	L2	All MCs	9	0.0	9	0.0	0.023	7.0	LOS A	0.1	0.5	0.10	0.60	0.10	64.4
9	R2	All MCs	21	0.0	21	0.0	0.023	6.8	LOS A	0.1	0.5	0.10	0.60	0.10	64.2
Approach			31	0.0	31	0.0	0.023	6.9	LOS A	0.1	0.5	0.10	0.60	0.10	64.2
All Vehicles			107	3.9	107	3.9	0.024	4.1	NA	0.1	0.6	0.06	0.37	0.06	69.2

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: [10] Ex PM Kayuga and Wybong (Kayuga and Wybong)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Kayuga Road and Wybong Road
PM Peak Hour
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Kayuga Road South															
10	L2	All MCs	38	0.0	38	0.0	0.046	7.0	LOS A	0.0	0.0	0.00	0.29	0.00	69.3
11	T1	All MCs	48	2.2	48	2.2	0.046	0.0	LOS A	0.0	0.0	0.00	0.29	0.00	74.9
Approach			86	1.2	86	1.2	0.046	3.1	NA	0.0	0.0	0.00	0.29	0.00	72.3
North: Kayuga Road North															
5	T1	All MCs	23	0.0	23	0.0	0.021	0.1	LOS A	0.1	0.5	0.14	0.26	0.14	74.8
6	R2	All MCs	15	0.0	15	0.0	0.021	6.8	LOS A	0.1	0.5	0.14	0.26	0.14	68.9
Approach			38	0.0	38	0.0	0.021	2.7	NA	0.1	0.5	0.14	0.26	0.14	72.4
West: Wybong Road															
7	L2	All MCs	15	0.0	15	0.0	0.025	7.1	LOS A	0.1	0.6	0.14	0.60	0.14	64.1
9	R2	All MCs	18	0.0	18	0.0	0.025	6.9	LOS A	0.1	0.6	0.14	0.60	0.14	63.9
Approach			33	0.0	33	0.0	0.025	7.0	LOS A	0.1	0.6	0.14	0.60	0.14	64.0
All Vehicles			157	0.7	157	0.7	0.046	3.8	NA	0.1	0.6	0.06	0.34	0.06	70.4

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: [11] 2026 AM Base Kayuga and Wybong (Kayuga and Wybong)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Kayuga Road and Wybong Road
AM Peak Hour
2026 No Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Queued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Kayuga Road South															
10	L2	All MCs	17	6.2	17	6.2	0.020	7.1	LOS A	0.0	0.0	0.00	0.31	0.00	66.3
11	T1	All MCs	18	17.6	18	17.6	0.020	0.0	LOS A	0.0	0.0	0.00	0.31	0.00	74.1
Approach			35	12.1	35	12.1	0.020	3.4	NA	0.0	0.0	0.00	0.31	0.00	70.1
North: Kayuga Road North															
5	T1	All MCs	28	0.0	28	0.0	0.038	0.1	LOS A	0.2	1.2	0.10	0.37	0.10	73.1
6	R2	All MCs	40	0.0	40	0.0	0.038	6.7	LOS A	0.2	1.2	0.10	0.37	0.10	67.5
Approach			68	0.0	68	0.0	0.038	4.0	NA	0.2	1.2	0.10	0.37	0.10	69.7
West: Wybong Road															
7	L2	All MCs	17	0.0	17	0.0	0.029	7.0	LOS A	0.1	0.7	0.10	0.60	0.10	64.3
9	R2	All MCs	22	0.0	22	0.0	0.029	6.9	LOS A	0.1	0.7	0.10	0.60	0.10	64.1
Approach			39	0.0	39	0.0	0.029	7.0	LOS A	0.1	0.7	0.10	0.60	0.10	64.2
All Vehicles			142	3.0	142	3.0	0.038	4.6	NA	0.2	1.2	0.08	0.42	0.08	68.2

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [12] 2026 PM Base Kayuga and Wybong (Kayuga and Wybong)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Kayuga Road and Wybong Road
PM Peak Hour
2026 No Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Queued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Kayuga Road South															
10	L2	All MCs	40	0.0	40	0.0	0.048	7.0	LOS A	0.0	0.0	0.00	0.28	0.00	69.3
11	T1	All MCs	52	2.0	52	2.0	0.048	0.0	LOS A	0.0	0.0	0.00	0.28	0.00	74.9
Approach			92	1.1	92	1.1	0.048	3.0	NA	0.0	0.0	0.00	0.28	0.00	72.4
North: Kayuga Road North															
5	T1	All MCs	24	0.0	24	0.0	0.025	0.2	LOS A	0.1	0.7	0.16	0.31	0.16	73.9
6	R2	All MCs	21	0.0	21	0.0	0.025	6.9	LOS A	0.1	0.7	0.16	0.31	0.16	68.2
Approach			45	0.0	45	0.0	0.025	3.3	NA	0.1	0.7	0.16	0.31	0.16	71.1
West: Wybong Road															
7	L2	All MCs	19	0.0	19	0.0	0.028	7.1	LOS A	0.1	0.7	0.15	0.59	0.15	64.1
9	R2	All MCs	19	0.0	19	0.0	0.028	7.0	LOS A	0.1	0.7	0.15	0.59	0.15	63.9
Approach			38	0.0	38	0.0	0.028	7.0	LOS A	0.1	0.7	0.15	0.59	0.15	64.0
All Vehicles			175	0.6	175	0.6	0.048	4.0	NA	0.1	0.7	0.07	0.36	0.07	70.0

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [13] 2032 AM Base Kayuga and Wybong (Kayuga and Wybong)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Kayuga Road and Wybong Road
AM Peak Hour
2032 No Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Queued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Kayuga Road South															
10	L2	All MCs	18	5.9	18	5.9	0.021	7.1	LOS A	0.0	0.0	0.00	0.31	0.00	66.5
11	T1	All MCs	19	16.7	19	16.7	0.021	0.0	LOS A	0.0	0.0	0.00	0.31	0.00	74.2
Approach			37	11.4	37	11.4	0.021	3.4	NA	0.0	0.0	0.00	0.31	0.00	70.2
North: Kayuga Road North															
5	T1	All MCs	29	0.0	29	0.0	0.024	0.1	LOS A	0.1	0.5	0.08	0.22	0.08	75.8
6	R2	All MCs	15	0.0	15	0.0	0.024	6.7	LOS A	0.1	0.5	0.08	0.22	0.08	69.7
Approach			44	0.0	44	0.0	0.024	2.3	NA	0.1	0.5	0.08	0.22	0.08	73.6
West: Wybong Road															
7	L2	All MCs	9	0.0	9	0.0	0.026	7.0	LOS A	0.1	0.6	0.11	0.60	0.11	64.4
9	R2	All MCs	24	0.0	24	0.0	0.026	6.8	LOS A	0.1	0.6	0.11	0.60	0.11	64.2
Approach			34	0.0	34	0.0	0.026	6.9	LOS A	0.1	0.6	0.11	0.60	0.11	64.2
All Vehicles			115	3.7	115	3.7	0.026	4.0	NA	0.1	0.6	0.06	0.36	0.06	69.5

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [14] 2032 PM Base Kayuga and Wybong (Kayuga and Wybong)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Kayuga Road and Wybong Road
PM Peak Hour
2032 No Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Queued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Kayuga Road South															
10	L2	All MCs	43	0.0	43	0.0	0.052	7.0	LOS A	0.0	0.0	0.00	0.29	0.00	69.2
11	T1	All MCs	55	1.9	55	1.9	0.052	0.0	LOS A	0.0	0.0	0.00	0.29	0.00	74.9
Approach			98	1.1	98	1.1	0.052	3.1	NA	0.0	0.0	0.00	0.29	0.00	72.3
North: Kayuga Road North															
5	T1	All MCs	26	0.0	26	0.0	0.021	0.1	LOS A	0.1	0.4	0.13	0.21	0.13	75.7
6	R2	All MCs	12	0.0	12	0.0	0.021	6.9	LOS A	0.1	0.4	0.13	0.21	0.13	69.7
Approach			38	0.0	38	0.0	0.021	2.2	NA	0.1	0.4	0.13	0.21	0.13	73.8
West: Wybong Road															
7	L2	All MCs	8	0.0	8	0.0	0.023	7.1	LOS A	0.1	0.5	0.16	0.60	0.16	64.1
9	R2	All MCs	20	0.0	20	0.0	0.023	7.0	LOS A	0.1	0.5	0.16	0.60	0.16	63.9
Approach			28	0.0	28	0.0	0.023	7.0	LOS A	0.1	0.5	0.16	0.60	0.16	64.0
All Vehicles			164	0.6	164	0.6	0.052	3.5	NA	0.1	0.5	0.06	0.32	0.06	71.0

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [15] 2026 AM Mod Kayuga and Wybong (Kayuga and Wybong)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Kayuga Road and Wybong Road
AM Peak Hour
2026 With Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Queued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Kayuga Road South															
10	L2	All MCs	17	6.2	17	6.2	0.020	7.1	LOS A	0.0	0.0	0.00	0.31	0.00	66.3
11	T1	All MCs	18	17.6	18	17.6	0.020	0.0	LOS A	0.0	0.0	0.00	0.31	0.00	74.1
Approach			35	12.1	35	12.1	0.020	3.4	NA	0.0	0.0	0.00	0.31	0.00	70.1
North: Kayuga Road North															
5	T1	All MCs	28	0.0	28	0.0	0.042	0.1	LOS A	0.2	1.3	0.11	0.39	0.11	72.7
6	R2	All MCs	47	0.0	47	0.0	0.042	6.7	LOS A	0.2	1.3	0.11	0.39	0.11	67.1
Approach			76	0.0	76	0.0	0.042	4.2	NA	0.2	1.3	0.11	0.39	0.11	69.1
West: Wybong Road															
7	L2	All MCs	17	0.0	17	0.0	0.029	7.0	LOS A	0.1	0.7	0.10	0.60	0.10	64.3
9	R2	All MCs	22	0.0	22	0.0	0.029	6.9	LOS A	0.1	0.7	0.10	0.60	0.10	64.1
Approach			39	0.0	39	0.0	0.029	7.0	LOS A	0.1	0.7	0.10	0.60	0.10	64.2
All Vehicles			149	2.8	149	2.8	0.042	4.8	NA	0.2	1.3	0.08	0.43	0.08	68.0

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [16] 2026 PM Mod Kayuga and Wybong (Kayuga and Wybong)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Kayuga Road and Wybong Road
PM Peak Hour
2026 With Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Queued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Kayuga Road South															
10	L2	All MCs	40	0.0	40	0.0	0.048	7.0	LOS A	0.0	0.0	0.00	0.28	0.00	69.3
11	T1	All MCs	52	2.0	52	2.0	0.048	0.0	LOS A	0.0	0.0	0.00	0.28	0.00	74.9
Approach			92	1.1	92	1.1	0.048	3.0	NA	0.0	0.0	0.00	0.28	0.00	72.4
North: Kayuga Road North															
5	T1	All MCs	24	0.0	24	0.0	0.025	0.2	LOS A	0.1	0.7	0.16	0.31	0.16	73.9
6	R2	All MCs	21	0.0	21	0.0	0.025	6.9	LOS A	0.1	0.7	0.16	0.31	0.16	68.2
Approach			45	0.0	45	0.0	0.025	3.3	NA	0.1	0.7	0.16	0.31	0.16	71.1
West: Wybong Road															
7	L2	All MCs	21	0.0	21	0.0	0.030	7.1	LOS A	0.1	0.7	0.15	0.59	0.15	64.1
9	R2	All MCs	19	0.0	19	0.0	0.030	7.0	LOS A	0.1	0.7	0.15	0.59	0.15	63.9
Approach			40	0.0	40	0.0	0.030	7.0	LOS A	0.1	0.7	0.15	0.59	0.15	64.0
All Vehicles			177	0.6	177	0.6	0.048	4.0	NA	0.1	0.7	0.07	0.36	0.07	70.0

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [17] 2032 AM Mod Kayuga and Wybong (Kayuga and Wybong)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Kayuga Road and Wybong Road
AM Peak Hour
2032 With Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Queued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Kayuga Road South															
10	L2	All MCs	18	5.9	18	5.9	0.021	7.1	LOS A	0.0	0.0	0.00	0.31	0.00	66.5
11	T1	All MCs	19	16.7	19	16.7	0.021	0.0	LOS A	0.0	0.0	0.00	0.31	0.00	74.2
Approach			37	11.4	37	11.4	0.021	3.4	NA	0.0	0.0	0.00	0.31	0.00	70.2
North: Kayuga Road North															
5	T1	All MCs	29	0.0	29	0.0	0.039	0.1	LOS A	0.2	1.2	0.11	0.37	0.11	73.1
6	R2	All MCs	41	0.0	41	0.0	0.039	6.7	LOS A	0.2	1.2	0.11	0.37	0.11	67.5
Approach			71	0.0	71	0.0	0.039	3.9	NA	0.2	1.2	0.11	0.37	0.11	69.7
West: Wybong Road															
7	L2	All MCs	17	0.0	17	0.0	0.031	7.0	LOS A	0.1	0.8	0.10	0.60	0.10	64.3
9	R2	All MCs	24	0.0	24	0.0	0.031	6.9	LOS A	0.1	0.8	0.10	0.60	0.10	64.1
Approach			41	0.0	41	0.0	0.031	7.0	LOS A	0.1	0.8	0.10	0.60	0.10	64.2
All Vehicles			148	2.8	148	2.8	0.039	4.7	NA	0.2	1.2	0.08	0.42	0.08	68.2

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [18] 2032 PM Mod Kayuga and Wybong (Kayuga and Wybong)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Kayuga Road and Wybong Road
PM Peak Hour
2032 With Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Queued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Kayuga Road South															
10	L2	All MCs	43	0.0	43	0.0	0.052	7.0	LOS A	0.0	0.0	0.00	0.29	0.00	69.2
11	T1	All MCs	55	1.9	55	1.9	0.052	0.0	LOS A	0.0	0.0	0.00	0.29	0.00	74.9
Approach			98	1.1	98	1.1	0.052	3.1	NA	0.0	0.0	0.00	0.29	0.00	72.3
North: Kayuga Road North															
5	T1	All MCs	26	0.0	26	0.0	0.027	0.2	LOS A	0.1	0.8	0.17	0.30	0.17	73.9
6	R2	All MCs	22	0.0	22	0.0	0.027	6.9	LOS A	0.1	0.8	0.17	0.30	0.17	68.2
Approach			48	0.0	48	0.0	0.027	3.2	NA	0.1	0.8	0.17	0.30	0.17	71.2
West: Wybong Road															
7	L2	All MCs	20	0.0	20	0.0	0.030	7.1	LOS A	0.1	0.7	0.15	0.59	0.15	64.1
9	R2	All MCs	20	0.0	20	0.0	0.030	7.0	LOS A	0.1	0.7	0.15	0.59	0.15	63.9
Approach			40	0.0	40	0.0	0.030	7.1	LOS A	0.1	0.7	0.15	0.59	0.15	64.0
All Vehicles			186	0.6	186	0.6	0.052	4.0	NA	0.1	0.8	0.08	0.36	0.08	70.1

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [19] Ex AM Wybong and Bengalla (Wybong and Bengalla)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Wybong Road and Bengalla Road
AM Peak Hour
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Bengalla Road															
5	T1	All MCs	29	7.1	29	7.1	0.016	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
6	R2	All MCs	84	6.2	84	6.2	0.065	7.9	LOS A	0.3	2.0	0.18	0.62	0.18	70.8
Approach			114	6.5	114	6.5	0.065	5.9	NA	0.3	2.0	0.14	0.46	0.14	76.6
North: Wybong Road North															
7	L2	All MCs	38	0.0	38	0.0	0.051	8.0	LOS A	0.2	1.4	0.18	0.61	0.18	72.5
9	R2	All MCs	17	12.5	17	12.5	0.051	9.7	LOS A	0.2	1.4	0.18	0.61	0.18	68.4
Approach			55	3.8	55	3.8	0.051	8.5	LOS A	0.2	1.4	0.18	0.61	0.18	71.2
West: Wybong Road West															
10	L2	All MCs	21	0.0	21	0.0	0.011	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	74.4
11	T1	All MCs	58	1.8	58	1.8	0.030	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			79	1.3	79	1.3	0.030	2.1	NA	0.0	0.0	0.00	0.18	0.00	91.6
All Vehicles			247	4.3	247	4.3	0.065	5.3	NA	0.3	2.0	0.10	0.40	0.10	79.4

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [20] Ex PM Wybong and Bengalla (Wybong and Bengalla)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Wybong Road and Bengalla Road
PM Peak Hour
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Bengalla Road															
5	T1	All MCs	40	5.3	40	5.3	0.021	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
6	R2	All MCs	15	28.6	15	28.6	0.013	8.7	LOS A	0.1	0.4	0.20	0.62	0.20	63.4
Approach			55	11.5	55	11.5	0.021	2.3	NA	0.1	0.4	0.05	0.17	0.05	86.5
North: Wybong Road North															
7	L2	All MCs	61	19.0	61	19.0	0.070	8.6	LOS A	0.3	2.1	0.16	0.61	0.16	66.4
9	R2	All MCs	16	0.0	16	0.0	0.070	8.8	LOS A	0.3	2.1	0.16	0.61	0.16	72.7
Approach			77	15.1	77	15.1	0.070	8.6	LOS A	0.3	2.1	0.16	0.61	0.16	67.6
West: Wybong Road West															
10	L2	All MCs	40	0.0	40	0.0	0.022	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	74.4
11	T1	All MCs	52	6.1	52	6.1	0.028	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			92	3.4	92	3.4	0.028	3.4	NA	0.0	0.0	0.00	0.29	0.00	86.9
All Vehicles			223	9.4	223	9.4	0.070	4.9	NA	0.3	2.1	0.07	0.37	0.07	79.0

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [21] 2026 AM Base Wybong and Bengalla (Wybong and Bengalla)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Wybong Road and Bengalla Road
AM Peak Hour
2026 No Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Bengalla Road															
5	T1	All MCs	32	6.7	32	6.7	0.017	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
6	R2	All MCs	134	3.9	134	3.9	0.103	7.9	LOS A	0.4	3.1	0.20	0.62	0.20	71.6
Approach			165	4.5	165	4.5	0.103	6.4	NA	0.4	3.1	0.16	0.51	0.16	75.7
North: Wybong Road North															
7	L2	All MCs	60	0.0	60	0.0	0.073	8.1	LOS A	0.3	2.0	0.19	0.61	0.19	72.5
9	R2	All MCs	19	11.1	19	11.1	0.073	10.2	LOS A	0.3	2.0	0.19	0.61	0.19	68.8
Approach			79	2.7	79	2.7	0.073	8.6	LOS A	0.3	2.0	0.19	0.61	0.19	71.6
West: Wybong Road West															
10	L2	All MCs	25	0.0	25	0.0	0.014	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	74.4
11	T1	All MCs	61	1.7	61	1.7	0.032	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			86	1.2	86	1.2	0.032	2.3	NA	0.0	0.0	0.00	0.19	0.00	90.8
All Vehicles			331	3.2	331	3.2	0.103	5.8	NA	0.4	3.1	0.12	0.45	0.12	78.0

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: [22] 2026 PM Base Wybong and Bengalla (Wybong and Bengalla)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Wybong Road and Bengalla Road
PM Peak Hour
2026 No Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Bengalla Road															
5	T1	All MCs	42	5.0	42	5.0	0.022	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
6	R2	All MCs	37	11.4	37	11.4	0.030	8.2	LOS A	0.1	0.9	0.20	0.62	0.20	68.8
Approach			79	8.0	79	8.0	0.030	3.8	NA	0.1	0.9	0.10	0.29	0.10	82.6
North: Wybong Road North															
7	L2	All MCs	77	16.4	77	16.4	0.086	8.5	LOS A	0.3	2.5	0.17	0.62	0.17	67.1
9	R2	All MCs	18	0.0	18	0.0	0.086	9.0	LOS A	0.3	2.5	0.17	0.62	0.17	72.6
Approach			95	13.3	95	13.3	0.086	8.6	LOS A	0.3	2.5	0.17	0.62	0.17	68.1
West: Wybong Road West															
10	L2	All MCs	43	0.0	43	0.0	0.023	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	74.4
11	T1	All MCs	55	5.8	55	5.8	0.029	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			98	3.2	98	3.2	0.029	3.5	NA	0.0	0.0	0.00	0.29	0.00	86.8
All Vehicles			272	8.1	272	8.1	0.086	5.4	NA	0.3	2.5	0.09	0.40	0.09	78.1

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [23] 2032 AM Base Wybong and Bengalla (Wybong and Bengalla)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Wybong Road and Bengalla Road
AM Peak Hour
2032 No Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Bengalla Road															
5	T1	All MCs	33	6.5	33	6.5	0.017	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
6	R2	All MCs	25	0.0	25	0.0	0.019	7.7	LOS A	0.1	0.5	0.18	0.61	0.18	73.8
Approach			58	3.6	58	3.6	0.019	3.4	NA	0.1	0.5	0.08	0.27	0.08	86.6
North: Wybong Road North															
7	L2	All MCs	33	0.0	33	0.0	0.047	8.1	LOS A	0.2	1.3	0.19	0.61	0.19	72.5
9	R2	All MCs	18	11.8	18	11.8	0.047	9.2	LOS A	0.2	1.3	0.19	0.61	0.19	68.6
Approach			51	4.2	51	4.2	0.047	8.5	LOS A	0.2	1.3	0.19	0.61	0.19	71.1
West: Wybong Road West															
10	L2	All MCs	21	0.0	21	0.0	0.011	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	74.4
11	T1	All MCs	65	1.6	65	1.6	0.034	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			86	1.2	86	1.2	0.034	1.9	NA	0.0	0.0	0.00	0.16	0.00	92.2
All Vehicles			195	2.7	195	2.7	0.047	4.0	NA	0.2	1.3	0.07	0.31	0.07	84.1

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [24] 2032 PM Base Wybong and Bengalla (Wybong and Bengalla)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Wybong Road and Bengalla Road
PM Peak Hour
2032 No Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Bengalla Road															
5	T1	All MCs	44	2.4	44	2.4	0.023	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
6	R2	All MCs	1	0.0	1	0.0	0.001	7.8	LOS A	0.0	0.0	0.20	0.59	0.20	73.7
Approach			45	2.3	45	2.3	0.023	0.2	NA	0.0	0.0	0.00	0.01	0.00	99.2
North: Wybong Road North															
7	L2	All MCs	23	31.8	23	31.8	0.038	9.0	LOS A	0.1	1.2	0.19	0.61	0.19	62.6
9	R2	All MCs	16	0.0	16	0.0	0.038	8.7	LOS A	0.1	1.2	0.19	0.61	0.19	72.5
Approach			39	18.9	39	18.9	0.038	8.8	LOS A	0.1	1.2	0.19	0.61	0.19	66.3
West: Wybong Road West															
10	L2	All MCs	44	0.0	44	0.0	0.024	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	74.4
11	T1	All MCs	58	5.5	58	5.5	0.031	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			102	3.1	102	3.1	0.031	3.4	NA	0.0	0.0	0.00	0.28	0.00	87.0
All Vehicles			186	6.2	186	6.2	0.038	3.8	NA	0.1	1.2	0.04	0.29	0.04	84.0

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: [25] 2026 AM Mod Wybong and Bengalla (Wybong and Bengalla)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Wybong Road and Bengalla Road
AM Peak Hour
2026 With Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Bengalla Road															
5	T1	All MCs	32	6.7	32	6.7	0.017	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
6	R2	All MCs	205	2.6	205	2.6	0.157	7.9	LOS A	0.7	5.0	0.21	0.63	0.21	72.0
Approach			237	3.1	237	3.1	0.157	6.8	NA	0.7	5.0	0.18	0.54	0.18	74.8
North: Wybong Road North															
7	L2	All MCs	60	0.0	60	0.0	0.076	8.1	LOS A	0.3	2.0	0.19	0.61	0.19	72.4
9	R2	All MCs	19	11.1	19	11.1	0.076	11.0	LOS A	0.3	2.0	0.19	0.61	0.19	68.7
Approach			79	2.7	79	2.7	0.076	8.8	LOS A	0.3	2.0	0.19	0.61	0.19	71.5
West: Wybong Road West															
10	L2	All MCs	25	0.0	25	0.0	0.014	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	74.4
11	T1	All MCs	61	1.7	61	1.7	0.032	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			86	1.2	86	1.2	0.032	2.3	NA	0.0	0.0	0.00	0.19	0.00	90.8
All Vehicles			402	2.6	402	2.6	0.157	6.2	NA	0.7	5.0	0.14	0.48	0.14	77.0

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [26] 2026 PM Mod Wybong and Bengalla (Wybong and Bengalla)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Wybong Road and Bengalla Road
PM Peak Hour
2026 With Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Bengalla Road															
5	T1	All MCs	42	5.0	42	5.0	0.022	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
6	R2	All MCs	38	11.1	38	11.1	0.031	8.1	LOS A	0.1	0.9	0.20	0.62	0.20	69.0
Approach			80	7.9	80	7.9	0.031	3.9	NA	0.1	0.9	0.10	0.29	0.10	82.4
North: Wybong Road North															
7	L2	All MCs	94	13.5	94	13.5	0.099	8.4	LOS A	0.4	2.9	0.16	0.62	0.16	68.1
9	R2	All MCs	18	0.0	18	0.0	0.099	9.0	LOS A	0.4	2.9	0.16	0.62	0.16	72.7
Approach			112	11.3	112	11.3	0.099	8.5	LOS A	0.4	2.9	0.16	0.62	0.16	68.8
West: Wybong Road West															
10	L2	All MCs	43	0.0	43	0.0	0.023	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	74.4
11	T1	All MCs	55	5.8	55	5.8	0.029	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			98	3.2	98	3.2	0.029	3.5	NA	0.0	0.0	0.00	0.29	0.00	86.8
All Vehicles			289	7.6	289	7.6	0.099	5.5	NA	0.4	2.9	0.09	0.42	0.09	77.8

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [27] 2032 AM Mod Wybong and Bengalla (Wybong and Bengalla)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Wybong Road and Bengalla Road
AM Peak Hour
2032 With Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Bengalla Road															
5	T1	All MCs	33	6.5	33	6.5	0.017	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
6	R2	All MCs	146	4.3	146	4.3	0.113	7.9	LOS A	0.5	3.5	0.21	0.63	0.21	71.4
Approach			179	4.7	179	4.7	0.113	6.5	NA	0.5	3.5	0.17	0.51	0.17	75.3
North: Wybong Road North															
7	L2	All MCs	63	0.0	63	0.0	0.078	8.1	LOS A	0.3	2.1	0.19	0.61	0.19	72.5
9	R2	All MCs	20	10.5	20	10.5	0.078	10.4	LOS A	0.3	2.1	0.19	0.61	0.19	68.9
Approach			83	2.5	83	2.5	0.078	8.6	LOS A	0.3	2.1	0.19	0.61	0.19	71.6
West: Wybong Road West															
10	L2	All MCs	27	0.0	27	0.0	0.015	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	74.4
11	T1	All MCs	65	1.6	65	1.6	0.034	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			93	1.1	93	1.1	0.034	2.3	NA	0.0	0.0	0.00	0.19	0.00	90.7
All Vehicles			355	3.3	355	3.3	0.113	5.9	NA	0.5	3.5	0.13	0.45	0.13	77.8

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [28] 2032 PM Mod Wybong and Bengalla (Wybong and Bengalla)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Wybong Road and Bengalla Road
PM Peak Hour
2032 With Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Bengalla Road															
5	T1	All MCs	48	10.9	48	10.9	0.027	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
6	R2	All MCs	35	6.1	35	6.1	0.028	8.0	LOS A	0.1	0.8	0.21	0.62	0.21	70.7
Approach			83	8.9	83	8.9	0.028	3.3	NA	0.1	0.8	0.09	0.26	0.09	85.3
North: Wybong Road North															
7	L2	All MCs	81	15.6	81	15.6	0.091	8.5	LOS A	0.3	2.7	0.17	0.62	0.17	67.4
9	R2	All MCs	19	0.0	19	0.0	0.091	9.1	LOS A	0.3	2.7	0.17	0.62	0.17	72.6
Approach			100	12.6	100	12.6	0.091	8.6	LOS A	0.3	2.7	0.17	0.62	0.17	68.3
West: Wybong Road West															
10	L2	All MCs	46	0.0	46	0.0	0.025	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	74.4
11	T1	All MCs	58	5.5	58	5.5	0.031	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach			104	3.0	104	3.0	0.031	3.5	NA	0.0	0.0	0.00	0.29	0.00	86.7
All Vehicles			287	8.1	287	8.1	0.091	5.2	NA	0.3	2.7	0.09	0.39	0.09	78.9

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [29] Ex AM Denman and Bengalla (Denman and Bengalla)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Denman Road and Bengalla Road
AM Peak Peak Hour
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Denman Road East															
5	T1	All MCs	155	14.3	155	14.3	0.087	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
6	R2	All MCs	175	9.6	175	9.6	0.149	7.6	LOS A	0.6	4.8	0.29	0.62	0.29	60.4
Approach			329	11.8	329	11.8	0.149	4.1	NA	0.6	4.8	0.15	0.33	0.15	68.2
North: Bengalla Road															
7	L2	All MCs	142	3.7	142	3.7	0.133	7.6	LOS A	0.5	3.7	0.26	0.61	0.26	62.2
9	R2	All MCs	4	25.0	4	25.0	0.133	13.9	LOS A	0.5	3.7	0.26	0.61	0.26	56.3
Approach			146	4.3	146	4.3	0.133	7.8	LOS A	0.5	3.7	0.26	0.61	0.26	62.0
West: Denman Road West															
10	L2	All MCs	14	0.0	14	0.0	0.007	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	64.6
11	T1	All MCs	136	7.8	136	7.8	0.073	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach			149	7.0	149	7.0	0.073	0.6	NA	0.0	0.0	0.00	0.06	0.00	78.2
All Vehicles			625	8.9	625	8.9	0.149	4.1	NA	0.6	4.8	0.14	0.33	0.14	68.7

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [30] Ex PM Denman and Bengalla (Denman and Bengalla)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Denman Road and Bengalla Road
PM Peak Hour
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Denman Road East															
5	T1	All MCs	181	9.3	181	9.3	0.098	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	All MCs	126	3.3	126	3.3	0.097	7.1	LOS A	0.4	2.9	0.20	0.60	0.20	62.7
Approach			307	6.8	307	6.8	0.098	2.9	NA	0.4	2.9	0.08	0.25	0.08	71.8
North: Bengalla Road															
7	L2	All MCs	166	9.5	166	9.5	0.152	7.5	LOS A	0.6	4.6	0.21	0.60	0.21	60.7
9	R2	All MCs	4	50.0	4	50.0	0.152	14.4	LOS A	0.6	4.6	0.21	0.60	0.21	50.8
Approach			171	10.5	171	10.5	0.152	7.7	LOS A	0.6	4.6	0.21	0.60	0.21	60.4
West: Denman Road West															
10	L2	All MCs	4	0.0	4	0.0	0.002	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	64.6
11	T1	All MCs	86	6.1	86	6.1	0.046	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach			91	5.8	91	5.8	0.046	0.3	NA	0.0	0.0	0.00	0.03	0.00	79.1
All Vehicles			568	7.8	568	7.8	0.152	4.0	NA	0.6	4.6	0.11	0.32	0.11	68.9

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [31] 2026 AM Base Denman and Bengalla (Denman and Bengalla)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Denman Road and Bengalla Road
AM Peak Hour
2026 No Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Denman Road East															
5	T1	All MCs	165	14.6	165	14.6	0.093	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	All MCs	248	7.6	248	7.6	0.214	7.8	LOS A	1.0	7.2	0.33	0.63	0.33	60.8
Approach			414	10.4	414	10.4	0.214	4.7	NA	1.0	7.2	0.20	0.38	0.20	67.3
North: Bengalla Road															
7	L2	All MCs	171	3.7	171	3.7	0.167	7.7	LOS A	0.7	4.8	0.29	0.62	0.29	62.1
9	R2	All MCs	6	16.7	6	16.7	0.167	15.5	LOS B	0.7	4.8	0.29	0.62	0.29	58.4
Approach			177	4.2	177	4.2	0.167	8.0	LOS A	0.7	4.8	0.29	0.62	0.29	61.9
West: Denman Road West															
10	L2	All MCs	19	0.0	19	0.0	0.010	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	64.6
11	T1	All MCs	152	7.6	152	7.6	0.082	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach			171	6.8	171	6.8	0.082	0.8	NA	0.0	0.0	0.00	0.07	0.00	77.9
All Vehicles			761	8.2	761	8.2	0.214	4.6	NA	1.0	7.2	0.18	0.36	0.18	68.0

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [32] 2026 PM Base Denman and Bengalla (Denman and Bengalla)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Denman Road and Bengalla Road
PM Peak Hour
2026 No Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Denman Road East															
5	T1	All MCs	193	9.3	193	9.3	0.105	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	All MCs	153	2.8	153	2.8	0.118	7.2	LOS A	0.5	3.6	0.22	0.60	0.22	62.8
Approach			345	6.4	345	6.4	0.118	3.2	NA	0.5	3.6	0.10	0.27	0.10	71.3
North: Bengalla Road															
7	L2	All MCs	189	8.9	189	8.9	0.175	7.6	LOS A	0.7	5.3	0.22	0.60	0.22	60.8
9	R2	All MCs	5	40.0	5	40.0	0.175	14.8	LOS B	0.7	5.3	0.22	0.60	0.22	52.9
Approach			195	9.7	195	9.7	0.175	7.8	LOS A	0.7	5.3	0.22	0.60	0.22	60.5
West: Denman Road West															
10	L2	All MCs	5	0.0	5	0.0	0.003	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	64.6
11	T1	All MCs	93	6.8	93	6.8	0.050	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach			98	6.5	98	6.5	0.050	0.4	NA	0.0	0.0	0.00	0.03	0.00	79.0
All Vehicles			638	7.4	638	7.4	0.175	4.2	NA	0.7	5.3	0.12	0.33	0.12	68.6

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [33] 2032 AM Base Denman and Bengalla (Denman and Bengalla)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Denman Road and Bengalla Road
AM Peak Hour
2032 No Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Denman Road East															
5	T1	All MCs	167	14.5	167	14.5	0.094	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	All MCs	144	3.6	144	3.6	0.121	7.5	LOS A	0.5	3.7	0.30	0.62	0.30	62.2
Approach			312	9.5	312	9.5	0.121	3.5	NA	0.5	3.7	0.14	0.29	0.14	70.6
North: Bengalla Road															
7	L2	All MCs	147	2.1	147	2.1	0.139	7.7	LOS A	0.5	3.8	0.28	0.62	0.28	62.6
9	R2	All MCs	4	25.0	4	25.0	0.139	13.8	LOS A	0.5	3.8	0.28	0.62	0.28	56.2
Approach			152	2.8	152	2.8	0.139	7.9	LOS A	0.5	3.8	0.28	0.62	0.28	62.4
West: Denman Road West															
10	L2	All MCs	14	7.7	14	7.7	0.008	7.1	LOS A	0.0	0.0	0.00	0.63	0.00	62.1
11	T1	All MCs	153	7.6	153	7.6	0.082	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach			166	7.6	166	7.6	0.082	0.6	NA	0.0	0.0	0.00	0.05	0.00	78.1
All Vehicles			629	7.4	629	7.4	0.139	3.8	NA	0.5	3.8	0.14	0.31	0.14	70.2

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: [34] 2032 PM Base Denman and Bengalla (Denman and Bengalla)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Denman Road and Bengalla Road
PM Peak Hour
2032 No Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Denman Road East															
5	T1	All MCs	197	9.6	197	9.6	0.107	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	All MCs	119	0.0	119	0.0	0.091	7.1	LOS A	0.4	2.6	0.21	0.60	0.21	63.8
Approach			316	6.0	316	6.0	0.107	2.7	NA	0.4	2.6	0.08	0.23	0.08	73.0
North: Bengalla Road															
7	L2	All MCs	146	8.6	146	8.6	0.134	7.5	LOS A	0.5	3.9	0.22	0.60	0.22	60.9
9	R2	All MCs	3	66.7	3	66.7	0.134	15.9	LOS B	0.5	3.9	0.22	0.60	0.22	47.5
Approach			149	9.9	149	9.9	0.134	7.7	LOS A	0.5	3.9	0.22	0.60	0.22	60.5
West: Denman Road West															
10	L2	All MCs	4	0.0	4	0.0	0.002	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	64.6
11	T1	All MCs	94	6.7	94	6.7	0.050	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach			98	6.5	98	6.5	0.050	0.3	NA	0.0	0.0	0.00	0.03	0.00	79.2
All Vehicles			563	7.1	563	7.1	0.134	3.6	NA	0.5	3.9	0.10	0.29	0.10	70.1

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [35] 2026 AM Mod Denman and Bengalla (Denman and Bengalla)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Denman Road and Bengalla Road
AM Peak Hour
With Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Denman Road East															
5	T1	All MCs	165	14.6	165	14.6	0.093	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	All MCs	319	5.9	319	5.9	0.272	7.8	LOS A	1.3	9.6	0.34	0.63	0.34	61.3
Approach			484	8.9	484	8.9	0.272	5.1	NA	1.3	9.6	0.23	0.41	0.23	66.6
North: Bengalla Road															
7	L2	All MCs	172	3.7	172	3.7	0.168	7.7	LOS A	0.7	4.8	0.29	0.62	0.29	62.1
9	R2	All MCs	5	20.0	5	20.0	0.168	17.9	LOS B	0.7	4.8	0.29	0.62	0.29	57.5
Approach			177	4.2	177	4.2	0.168	8.0	LOS A	0.7	4.8	0.29	0.62	0.29	61.9
West: Denman Road West															
10	L2	All MCs	20	0.0	20	0.0	0.011	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	64.6
11	T1	All MCs	152	7.6	152	7.6	0.082	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach			172	6.7	172	6.7	0.082	0.8	NA	0.0	0.0	0.00	0.07	0.00	77.8
All Vehicles			833	7.5	833	7.5	0.272	4.9	NA	1.3	9.6	0.19	0.39	0.19	67.5

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [36] 2026 PM Mod Denman and Bengalla (Denman and Bengalla)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Denman Road and Bengalla Road
PM Peak Hour
2026 With Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Denman Road East															
5	T1	All MCs	193	9.3	193	9.3	0.105	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	All MCs	153	2.8	153	2.8	0.118	7.2	LOS A	0.5	3.6	0.22	0.60	0.22	62.8
Approach			345	6.4	345	6.4	0.118	3.2	NA	0.5	3.6	0.10	0.27	0.10	71.3
North: Bengalla Road															
7	L2	All MCs	207	8.1	207	8.1	0.188	7.6	LOS A	0.8	5.8	0.22	0.60	0.22	61.0
9	R2	All MCs	4	50.0	4	50.0	0.188	15.9	LOS B	0.8	5.8	0.22	0.60	0.22	50.7
Approach			212	9.0	212	9.0	0.188	7.7	LOS A	0.8	5.8	0.22	0.60	0.22	60.8
West: Denman Road West															
10	L2	All MCs	6	0.0	6	0.0	0.003	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	64.6
11	T1	All MCs	93	6.8	93	6.8	0.050	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach			99	6.4	99	6.4	0.050	0.5	NA	0.0	0.0	0.00	0.04	0.00	78.8
All Vehicles			656	7.2	656	7.2	0.188	4.2	NA	0.8	5.8	0.12	0.34	0.12	68.5

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Organisation: TTPP - THE TRANSPORT PLANNING PARTNERSHIP | Licence: NETWORK / 1PC | Processed: Thursday, 9 October 2025 12:59:38 PM
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MOVEMENT SUMMARY

Site: [37] 2032 AM Mod Denman and Bengalla (Denman and Bengalla)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Denman Road and Bengalla Road
AM Peak Hour
2032 With Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Denman Road East															
5	T1	All MCs	167	14.5	167	14.5	0.094	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	All MCs	266	7.5	266	7.5	0.230	7.8	LOS A	1.1	7.9	0.33	0.63	0.33	60.9
Approach			434	10.2	434	10.2	0.230	4.8	NA	1.1	7.9	0.21	0.39	0.21	67.0
North: Bengalla Road															
7	L2	All MCs	181	4.1	181	4.1	0.175	7.8	LOS A	0.7	5.0	0.30	0.62	0.30	61.9
9	R2	All MCs	5	20.0	5	20.0	0.175	16.6	LOS B	0.7	5.0	0.30	0.62	0.30	57.5
Approach			186	4.5	186	4.5	0.175	8.0	LOS A	0.7	5.0	0.30	0.62	0.30	61.8
West: Denman Road West															
10	L2	All MCs	20	0.0	20	0.0	0.011	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	64.6
11	T1	All MCs	153	7.6	153	7.6	0.082	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach			173	6.7	173	6.7	0.082	0.8	NA	0.0	0.0	0.00	0.07	0.00	77.8
All Vehicles			793	8.1	793	8.1	0.230	4.7	NA	1.1	7.9	0.18	0.37	0.18	67.7

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Organisation: TTPP - THE TRANSPORT PLANNING PARTNERSHIP | Licence: NETWORK / 1PC | Processed: Thursday, 9 October 2025 12:59:38 PM
Project: C:\Users\Penny.Dalton\OneDrive - TTPP\Projects - 23245 Mount Pleasant Modification 7\07 Modelling Files\Model\23245-251009-Mount Pleasant Mod 7.sipx

MOVEMENT SUMMARY

Site: [38] 2032 PM Mod Denman and Bengalla (Denman and Bengalla)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Denman Road and Bengalla Road
PM Peak Hour
2032 With Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Denman Road East															
5	T1	All MCs	197	9.6	197	9.6	0.107	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	All MCs	162	3.2	162	3.2	0.126	7.2	LOS A	0.5	3.9	0.22	0.60	0.22	62.6
Approach			359	6.7	359	6.7	0.126	3.3	NA	0.5	3.9	0.10	0.27	0.10	71.1
North: Bengalla Road															
7	L2	All MCs	201	8.9	201	8.9	0.186	7.6	LOS A	0.8	5.7	0.23	0.60	0.23	60.8
9	R2	All MCs	5	40.0	5	40.0	0.186	15.3	LOS B	0.8	5.7	0.23	0.60	0.23	52.9
Approach			206	9.7	206	9.7	0.186	7.8	LOS A	0.8	5.7	0.23	0.60	0.23	60.5
West: Denman Road West															
10	L2	All MCs	6	0.0	6	0.0	0.003	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	64.6
11	T1	All MCs	94	6.7	94	6.7	0.050	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach			100	6.3	100	6.3	0.050	0.4	NA	0.0	0.0	0.00	0.04	0.00	78.8
All Vehicles			665	7.6	665	7.6	0.186	4.2	NA	0.8	5.7	0.12	0.34	0.12	68.4

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [47] Ex AM TM Dr and Denman (TM Dr and Denman-PRIOR TO UPGRADE)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Denman Road and Thomas Mitchell Drive
AM Peak Hour
2020 Prior to Upgrade
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Thomas Mitchell Dr															
1	L2	All MCs	119	15.9	119	15.9	0.122	8.4	LOS A	0.5	3.6	0.33	0.64	0.33	58.3
3	R2	All MCs	128	4.9	128	4.9	0.262	13.3	LOS A	1.1	8.0	0.62	0.87	0.68	56.7
Approach			247	10.2	247	10.2	0.262	10.9	LOS A	1.1	8.0	0.48	0.76	0.51	57.5
East: Denman Rd N															
4	L2	All MCs	300	2.5	300	2.5	0.164	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	63.7
5	T1	All MCs	212	7.0	212	7.0	0.113	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach			512	4.3	512	4.3	0.164	4.1	NA	0.0	0.0	0.00	0.37	0.00	69.5
West: Denman Rd S															
11	T1	All MCs	156	5.4	156	5.4	0.182	1.2	LOS A	0.9	6.4	0.17	0.21	0.17	75.8
12	R2	All MCs	123	6.8	123	6.8	0.182	10.1	LOS A	0.9	6.4	0.55	0.69	0.55	61.2
Approach			279	6.0	279	6.0	0.182	5.1	NA	0.9	6.4	0.34	0.42	0.34	68.6
All Vehicles			1038	6.2	1038	6.2	0.262	6.0	NA	1.1	8.0	0.21	0.48	0.21	66.0

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Organisation: TTPP - THE TRANSPORT PLANNING PARTNERSHIP | Licence: NETWORK / 1PC | Processed: Thursday, 9 October 2025 12:59:44 PM
Project: C:\Users\Penny.Dalton\OneDrive - TTPP\Projects - 23245 Mount Pleasant Modification 7\07 Modelling Files\Model\23245-251009-Mount Pleasant Mod 7.sipx

MOVEMENT SUMMARY

Site: [48] Ex PM TM Dr and Denman (TM Dr and Denman-PRIOR TO UPGRADE)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Denman Road and Thomas Mitchell Drive
PM Peak Hour
2020 Prior to Upgrade
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Thomas Mitchell Dr															
1	L2	All MCs	61	0.0	61	0.0	0.059	8.0	LOS A	0.2	1.5	0.33	0.63	0.33	63.1
3	R2	All MCs	162	1.3	162	1.3	0.310	13.1	LOS A	1.4	10.1	0.62	0.87	0.73	57.8
Approach			223	0.9	223	0.9	0.310	11.7	LOS A	1.4	10.1	0.54	0.81	0.62	59.1
East: Denman Rd N															
4	L2	All MCs	122	17.2	122	17.2	0.074	7.3	LOS A	0.0	0.0	0.00	0.63	0.00	59.2
5	T1	All MCs	246	8.5	246	8.5	0.133	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach			368	11.4	368	11.4	0.133	2.4	NA	0.0	0.0	0.00	0.21	0.00	71.6
West: Denman Rd S															
11	T1	All MCs	192	7.1	192	7.1	0.131	1.0	LOS A	0.6	4.5	0.22	0.25	0.22	75.9
12	R2	All MCs	61	12.1	61	12.1	0.131	9.2	LOS A	0.6	4.5	0.37	0.42	0.37	63.6
Approach			253	8.3	253	8.3	0.131	3.0	NA	0.6	4.5	0.26	0.29	0.26	72.5
All Vehicles			844	7.7	844	7.7	0.310	5.1	NA	1.4	10.1	0.22	0.39	0.24	68.1

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: [39] 2026 AM Base TM Dr and Denman (TM Dr and Denman UPGRADED)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Thomas Mitchell Dr and Denman Rd
MPO Peak Hour
2026 No Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Queued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Denman Rd S															
11	T1	All MCs	191	4.8	191	4.8	0.101	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
12	R2	All MCs	158	6.5	158	6.5	0.121	8.1	LOS A	0.6	4.1	0.40	0.65	0.40	60.9
Approach			349	5.5	349	5.5	0.121	3.7	NA	0.6	4.1	0.18	0.29	0.18	70.0
East: Thomas Mitchell Dr E															
1	L2	All MCs	165	13.8	165	13.8	0.144	8.5	LOS A	0.6	4.7	0.39	0.66	0.39	58.7
3	R2	All MCs	150	6.8	150	6.8	0.301	14.1	LOS A	1.3	9.8	0.65	0.90	0.76	55.7
Approach			315	10.5	315	10.5	0.301	11.1	LOS A	1.3	9.8	0.51	0.77	0.57	57.3
North: Denman Rd N															
4	L2	All MCs	353	4.8	353	4.8	0.256	8.1	LOS A	1.2	8.9	0.31	0.60	0.31	61.5
5	T1	All MCs	284	6.4	284	6.4	0.152	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach			638	5.5	638	5.5	0.256	4.5	LOS A	1.2	8.9	0.17	0.33	0.17	68.5
All Vehicles			1301	6.7	1301	6.7	0.301	5.9	NA	1.3	9.8	0.26	0.43	0.27	65.8

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: [40] 2026 PM Base TM Dr and Denman (TM Dr and Denman UPGRADED)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Thomas Mitchell Dr and Denman Rd
PM Peak Hour
2026 No Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Denman Rd S															
11	T1	All MCs	228	7.5	228	7.5	0.123	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
12	R2	All MCs	75	10.6	75	10.6	0.060	8.2	LOS A	0.3	2.0	0.40	0.64	0.40	59.6
Approach			303	8.2	303	8.2	0.123	2.0	NA	0.3	2.0	0.10	0.16	0.10	73.7
East: Thomas Mitchell Dr E															
1	L2	All MCs	80	0.0	80	0.0	0.064	8.0	LOS A	0.3	1.8	0.37	0.64	0.37	62.9
3	R2	All MCs	193	5.3	193	5.3	0.367	14.2	LOS A	1.8	13.2	0.65	0.92	0.85	56.0
Approach			273	3.8	273	3.7	0.367	12.4	LOS A	1.8	13.2	0.57	0.84	0.71	57.8
North: Denman Rd N															
4	L2	All MCs	144	19.7	144	19.7	0.104	7.9	LOS A	0.4	3.6	0.18	0.57	0.18	58.0
5	T1	All MCs	293	8.1	293	8.1	0.158	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach			438	11.9	438	11.9	0.158	2.6	LOS A	0.4	3.6	0.06	0.19	0.06	71.0
All Vehicles			1014	8.6	1014	8.6	0.367	5.1	NA	1.8	13.2	0.21	0.35	0.25	67.6

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Organisation: TTPP - THE TRANSPORT PLANNING PARTNERSHIP | Licence: NETWORK / 1PC | Processed: Thursday, 9 October 2025 12:59:40 PM
Project: C:\Users\Penny.Dalton\OneDrive - TTPP\Projects - 23245 Mount Pleasant Modification 7\07 Modelling Files\Model\23245-251009-Mount Pleasant Mod 7.sipx

MOVEMENT SUMMARY

Site: [41] 2032 AM Base TM Dr and Denman (TM Dr and Denman UPGRADED)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Thomas Mitchell Dr and Denman Rd
AM Peak Hour
2032 No Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Denman Rd S															
11	T1	All MCs	181	4.4	181	4.4	0.095	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
12	R2	All MCs	144	6.3	144	6.3	0.102	7.7	LOS A	0.5	3.5	0.34	0.62	0.34	61.1
Approach			325	5.2	325	5.2	0.102	3.4	NA	0.5	3.5	0.15	0.27	0.15	70.3
East: Thomas Mitchell Dr E															
1	L2	All MCs	111	14.3	111	14.3	0.091	8.1	LOS A	0.4	2.9	0.33	0.62	0.33	58.8
3	R2	All MCs	86	1.3	86	1.3	0.141	11.2	LOS A	0.5	3.8	0.56	0.80	0.56	59.8
Approach			198	8.6	198	8.6	0.141	9.4	LOS A	0.5	3.8	0.43	0.70	0.43	59.2
North: Denman Rd N															
4	L2	All MCs	276	0.4	276	0.4	0.192	7.8	LOS A	0.9	6.1	0.27	0.59	0.27	63.0
5	T1	All MCs	219	3.1	219	3.1	0.115	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach			495	1.6	495	1.6	0.192	4.4	LOS A	0.9	6.1	0.15	0.33	0.15	69.5
All Vehicles			1018	4.1	1018	4.1	0.192	5.1	NA	0.9	6.1	0.20	0.38	0.20	67.5

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: [42] 2032 PM Base TM Dr and Denman (TM Dr and Denman UPGRADED)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Thomas Mitchell Dr and Denman Rd
PM Peak Hour
2032 No Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Denman Rd S															
11	T1	All MCs	206	6.1	206	6.1	0.110	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
12	R2	All MCs	50	13.6	50	13.6	0.040	8.2	LOS A	0.2	1.4	0.39	0.63	0.39	58.8
Approach			256	7.6	256	7.6	0.110	1.6	NA	0.2	1.4	0.08	0.12	0.08	74.7
East: Thomas Mitchell Dr E															
1	L2	All MCs	58	2.0	58	2.0	0.047	8.0	LOS A	0.2	1.3	0.36	0.63	0.36	62.3
3	R2	All MCs	112	1.0	112	1.0	0.187	11.5	LOS A	0.7	5.2	0.58	0.81	0.58	59.6
Approach			170	1.3	170	1.3	0.187	10.3	LOS A	0.7	5.2	0.50	0.75	0.50	60.5
North: Denman Rd N															
4	L2	All MCs	99	21.8	99	21.8	0.070	7.9	LOS A	0.3	2.4	0.14	0.57	0.14	57.6
5	T1	All MCs	285	8.0	285	8.0	0.154	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach			384	11.5	384	11.5	0.154	2.0	LOS A	0.3	2.4	0.04	0.15	0.04	72.6
All Vehicles			810	8.1	810	8.1	0.187	3.6	NA	0.7	5.2	0.15	0.27	0.15	70.3

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Organisation: TTPP - THE TRANSPORT PLANNING PARTNERSHIP | Licence: NETWORK / 1PC | Processed: Thursday, 9 October 2025 12:59:41 PM
Project: C:\Users\Penny.Dalton\OneDrive - TTPP\Projects - 23245 Mount Pleasant Modification 7\07 Modelling Files\Model\23245-251009-Mount Pleasant Mod 7.sipx

MOVEMENT SUMMARY

Site: [43] 2026 AM Mod TM Dr and Denman (TM Dr and Denman UPGRADED)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Thomas Mitchell Dr and Denman Rd
AM Peak Hour
2026 With Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Denman Rd S															
11	T1	All MCs	191	4.8	191	4.8	0.101	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
12	R2	All MCs	159	6.4	159	6.4	0.132	8.4	LOS A	0.6	4.4	0.45	0.68	0.45	60.7
Approach			350	5.5	350	5.5	0.132	3.8	NA	0.6	4.4	0.21	0.31	0.21	69.9
East: Thomas Mitchell Dr E															
1	L2	All MCs	168	13.5	168	13.5	0.160	8.9	LOS A	0.7	5.1	0.44	0.69	0.44	58.6
3	R2	All MCs	150	6.8	150	6.8	0.340	15.9	LOS B	1.5	11.2	0.70	0.93	0.88	54.3
Approach			318	10.4	318	10.4	0.340	12.2	LOS A	1.5	11.2	0.57	0.81	0.65	56.5
North: Denman Rd N															
4	L2	All MCs	353	4.8	353	4.8	0.256	8.1	LOS A	1.2	8.9	0.31	0.60	0.31	61.5
5	T1	All MCs	357	5.1	357	5.1	0.189	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach			710	5.0	710	5.0	0.256	4.0	LOS A	1.2	8.9	0.15	0.30	0.15	69.5
All Vehicles			1378	6.3	1378	6.3	0.340	5.9	NA	1.5	11.2	0.26	0.42	0.28	66.1

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: [44] 2026 PM Mod TM Dr and Denman (TM Dr and Denman UPGRADED)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Thomas Mitchell Dr and Denman Rd
PM Peak Hour
2026 With Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Queued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Denman Rd S															
11	T1	All MCs	248	6.9	248	6.9	0.133	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
12	R2	All MCs	75	10.6	75	10.6	0.060	8.2	LOS A	0.3	2.0	0.40	0.64	0.40	59.6
Approach			323	7.7	323	7.7	0.133	1.9	NA	0.3	2.0	0.09	0.15	0.09	74.1
East: Thomas Mitchell Dr E															
1	L2	All MCs	80	0.0	80	0.0	0.064	8.0	LOS A	0.3	1.8	0.37	0.64	0.37	62.9
3	R2	All MCs	193	5.3	193	5.3	0.377	14.6	LOS B	1.9	13.6	0.67	0.93	0.88	55.6
Approach			273	3.8	273	3.7	0.377	12.7	LOS A	1.9	13.6	0.58	0.84	0.73	57.6
North: Denman Rd N															
4	L2	All MCs	144	19.7	144	19.7	0.104	7.9	LOS A	0.4	3.6	0.18	0.57	0.18	58.0
5	T1	All MCs	293	8.1	293	8.1	0.158	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach			438	11.9	438	11.9	0.158	2.6	LOS A	0.4	3.6	0.06	0.19	0.06	71.0
All Vehicles			1033	8.5	1033	8.5	0.377	5.1	NA	1.9	13.6	0.21	0.35	0.25	67.7

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [45] 2032 AM Mod TM Dr and Denman (TM Dr and Denman UPGRADED)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Thomas Mitchell Dr and Denman Rd
AM Peak Hour
2032 With Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Denman Rd S															
11	T1	All MCs	201	5.1	201	5.1	0.107	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
12	R2	All MCs	160	7.1	160	7.1	0.125	8.1	LOS A	0.6	4.2	0.41	0.65	0.41	60.6
Approach			361	6.0	361	6.0	0.125	3.6	NA	0.6	4.2	0.18	0.29	0.18	70.0
East: Thomas Mitchell Dr E															
1	L2	All MCs	166	13.7	166	13.7	0.147	8.5	LOS A	0.6	4.7	0.40	0.66	0.40	58.7
3	R2	All MCs	86	1.3	86	1.3	0.168	12.7	LOS A	0.6	4.5	0.61	0.86	0.61	58.4
Approach			252	9.5	252	9.5	0.168	9.9	LOS A	0.6	4.7	0.47	0.73	0.47	58.6
North: Denman Rd N															
4	L2	All MCs	276	0.4	276	0.4	0.195	7.9	LOS A	0.9	6.2	0.29	0.60	0.29	62.9
5	T1	All MCs	297	5.4	297	5.4	0.157	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach			573	3.0	573	3.0	0.195	3.8	LOS A	0.9	6.2	0.14	0.29	0.14	70.7
All Vehicles			1186	5.3	1186	5.3	0.195	5.1	NA	0.9	6.2	0.22	0.38	0.22	67.5

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: [46] 2032 PM Mod TM Dr and Denman (TM Dr and Denman UPGRADED)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Thomas Mitchell Dr and Denman Rd
PM Peak Hour
2032 With Modification
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Denman Rd S															
11	T1	All MCs	240	6.6	240	6.6	0.128	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
12	R2	All MCs	75	12.1	75	12.1	0.062	8.3	LOS A	0.3	2.1	0.41	0.64	0.41	59.1
Approach			315	7.9	315	7.9	0.128	2.0	NA	0.3	2.1	0.10	0.15	0.10	73.7
East: Thomas Mitchell Dr E															
1	L2	All MCs	75	0.0	75	0.0	0.062	8.0	LOS A	0.2	1.7	0.38	0.64	0.38	62.9
3	R2	All MCs	112	1.0	112	1.0	0.212	12.6	LOS A	0.8	5.8	0.61	0.85	0.61	58.5
Approach			188	0.6	188	0.6	0.212	10.8	LOS A	0.8	5.8	0.52	0.77	0.52	60.2
North: Denman Rd N															
4	L2	All MCs	99	21.8	99	21.8	0.072	8.0	LOS A	0.3	2.5	0.18	0.57	0.18	57.5
5	T1	All MCs	311	8.4	311	8.4	0.168	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach			410	11.6	410	11.6	0.168	1.9	LOS A	0.3	2.5	0.04	0.14	0.04	73.0
All Vehicles			912	8.1	912	8.1	0.212	3.8	NA	0.8	5.8	0.16	0.27	0.16	70.2

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: [49] 2020 AM TMD and NEH (TM Dr and NEH)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Thomas Mitchell Dr and New England Hwy
AM Peak Hour
2020
Site Category: (None)
Stop (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: New England Hwy S															
3	L2	All MCs	193	15.3	193	15.3	0.128	8.7	LOS A	0.6	4.5	0.07	0.61	0.07	63.5
4	T1	All MCs	257	23.4	257	23.4	0.152	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach			449	19.9	449	19.9	0.152	3.8	LOS A	0.6	4.5	0.03	0.26	0.03	80.1
North: New England Hwy N															
5	T1	All MCs	372	11.3	372	11.3	0.205	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
6	R2	All MCs	14	0.0	14	0.0	0.010	8.8	LOS A	0.0	0.3	0.36	0.60	0.36	67.2
Approach			385	10.9	385	10.9	0.205	0.3	NA	0.0	0.3	0.01	0.02	0.01	98.2
West: Thomas Mitchell Dr															
1	L2	All MCs	9	11.1	9	11.1	0.006	8.3	LOS A	0.0	0.0	0.00	0.60	0.00	61.4
2	R2	All MCs	129	9.8	129	9.8	0.163	12.8	LOS A	0.7	4.9	0.49	0.93	0.49	61.6
Approach			139	9.8	139	9.8	0.163	12.5	LOS A	0.7	4.9	0.46	0.90	0.46	61.6
All Vehicles			974	14.9	974	14.9	0.205	3.6	NA	0.7	4.9	0.08	0.26	0.08	82.6

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [50] 2020 PM TMD and NEH (TM Dr and NEH)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Thomas Mitchell Dr and New England Hwy
PM Peak Hour
2020
Site Category: (None)
Stop (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: New England Hwy S															
3	L2	All MCs	60	47.4	60	47.4	0.046	9.5	LOS A	0.2	1.8	0.06	0.61	0.06	54.9
4	T1	All MCs	396	5.9	396	5.9	0.211	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach			456	11.3	456	11.3	0.211	1.3	LOS A	0.2	1.8	0.01	0.08	0.01	90.1
North: New England Hwy N															
5	T1	All MCs	381	11.6	381	11.6	0.210	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
6	R2	All MCs	11	20.0	11	20.0	0.010	10.3	LOS A	0.0	0.3	0.46	0.63	0.46	60.3
Approach			392	11.8	392	11.8	0.210	0.3	NA	0.0	0.3	0.01	0.02	0.01	98.1
West: Thomas Mitchell Dr															
1	L2	All MCs	8	12.5	8	12.5	0.005	8.6	LOS A	0.0	0.0	0.00	0.60	0.00	61.0
2	R2	All MCs	204	5.7	204	5.7	0.268	13.4	LOS A	1.2	8.5	0.55	0.94	0.57	62.1
Approach			213	5.9	213	5.9	0.268	13.2	LOS A	1.2	8.5	0.53	0.93	0.54	62.1
All Vehicles			1060	10.4	1060	10.4	0.268	3.3	NA	1.2	8.5	0.11	0.23	0.12	85.0

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [51] 2026 AM Base TMD and NEH (TM Dr and NEH)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Thomas Mitchell Dr and New England Hwy
AM Peak Hour
2026 No Modification
Site Category: (None)
Stop (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: New England Hwy S															
3	L2	All MCs	283	13.4	283	13.4	0.196	8.9	LOS A	0.9	7.1	0.18	0.60	0.18	63.5
4	T1	All MCs	328	20.8	328	20.8	0.191	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach			612	17.4	612	17.4	0.196	4.1	LOS A	0.9	7.1	0.08	0.28	0.08	78.8
North: New England Hwy N															
5	T1	All MCs	428	11.1	428	11.1	0.235	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
6	R2	All MCs	64	8.2	64	8.2	0.054	9.6	LOS A	0.2	1.7	0.43	0.66	0.43	64.0
Approach			493	10.7	493	10.7	0.235	1.3	NA	0.2	1.7	0.06	0.09	0.06	93.1
West: Thomas Mitchell Dr															
1	L2	All MCs	15	28.6	15	28.6	0.010	8.9	LOS A	0.0	0.0	0.00	0.59	0.00	56.9
2	R2	All MCs	152	11.8	152	11.8	0.246	15.3	LOS B	1.0	7.7	0.60	0.99	0.62	59.2
Approach			166	13.3	166	13.3	0.246	14.7	LOS B	1.0	7.7	0.54	0.95	0.57	59.0
All Vehicles			1271	14.3	1271	14.3	0.246	4.4	NA	1.0	7.7	0.13	0.29	0.14	80.0

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [52] 2026 PM Base TMD and NEH (TM Dr and NEH)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Thomas Mitchell Dr and New England Hwy
PM Peak Hour
2026 No Modification
Site Category: (None)
Stop (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: New England Hwy S															
3	L2	All MCs	77	42.5	77	42.5	0.058	9.4	LOS A	0.2	2.3	0.07	0.61	0.07	56.0
4	T1	All MCs	455	6.0	455	6.0	0.242	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach			532	11.3	532	11.3	0.242	1.4	LOS A	0.2	2.3	0.01	0.09	0.01	89.7
North: New England Hwy N															
5	T1	All MCs	460	11.2	460	11.2	0.253	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
6	R2	All MCs	14	23.1	14	23.1	0.015	10.8	LOS A	0.1	0.5	0.50	0.66	0.50	59.1
Approach			474	11.6	474	11.6	0.253	0.3	NA	0.1	0.5	0.01	0.02	0.01	97.9
West: Thomas Mitchell Dr															
1	L2	All MCs	14	30.8	14	30.8	0.009	9.3	LOS A	0.0	0.0	0.00	0.59	0.00	56.4
2	R2	All MCs	226	6.5	226	6.5	0.333	15.1	LOS B	1.6	12.0	0.61	1.00	0.72	60.6
Approach			240	7.9	240	7.9	0.333	14.8	LOS B	1.6	12.0	0.57	0.97	0.68	60.3
All Vehicles			1245	10.7	1245	10.7	0.333	3.6	NA	1.6	12.0	0.12	0.23	0.14	84.4

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [53] 2032 AM Base TMD and NEH (TM Dr and NEH)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Thomas Mitchell Dr and New England Hwy
AM Peak Hour
2032 No Modification
Site Category: (None)
Stop (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: New England Hwy S															
3	L2	All MCs	183	10.3	183	10.3	0.124	8.8	LOS A	0.5	4.1	0.15	0.60	0.15	64.6
4	T1	All MCs	289	23.3	289	23.3	0.171	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach			473	18.3	473	18.3	0.171	3.4	LOS A	0.5	4.1	0.06	0.23	0.06	82.3
North: New England Hwy N															
5	T1	All MCs	419	11.3	419	11.3	0.231	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
6	R2	All MCs	58	1.8	58	1.8	0.044	9.1	LOS A	0.2	1.4	0.40	0.64	0.40	66.3
Approach			477	10.2	477	10.2	0.231	1.1	NA	0.2	1.4	0.05	0.08	0.05	94.1
West: Thomas Mitchell Dr															
1	L2	All MCs	14	15.4	14	15.4	0.008	8.4	LOS A	0.0	0.0	0.00	0.59	0.00	60.2
2	R2	All MCs	97	2.2	97	2.2	0.125	12.7	LOS A	0.5	3.5	0.51	0.93	0.51	63.5
Approach			111	3.8	111	3.8	0.125	12.1	LOS A	0.5	3.5	0.45	0.89	0.45	63.1
All Vehicles			1060	13.1	1060	13.1	0.231	3.3	NA	0.5	4.1	0.09	0.23	0.09	84.4

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [54] 2032 PM Base TMD and NEH (TM Dr and NEH)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Thomas Mitchell Dr and New England Hwy
PM Peak Hour
2032 No Modification
Site Category: (None)
Stop (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: New England Hwy S															
3	L2	All MCs	31	86.2	31	86.2	0.027	10.5	LOS A	0.1	1.3	0.07	0.60	0.07	47.2
4	T1	All MCs	446	5.9	446	5.9	0.238	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach			477	11.0	477	11.0	0.238	0.7	LOS A	0.1	1.3	0.00	0.04	0.00	93.2
North: New England Hwy N															
5	T1	All MCs	429	11.5	429	11.5	0.237	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
6	R2	All MCs	14	15.4	14	15.4	0.014	10.4	LOS A	0.1	0.4	0.49	0.65	0.49	61.5
Approach			443	11.6	443	11.6	0.237	0.3	NA	0.1	0.4	0.02	0.02	0.02	98.0
West: Thomas Mitchell Dr															
1	L2	All MCs	12	9.1	12	9.1	0.007	8.6	LOS A	0.0	0.0	0.00	0.60	0.00	61.9
2	R2	All MCs	159	0.7	159	0.7	0.211	13.1	LOS A	0.9	6.0	0.55	0.94	0.55	63.5
Approach			171	1.2	171	1.2	0.211	12.8	LOS A	0.9	6.0	0.51	0.92	0.51	63.4
All Vehicles			1091	9.7	1091	9.7	0.238	2.4	NA	0.9	6.0	0.09	0.17	0.09	88.4

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [55] 2026 AM Mod TMD and NEH (TM Dr and NEH)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Thomas Mitchell Dr and New England Hwy
AM Peak Hour
2026 With Modification
Site Category: (None)
Stop (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: New England Hwy S															
3	L2	All MCs	286	13.2	286	13.2	0.198	8.9	LOS A	0.9	7.2	0.18	0.60	0.18	63.5
4	T1	All MCs	328	20.8	328	20.8	0.191	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach			615	17.3	615	17.3	0.198	4.2	LOS A	0.9	7.2	0.08	0.28	0.08	78.8
North: New England Hwy N															
5	T1	All MCs	428	11.1	428	11.1	0.235	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
6	R2	All MCs	64	8.2	64	8.2	0.054	9.6	LOS A	0.2	1.7	0.43	0.66	0.43	64.0
Approach			493	10.7	493	10.7	0.235	1.3	NA	0.2	1.7	0.06	0.09	0.06	93.1
West: Thomas Mitchell Dr															
1	L2	All MCs	15	28.6	15	28.6	0.010	8.9	LOS A	0.0	0.0	0.00	0.59	0.00	56.9
2	R2	All MCs	153	11.7	153	11.7	0.248	15.3	LOS B	1.0	7.8	0.60	0.99	0.63	59.2
Approach			167	13.2	167	13.2	0.248	14.7	LOS B	1.0	7.8	0.54	0.95	0.57	59.0
All Vehicles			1275	14.2	1275	14.2	0.248	4.4	NA	1.0	7.8	0.13	0.29	0.14	80.0

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [56] 2026 PM Mod TMD and NEH (TM Dr and NEH)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Thomas Mitchell Dr and New England Hwy
PM Peak Hour
2026 With Modification
Site Category: (None)
Stop (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: New England Hwy S															
3	L2	All MCs	77	42.5	77	42.5	0.058	9.4	LOS A	0.2	2.3	0.07	0.61	0.07	56.0
4	T1	All MCs	455	6.0	455	6.0	0.242	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach			532	11.3	532	11.3	0.242	1.4	LOS A	0.2	2.3	0.01	0.09	0.01	89.7
North: New England Hwy N															
5	T1	All MCs	460	11.2	460	11.2	0.253	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
6	R2	All MCs	14	23.1	14	23.1	0.015	10.8	LOS A	0.1	0.5	0.50	0.66	0.50	59.1
Approach			474	11.6	474	11.6	0.253	0.3	NA	0.1	0.5	0.01	0.02	0.01	97.9
West: Thomas Mitchell Dr															
1	L2	All MCs	14	30.8	14	30.8	0.009	9.3	LOS A	0.0	0.0	0.00	0.59	0.00	56.4
2	R2	All MCs	226	6.5	226	6.5	0.333	15.1	LOS B	1.6	12.0	0.61	1.00	0.72	60.6
Approach			240	7.9	240	7.9	0.333	14.8	LOS B	1.6	12.0	0.57	0.97	0.68	60.3
All Vehicles			1245	10.7	1245	10.7	0.333	3.6	NA	1.6	12.0	0.12	0.23	0.14	84.4

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [57] 2032 AM Mod TMD and NEH (TM Dr and NEH)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Thomas Mitchell Dr and New England Hwy
AM Peak Hour
2032 With Modification
Site Category: (None)
Stop (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: New England Hwy S															
3	L2	All MCs	234	10.8	234	10.8	0.159	8.8	LOS A	0.7	5.4	0.16	0.60	0.16	64.4
4	T1	All MCs	289	23.3	289	23.3	0.171	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach			523	17.7	523	17.7	0.171	3.9	LOS A	0.7	5.4	0.07	0.27	0.07	80.1
North: New England Hwy N															
5	T1	All MCs	419	11.3	419	11.3	0.231	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
6	R2	All MCs	58	1.8	58	1.8	0.044	9.1	LOS A	0.2	1.4	0.40	0.64	0.40	66.3
Approach			477	10.2	477	10.2	0.231	1.1	NA	0.2	1.4	0.05	0.08	0.05	94.1
West: Thomas Mitchell Dr															
1	L2	All MCs	14	15.4	14	15.4	0.008	8.4	LOS A	0.0	0.0	0.00	0.59	0.00	60.2
2	R2	All MCs	112	3.8	112	3.8	0.151	13.1	LOS A	0.6	4.3	0.53	0.94	0.53	62.7
Approach			125	5.0	125	5.0	0.151	12.6	LOS A	0.6	4.3	0.47	0.91	0.47	62.4
All Vehicles			1125	13.1	1125	13.1	0.231	3.7	NA	0.7	5.4	0.11	0.26	0.11	82.7

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [58] 2032 PM Mod TMD and NEH (TM Dr and NEH)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Thomas Mitchell Dr and New England Hwy
PM Peak Hour
2032 With Modification
Site Category: (None)
Stop (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: New England Hwy S															
3	L2	All MCs	49	57.4	49	57.4	0.040	9.8	LOS A	0.2	1.7	0.07	0.61	0.07	52.7
4	T1	All MCs	446	5.9	446	5.9	0.238	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach			496	11.0	496	11.0	0.238	1.0	LOS A	0.2	1.7	0.01	0.06	0.01	91.6
North: New England Hwy N															
5	T1	All MCs	429	11.5	429	11.5	0.237	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
6	R2	All MCs	14	15.4	14	15.4	0.014	10.4	LOS A	0.1	0.4	0.49	0.65	0.49	61.5
Approach			443	11.6	443	11.6	0.237	0.3	NA	0.1	0.4	0.02	0.02	0.02	98.0
West: Thomas Mitchell Dr															
1	L2	All MCs	12	9.1	12	9.1	0.007	8.6	LOS A	0.0	0.0	0.00	0.60	0.00	61.9
2	R2	All MCs	180	0.6	180	0.6	0.241	13.2	LOS A	1.0	7.0	0.56	0.95	0.56	63.4
Approach			192	1.1	192	1.1	0.241	13.0	LOS A	1.0	7.0	0.53	0.93	0.53	63.3
All Vehicles			1131	9.6	1131	9.6	0.241	2.8	NA	1.0	7.0	0.10	0.19	0.10	87.2

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Appendix C

Developments in the Region

C.1 Maxwell Underground Mine

Development Consent for the Maxwell Underground Mine (SSD 9526), at the site of the former Drayton Mine, was granted by the NSW Independent Planning Commission in December 2020 and three modifications were subsequently approved in November 2021 (Modification 1 – Mine Entry Area Modification), October 2022 (Modification 2 – Mining Optimisation Modification), and September 2025 (Modification 3 – Joint Tailings and Reject Management). The Maxwell Underground Mine is approved to extract up to 8 Mtpa of ROM coal until 30 June 2047. Vehicular access for the Maxwell Underground Mine is via an access road to and from Thomas Mitchell Drive, approximately 1.1 km west of New England Highway.

The construction phase of the Maxwell Underground Mine commenced in May 2022, and the transport of product coal by rail commenced in June 2023. TTPP (2019) assessed the road traffic generation of the Maxwell Underground Mine during its operational phase with the peak operational workforce (Project Year 6, nominally 2026) and its longer-term operational stage (Project Year 13, nominally 2033). The approved modifications would not alter the vehicular traffic characteristics of the Maxwell Underground Mine from those anticipated during the initial project assessment.

For the purpose of this study, it has been assumed that the traffic forecast to be generated during the short-term peak operational stage of the Maxwell Underground Mine (Project Year 6, now indicatively 2028) may coincide with the Modification assessment years 2026 and 2032. As the traffic generation of the Maxwell Underground Mine is forecast to peak in Project Year 6 (indicatively 2028), this is considered to be a conservatively high estimate for both 2026 and 2032 conditions.

Applying the same travel characteristics as assumed in TTPP (2019), the traffic generated by the Maxwell Underground Mine during the peak hours for Mount Pleasant Operation traffic during 2026 and 2032 has been estimated as presented in Table C 1.

Table C 1: Maxwell Underground Mine Traffic Generation in 2026 and 2032

Time of Day	Inbound Vehicles to Maxwell Project		Outbound Vehicles from Maxwell Project		Total Vehicles		
	Light	Heavy	Light	Heavy	Light	Heavy	Total
6:00 am to 7:00 am (vehicles per hour)	92	4	6	2	98	6	104
6:00 pm to 7:00 pm (vehicles per hour)	4	0	4	0	8	0	8
Daily Total (vehicles per day)	207	40	207	40	414	80	494

C.2 Mangoola Coal

Mangoola Coal is an open cut coal mine located approximately 20 km west of Muswellbrook and 10 km north of Denman. It is owned by Mangoola Coal Operations Pty Limited (a subsidiary of Glencore plc). The Mangoola Coal Continued Operations Project (MCCOP) was approved in 2021, and permits development of a new open cut pit to continue to extract approximately 13.5 Mtpa of ROM coal, extension of the life of the mine to 31 December 2030, construction of a haul road overpass over Wybong Road and Big Flat Creek, and realignment of a section of Wybong Post Office Road (Umwelt, 2019).

Short-term impacts of MCCOP construction activity occurred between 2021 and 2023. The operation of the MCCOP anticipates no change to the hours of operation, the number of operational employees or the coal transport methods at Mangoola Coal following completion of the construction activity. The operation of the MCCOP would therefore not impact the ongoing traffic conditions on the wider road network in the region compared with Mangoola Coal operations, beyond the localised impact of the realignment of Wybong Post Office Road (GHD, 2019).

The traffic generated by Mangoola Coal captured in the traffic surveys is therefore expected to continue at the same level until 31 December 2030, and so is not expected to result in any changes to traffic conditions during the Modification assessment year of 2026 compared with the surveyed conditions.

During the 2032 Modification assessment year, it is anticipated that mining operations at Mangoola Mine would have ceased, with rehabilitation activities occurring which would generate less traffic than the mining activities captured in the 2020 traffic surveys. For the purpose of this assessment, no reduction in traffic generated by Mangoola Coal has been applied for the 2032 assessment scenario.

C.3 Bengalla Mine

The Bengalla Mine is an open cut coal mine located immediately to the south of the Mount Pleasant Operation, and 4 km west of Muswellbrook. Development Consent SSD-5170 (as modified) permits open cut coal mining operations and associated activities to 2039, with open cut mining at a rate of up to 15 Mtpa ROM coal. Bengalla Mining Company commenced operating under Development Consent SSD-5170 from 1 October 2015 (Bengalla Mining Company, 2019). Modifications 1 to 5 and 7 to Development Consent SSD-5170 have been approved, which do not impact the traffic generation potential of the operational mine.

A scoping letter has been submitted with respect to a proposed modification (Modification 6) to SSD-5170. Modification 6 proposes installation of two water pipelines from the MSC waste water treatment plant to Bengalla Mine, within an easement adjacent to Bengalla Road and Denman Road. Bengalla Mining Company (2024a) indicates that there is the potential for traffic impacts during construction activities associated with the installation of the pipelines within the road corridor. Should the modification be approved, a Traffic Management Plan (TMP) would be prepared to describe how the construction activities would effectively ensure the safety of road workers and users as well as minimising potential impacts or delays to road users is addressed. The scoping report does not quantify potential traffic impacts of Modification 6.

A scoping letter has been submitted with respect to a proposed modification (Modification 8) to SSD-5170. Modification 8 proposes adjustments to the approved realignment of Bengalla Road; changes to the conceptual final landform; changes to the layout of infrastructure to authorise a ROM pad extension and associated water management infrastructure; and installation of gas drainage wells and methane flaring infrastructure. Bengalla Mining Company (2024b) indicates that should Modification 8 be approved, the operation of the road network would be maintained for public and emergency vehicles during construction of the Bengalla Road realignment. The proposed design would be developed to comply with the relevant road safety design guidelines, and a TMP would be prepared in consultation with MSC and TfNSW. The scoping report does not quantify potential traffic impacts of Modification 8.

No information is available regarding the timing of submission of the Modification Reports for Modifications 6 and 8 to SSD-5170, they do not meet the definition of a "relevant future project" in DPIE (2022), and have not been considered further in this assessment.

Nevertheless, it is expected that changes to traffic generated by Bengalla Mine would occur from those captured during the traffic surveys. Hansen Bailey (2013) anticipated that the Bengalla Continuation Project would employ up to 900 FTE personnel at peak production, plus up to 315 additional contractors during the construction period between Year 1 and Year 4 of the project. The indicative coal production schedule anticipated that coal production would reach its maximum in Year 4, and continue at that level throughout the life of the mine.

At the time of the traffic surveys, Bengalla Mine employed approximately 800 employees and contractors (Bengalla Mining Company, 2020a), with production of 12.5 million tonnes (Mt) of ROM coal during 2019 and 11.96 Mt of ROM coal during 2020 (Bengalla Mining Company, 2020b). Activity at the time of the traffic surveys was therefore below the approved peak production of 15 Mtpa of ROM coal and expected peak workforce of 900 people. On this basis, up to 100 additional people can be expected to work at Bengalla Mine at any time throughout the remainder of the life of the mine above those working at the time of the traffic surveys.

Based on the shift assumptions and travel characteristics presented by DC Engineering (2013), the potential additional workforce of 100 people and the increase in production to 15 Mtpa would generate the additional vehicle trips presented in Table C 2.

The travel characteristics presented by DC Engineering (2013) assumed that all inbound and outbound workforce travel would occur between 6:00 am and 7:00 am, and between 4:00 pm and 5:00 pm, noting the evening peak does not align with the peak hour for traffic generated by the Mount Pleasant Operation. The DC Engineering assessment effectively assumes that shift changes take place at 6:30 am and 4:30 pm, with workers arriving in the 30 minutes prior to their shift start time, and departing in the 30 minutes after the end of their shift time. The DC Engineering report notes that the afternoon peak may be more spread out due to greater variability in end-of work times.

For the purpose of this assessment, it has therefore been assumed that during the Mount Pleasant Operation's evening peak hour (6:00 pm to 7:00 pm), the additional traffic that may potentially be generated by the Bengalla Mine would include 10% of the outbound traffic forecast for the 4:00 pm to 5:00 pm peak adopted by DC Engineering (2013). This reflects the possible spread of traffic during the afternoon as noted by DC Engineering.

Table C 2: Bengalla Mine Additional[A] Trip Generation in 2026 and 2032

Time of Day	Inbound Vehicles to Bengalla Mine		Outbound Vehicles from Bengalla Mine		Total Vehicles		
	Light	Heavy	Light	Heavy	Light	Heavy	Total
6:00 am to 7:00 am (vehicles per hour)	35	1	15	1	50	2	52
6:00 pm to 7:00 pm (vehicles per hour)	0	0	3	0	3	0	3
Daily Total (vehicles per day)	50	8	50	8	100	16	116

[A] *Potential additional traffic above 2020 levels, until 2039.*

C.4 Dartbrook Mine

The Dartbrook Mine is an underground coal mine located immediately north of the Mount Pleasant Operation, which was placed in care and maintenance in 2007. Approval to extend the life of the Dartbrook Mine for an additional five years to 5 December 2027 was granted on 11 March 2022, and mining operations at Dartbrook Mine were recommenced in 2024. Dartbrook Mine operates under Development Consent DA 231-07-2000, which permits extraction and processing of up to 6 Mtpa of ROM coal. Dartbrook Mine went into external administration and receivership in July 2025, and operations were wound down, however it continues to operate while its financial viability is assessed.

Modification 8 to DA 231-07-2000 to extend the period of mining operations by six years until 5 December 2033 is currently under assessment. Other than the duration of mining operations, all other aspects of mining operations would remain consistent with those approved under DA 231-07-2000.

As approved, Dartbrook Mine operations may coincide with the Modification construction activity in 2026, and should Modification 8 be approved, Dartbrook Mine operations may coincide with the Modification operational activity in 2032.

During care and maintenance, Dartbrook Mine employed 11 FTE personnel, and recommencement of mining operations was anticipated to employ an additional 26 FTE construction workers during the short-term construction phase and 99 FTE operational workers until cessation of mining operations (Hansen Bailey, 2018). The workforce would primarily access the site via New England Highway and the Dartbrook Western Access Road (Stair Street). As of October 2025, Dartbrook Mine will be placed into care and maintenance in November 2025.

Considering the residential distribution of the mining workforce in the region, and the likely use of the Dartbrook Western Access Road, traffic generated by the Dartbrook Mine is expected to have little overlap with traffic generated by the Mount Pleasant Operation on the roads in proximity to the Mount Pleasant Operation. Overlap may be expected on New England Highway north of Stair Street (employees travelling to and from Scone and Aberdeen) and on New England Highway south of Thomas Mitchell Drive (employees travelling to and from Singleton). Dartbrook Mine employees living in the west may use Wybong Road and Kayuga Road via Kayuga to access Dartbrook Mine, however this would represent only a small proportion of employees, and the impacts on the road conditions are not expected to be significant.

Considering the uncertainties regarding future operation of Dartbrook Mine, and the minor nature of its potential intersection with Modification traffic should it continue operating as approved and/or with Modification 8, for the purpose of this assessment, the potential traffic generation of the Dartbrook Mine should it be operating in 2026 and/or 2032 has not been considered further.

C.5 Mt Arthur Coal Mine

The Mt Arthur Coal Mine is located approximately 5 km south-west of Muswellbrook, and has its principal vehicular access via two accesses on Thomas Mitchell Drive (MAC Main Access and MAC Bayswater Access), and one on Edderton Road (MAC Stage 2 Access). It is owned by Hunter Valley Energy Coal Pty Ltd (HVEC), a wholly owned subsidiary of BHP.

Mt Arthur Coal Mine operates under Project Approval 09_0062. Following HVEC's decision to cease mining at Mt Arthur Coal Mine in 2030 as part of a plan to provide a pathway to closure of the operation, Modification 2 to Project Approval 09_0062 was approved in April 2025. Modification 2 permits continuation of open cut mining operations to 30 June 2030 at a maximum rate of 25 Mtpa of ROM coal, with continued employment of up to 2,200 FTE employees. Employment over the extended life of the Mine would vary over time, with the peak of 2,200 FTE personnel in 2024, reducing to 2,064 FTE personnel in 2026 and 980 FTE personnel in 2030 (TTPP, 2023).

At the end of June 2019 and June 2020, Mt Arthur Coal Mine employed 1,985 and 2,147 people respectively on a FTE basis (BHP, 2019 and 2020). Over the period from 1 July 2019 to 30 June 2020, approximately 21.3 Mt of ROM coal was produced at the Mt Arthur Coal Mine (BHP, 2020). At the time of the traffic surveys in February 2020, it is therefore expected that the workforce at Mt Arthur Coal Mine was in the order of 2,100 people, and ROM coal production was 21.3 Mtpa.

TTPP (2023) assessed the trip generation of the Mt Arthur Coal Mine on the basis of surveys conducted in June 2021, at which time the workforce at Mt Arthur Coal Mine was approximately 2,200 FTE personnel and its production rate was approximately 21 Mtpa. The future changes to traffic that would be generated by Mt Arthur Coal Mine with Modification 2 were forecast, robustly assuming that the peak workforce of 2,200 FTE personnel may remain present until 2030, rather than reducing to 980 FTE personnel as anticipated. This resulted in the light vehicle trip generation until 2030 being forecast to remain unchanged from that surveyed during June 2021.

Modification 2 was forecast to result in an increase in heavy vehicle trips generated by Mt Arthur Coal Mine compared with the heavy vehicle trips surveyed during June 2021, due to the proposed increase in the ROM coal extraction and processing rate from 21 Mtpa in June 2021 to 25 Mtpa until mid-2030.

Table C 3 presents the forecast incremental increase (above 2021 conditions) in traffic generated by Mt Arthur Coal Mine as approved with Modification 2. It is noted that the peak hours for trips generated by Mt Arthur Coal Mine do not align exactly with those of the Mount Pleasant Operation.

Table C 3: Mt Arthur Coal Mine Modification 2 Average Weekday Traffic Increase 2021 to 2030

	Light Vehicles	Rigid Heavy Vehicles	Articulated Heavy Vehicles	Total Vehicles
AM Peak Hour 5:30 am to 6:30 am (vehicles per hour)				
MAC Main Access	0	14	2	16
MAC Bayswater Access	0	4	1	5
MAC Stage 2 Access	0	1	0	1
Total	0	19	3	22
PM Peak Hour 5:30 pm to 6:30 pm (vehicles per hour)				
MAC Main Access	0	13	2	15
MAC Bayswater Access	0	4	0	4
MAC Stage 2 Access	0	1	0	1
Total	0	18	2	20
Daily Total (vehicles per day)				
MAC Main Access	0	76	10	86
MAC Bayswater Access	0	22	5	27
MAC Stage 2 Access	0	9	5	14
Total	0	107	20	127

Source: Table 4.2, TTPP (2023).

The processing rate of 21.3 Mtpa at the time of the traffic surveys in February 2020 is consistent with the processing rate of approximately 21 Mtpa during the June 2021 surveys. Therefore, the incremental increase in heavy vehicle traffic presented in Table C 3 would be consistent with the incremental increase expected from the February 2020 surveyed conditions through to mid-2030.

At the time of the traffic surveys at Mount Pleasant Operation, the workforce at Mt Arthur Coal Mine of approximately 2,100 personnel was broadly consistent with the 2,064 FTE personnel expected in 2026 with the approved Modification 2. It follows that the traffic generated by Mt Arthur Coal Mine's workforce as captured in the 2020 traffic surveys would remain unchanged in 2026. The forecast "no change" in light vehicle trips generation presented in Table C 3 has therefore been applied to this assessment for 2026 conditions.

The forecast additional trips (Table C 3) would be generated by Mt Arthur Coal Mine in 2026. This will result in a higher trip generation than assumed under previous planning prior to the Modification 2 application, which assumed that the workforce at Mt Arthur Coal Mine would decrease to approximately 1,500 FTE workers in 2026, as suggested by TfNSW in its consideration of the Maxwell Underground Mine.

For the purpose of this assessment, It has also been assumed that the additional Mt Arthur Coal Mine's peak hourly traffic generation generated by the approved Modification 2 (Table C 3) would coincide with those of the Mount Pleasant Operation, noting that the peak hours associated with Mt Arthur Coal Mine's activities occur between 5:30 am and 6:30 am, and between 5:30 pm and 6:30 pm.

After 2030, mining activity at Mt Arthur Coal Mine would cease, and its operational traffic would be removed from the road network. Some traffic would be expected to continue to be generated as a result of decommissioning and rehabilitation activity. At the time of the traffic surveys at Mount Pleasant Operation in 2020, the workforce at Mt Arthur Coal Mine of approximately 2,100 personnel was approximately 95% of the workforce of approximately 2,200 FTE personnel when surveys were conducted of the trips generated by Mt Arthur Coal Mine in June 2021 (TTPP, 2023). It is therefore assumed that the light vehicle trip generation of Mt Arthur Coal Mine captured by the traffic surveys in 2020 was approximately 95% of that captured by the June 2021 surveys. As the processing rate of Mt Arthur Coal was very similar during the traffic surveys in both 2020 and 2021, it is assumed that the heavy vehicle trips generation captured during the 2021 surveys is reasonably consistent with that which was occurring during the 2020 surveys. It is assumed that rehabilitation activity at Mt Arthur Coal Mine in 2032 may generate in the order of 10% of the operational traffic captured during the 2020 traffic surveys.

On the basis of the assumptions above, the estimated change in Mt Arthur Coal Mine traffic generation from that captured during the 2020 surveys to that forecast to occur in 2032 with the approved Modification 2 is summarised in Table C4.

Table C 4: Forecast Estimated Change in Mt Arthur Coal Mine Traffic Generation

	Surveyed 2021			Estimated Change from 2020 to 2032		
	Light Vehicles	Heavy Vehicles	Total Vehicles	Light Vehicles	Heavy Vehicles	Total Vehicles
6:00 am to 7:00 am (vehicles per hour)						
MAC Main Access	252	56	308	-216	-50	-266
MAC Bayswater Access	143	6	149	-123	-5	-128
MAC Stage 2 Access	9	4	13	-8	-4	-12
Total	404	66	470	-347	-59	-406
6:00 pm to 7:00 pm (vehicles per hour)						
MAC Main Access	222	44	266	-191	-40	-231
MAC Bayswater Access	149	10	159	-128	-9	-137
MAC Stage 2 Access	2	1	3	-2	-1	-3
Total	373	55	428	-321	-50	-371
Daily Total (vehicles per day)						
MAC Main Access	1,641	428	2,069	-1,410	-385	-1,795
MAC Bayswater Access	936	124	1,060	-804	-112	-916
MAC Stage 2 Access	95	59	154	-82	-53	-135
Total	2,672	611	3,283	-2,296	-550	-2,846

C.6 Former Drayton Mine

The Maxwell Underground Mine is located on the site of the former Drayton Mine. Mining activity at Drayton Mine ceased in October 2016, and care and maintenance and rehabilitation activities occurred at the site since then, until commencement of the construction activity for the Maxwell Underground Mine in May 2022. Vehicular access for the former Drayton Mine was via Thomas Mitchell Drive and the site access road now used to access the Maxwell Underground Mine.

At the time of the traffic surveys in 2020, it is therefore expected that care and maintenance activity relating to the former Drayton Mine would have been ongoing, contributing to traffic demands on the road network. TTPP (2019) conducted a survey of traffic generated by care and maintenance activity during June 2018, which recorded the following trip generation during Mount Pleasant Operation peak hours (Table C 5).

Table C 5: Former Drayton Mine Care and Maintenance Traffic Generation in 2018

Time of Day	Inbound Vehicles to Maxwell Project		Outbound Vehicles from Maxwell Project		Total Vehicles		
	Light	Heavy	Light	Heavy	Light	Heavy	Total
6:00 am to 7:00 am (vehicles per hour)	6	1	1	0	7	1	8
6:00 pm to 7:00 pm (vehicles per hour)	0	0	1	0	1	0	1
Daily Total (vehicles per day)	40	9	42	7	82	16	98

Source: TTPP (2019).

For the purpose of this assessment, it is assumed that a similar level of traffic was generated during the traffic surveys in 2020, and ceased at commencement of construction activity for the Maxwell Underground Mine in 2022. The traffic captured by the traffic surveys would therefore no longer be travelling on the road network in 2026 or 2032.

C.7 Liddell and Bayswater Power Stations and Future Land Use

The Liddell and Bayswater power stations are located on the western side and south-west of Lake Liddell approximately 15 km south-east of Muswellbrook. Closure works for Liddell commenced in April 2022 with closure occurring in April 2023. In its assessment of the implications of the Liddell Battery and Bayswater Ancillary Works, Jacobs (2021) indicates that the closure activities at the Liddell power station would occur over approximately two years, with rehabilitation activities possible for a further two years. Heavy vehicles associated with the Liddell closure and rehabilitation works are expected to be to and from Ravensworth, south of the site. It is therefore unlikely that traffic associated with Liddell closure and rehabilitation activities would be generated during the assessment years 2026 or 2032.

Closure of Bayswater is planned for between 2030 and 2033. It is reasonable to assume that, similar to the Liddell closure activities, the majority of traffic generated by closure activities at Bayswater would be to and from the south, and so would not contribute to traffic demands in proximity to the Mount Pleasant Operation. Given the uncertainty of the timing of the Bayswater closure and its distance from the Mount Pleasant Operation, no allowance has been made for traffic generated during its closure or rehabilitation activities should they occur during 2032.

C.8 Maxwell Solar Project

The Maxwell Solar Project (SSD 9820) was approved by the Minister for Planning and Public Spaces on 19 August 2020. The Maxwell Solar Project will comprise the installation of a solar plant with a capacity of 25 megawatts (MW) at the Maxwell Infrastructure, which will supply electricity to the Maxwell Underground Mine and/or the National Energy Market.

Construction of the Maxwell Solar Project is expected to take 18 months if constructed in one stage, although construction may be staged and therefore take longer than 18 months. The Maxwell Solar Project is expected to operate for more than 25 years.

TTPP (2019) and Amber Organisation (2019) assessed the traffic impacts of the Maxwell Solar Project, which found that during peak construction periods, the Maxwell Solar Project will generate 100 to 110 light vehicle trips per day, and 20 heavy vehicle trips per day. Amber (2019) indicates that on average, approximately two trucks would access the site per day during the construction stage, and that construction activity would generate approximately 12 vehicle movements during the peak hours.

The heavy vehicles are expected to access the site from Newcastle, and so would travel via New England Highway and Thomas Mitchell Drive. Light vehicle would access the site from the Muswellbrook LGA (30 %), the Singleton LGA (30 %), the Upper Hunter LGA (30 %) and Newcastle (10 %). The majority of light vehicles would therefore be expected to travel via New England Highway (north or south) and Thomas Mitchell Drive. A proportion of workers travelling to/from the Upper Hunter LGA may travel via Merriwa Road, Denman Road and Thomas Mitchell Drive.

TTPP (2019) indicates that construction is expected to take 18 months if the Maxwell Solar Farm is constructed in one stage, although notes that construction may be staged and therefore take longer than 18 months. Malabar Resources Limited recently advised DPHI that Stage 1 works associated with Maxwell Solar Farm would commence on or after 1 August 2025 (letter dated 29 July 2025). There is potential for the Maxwell Solar Project construction activity to coincide with the Modification construction or long-term operational stages, however as staging of the Maxwell Solar Farm construction is unknown, and its potential traffic generation on Modification access roads would be low, it has not been considered further in this assessment.

Once operational, the Maxwell Solar Project would operate with a very small workforce of three operational staff attending the Maxwell Solar Project each day, and delivery and visitor trips would be negligible. Considering the traffic generated by the operational stage of the Maxwell Solar Project would be fewer than 10 vehicle trips per day, it has not been considered further in this assessment.

C.9 Mount Pleasant Optimisation Project

The Mount Pleasant Optimisation Project (SSD-10418) was approved with conditions by the Independent Planning Commission on 6 September 2022, and under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 24 September 2024 (EPBC 202/8735). It allows for a staged increase in the extraction, handling and processing of ROM coal up to 21 Mtpa, and extension on the life of mining operations at the Mount Pleasant Operation to 22 December 2048.

It is MACH's preference to proceed with the development of the Mount Pleasant Optimisation Project as approved (i.e. production up to 21 Mtpa ROM coal and approved operations until 2048) rather than the Modification. However, if MACH is unable to rely on the existing Mount Pleasant Optimisation Project Development Consent SSD 10418 for any reason, the Modification would provide MACH with the alternative option of carrying out mining operations until the end of 2032 pursuant to Development Consent DA 92/97.

For the purposes of cumulative impact assessment, in the absence of the Modification, the base-case assumption is that Mount Pleasant Operation mining operations will cease in 2026, consistent with the current Condition 5, Schedule 2 of Development Consent DA 92/97 (which currently permits mining operations until 22 December 2026).

Therefore, this assessment does not consider cumulative impacts as if both developments would be concurrently carried out until the end of 2032.

C.10 Liddell Battery and Bayswater Ancillary Works

The Liddell Battery and Bayswater Ancillary Works project (SSD 8889679) was approved on 8 March 2022, and will consist of a grid-connected BESS with capacity of up to 500 megawatt and 2 gigawatt hours, decoupling works required for alternative connection arrangements for the Liddell switching station, and upgrades to ancillary infrastructure at Bayswater.

Jacobs (2021) assessed the traffic and transport implications of the Liddell Battery and Bayswater Ancillary Works project. That assessment indicates that the development of the battery may be staged to respond to market demands, with an indicative construction schedule suggesting three stages starting in 2021, 2023 and 2025, with each stage taking approximately 12 months. The third stage may be further divided into smaller stages and be delivered on a progressive basis. The decoupling works were anticipated to take up to 12 months and be undertaken prior to 2024, while the Bayswater ancillary works would be undertaken at any time up to the retirement of Bayswater, planned for 2030 to 3033.

AGL (2024) indicates that construction work for the battery is now planned to begin in early 2024, with the commencement of operations expected in mid-2026, thus there is potential for the later construction activities to coincide with the Mount Pleasant Operation construction activities in 2026. Jacobs (2021) indicates that Stage 3 of the construction of the Liddell Battery is expected to generate 200 light vehicle and 40 heavy vehicle trips per day. The additional traffic is estimated to be distributed with approximately 60% of the workforce travelling to and from the south and 40% travelling to and from the north, with all traffic travelling via New England Highway and the Bayswater interchange.

Assuming all traffic north of the site travels as far as Muswellbrook, the Stage 3 construction activities for the Liddell Battery may generate the following vehicle trips on New England Highway between the site and Muswellbrook:

- 80 light vehicle and 16 heavy vehicle trips per day; and
- 40 light vehicle and one heavy vehicle trips during peak hours (southbound in the morning and northbound in the evening).

Jacobs (2021) demonstrates that the highest levels of traffic generated by the Liddell Battery and Bayswater Ancillary Works project with other concurrent developments in the local area would occur during the period up to and including 2026. From 2027 to 2040, the total cumulative traffic generation would be less than that forecast during any year from 2020 to 2026. The concurrent developments considered included the construction, operation and decommissioning of the Bayswater Water and Other Associated Operational Works Project; the Bayswater Turbine Efficiency Upgrade; the Ravensworth Composting Facility; Liddell Power Station closure and rehabilitation; and Liddell minor shutdowns.

During the Modification assessment year 2032, the cumulative traffic generation of the activity associated with the Liddell Battery and Bayswater Ancillary Works project and the aforementioned other developments is therefore expected to be less than that which was occurring on the road network during the traffic surveys in 2020. In proximity to the Modification, this reduction is likely to be primarily experienced along New England Highway to and from Muswellbrook. As a robust assessment, this study has not applied any reduction to traffic on New England Highway during 2032 to reflect the cumulative impacts of the aforementioned projects.

C.11 Muswellbrook BESS

Muswellbrook BESS (SSD-29704663) is an approved Battery Energy Storage System (BESS) with a capacity of 150 MW, located at 20-24 Sandy Creek Road, which lies to the north-east of Muswellbrook. Access to the site will be via an existing access driveway located on Crown reserve, Sandy Creek Road and New England Highway. The traffic impacts of the Muswellbrook BESS were assessed by Amber Organisation (2022), which indicates that construction is expected to take approximately 12 months. A peak construction period of five months is anticipated, during which a maximum of 75 workers are anticipated to be on-site.

Amber (2022) indicates that construction of the Muswellbrook BESS is expected to generate the following vehicle trips, noting the heavy vehicle trips include shuttle buses for transport of the workforce:

- average 30 light vehicle and 26 heavy vehicle trips per day;
- average 20 light vehicle and five heavy vehicle trips during peak hours;

- peak 60 light and 66 heavy vehicle trips per day; and
- peak 40 light and 11 heavy vehicle trips during peak hours.

The construction workforce is expected to be primarily located in Muswellbrook, vehicles delivering water and materials will be sourced within the local area, and plant is expected to be delivered from Port of Newcastle. The significant majority of both light vehicles (90%) and heavy vehicles (95%) would originate from Muswellbrook, and are expected to travel to/from the Muswellbrook BESS site via New England Highway south of Sandy Creek Road. The proposed construction traffic access route from the Port of Newcastle to the site is via Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, and Sandy Creek Road.

While detailed timing of construction of the Muswellbrook BESS is not known, it is anticipated that there is potential for its construction activity to occur during 2026, and so coincide with the Modification assessment year. Based on the Amber (2022) assessment, the majority of trips generated by construction of the Muswellbrook BESS would use New England Highway between Muswellbrook and Sandy Creek Road and be dispersed throughout Muswellbrook town, with some heavy vehicles potentially using New England Highway to the south of Muswellbrook for deliveries sourced from outside the Muswellbrook area. The Muswellbrook BESS construction traffic would therefore make limited use of the key routes expected to be used by Modification-generated traffic. The volume of traffic generated by the Muswellbrook BESS construction activity on Modification routes would be very low and well within the day-to-day variations in traffic conditions. On this basis, no quantitative allowance has been made for trips generated by the Muswellbrook BESS construction activity during the 2026 assessment year.

Amber (2022) indicates that once operational, the Muswellbrook BESS would be operated by two staff, generating four light vehicle trips per day and two heavy vehicle trips per month. These trips would result in negligible change to the traffic environment. It is anticipated that the Muswellbrook BESS may be operational during the 2032 assessment year, however as it would generated negligible traffic, no quantitative allowance has been made for that traffic in this assessment.

C.12 Bowmans Creek Wind Farm Stage 1

Bowmans Creek Wind Farm (SSD-10315) located at Bowmans Creek, approximately 10 km east of Muswellbrook was approved by the NSW Independent Planning Commission (IPC) in February 2024, and under the EPBC Act in July 2024. The traffic and transport impact assessment of the Bowmans Creek Wind Farm (Cardno, 2021) assumes that the wind farm would include up to 60 wind turbine sites across the Muswellbrook, Singleton and Upper Hunter Shire LGAs, however the IPC approval limits the project to a maximum of 54 turbines.

Traffic impacts from the Bowmans Creek Wind Farm are anticipated to be primarily related to the construction phase, including oversize overmass (OSOM) vehicles, and heavy and light vehicles delivering construction materials and personnel. OSOM deliveries of turbines will originate from the Port of Newcastle, and the haulage route for OSOM vehicles is proposed via Hebden Road (south) from New England Highway at Ravensworth and Scrumlo Road. General vehicle access including heavy vehicles would be via Hebden Road (north and south) from New England Highway at Ravensworth and at Muswellbrook. A schedule of road upgrade commitments is proposed, which typically relates to addressing the requirements for OSOM vehicle access during construction of the wind farm.

While detailed timing of construction of the Bowmans Creek Wind Farm is not known, the construction activity may potentially occur during 2026, and so may coincide with the Modification assessment year. Cardno (2021) indicates that construction would occur over a period of approximately 18 months, and will generate 150 light vehicle and 132 heavy vehicle trips per day during the peak construction period (Months 7 to 8).

With the exception of OSOM vehicles, half the trips generated during the construction phase are anticipated to be to/from Singleton, and will enter and exit via Hebden Road (south), while 45% of trips will be to/from Muswellbrook, and 5% to/from Scone, all of which would enter and exit via Hebden Road (north).

Based on the Cardno (2021) assessment, during the peak construction stage, construction activity would generate the following vehicle trips on New England Highway between Hebden Road (North) and the town of Muswellbrook (i.e., past Thomas Mitchell Drive) during the morning and evening peak hours:

- 30 light vehicles and three heavy vehicles southbound to the site in the AM peak hour and northbound from the site in the PM peak hour; and
- eight light vehicles and three heavy vehicles northbound from the site in the AM peak hour and southbound to the site in the PM peak hour.

Similar volumes in the reverse directions would be generated on New England Highway south of Hebden Road (South). The potential overlap of routes used by the Bowmans Creek Wind Farm and Modification traffic would therefore be effectively limited to New England Highway between Thomas Mitchell Drive and Hebden Road (North), and New England Highway south of Hebden Road (South).

In its assessment of intersection performance, Cardno (2021) suggests that the AM peak hour would occur between 7:45 am and 8:45 am, and the PM peak hour would occur between 4:00 pm and 5:00 pm. It also indicates that the construction hours would be generally 7:00 am to 6:00 pm on weekdays, and recommends that travel be avoided between 5:00am and 6:00 am, and between 4:00 pm and 5:00 pm. The expected timing of the peak hour traffic generation is therefore unclear. As a robust assessment, TTPP has assumed that the Bowmans Creek Wind Farm construction traffic on New England Highway may coincide with the Modification peak hours during 2026.

Once operational, Cardno (2021) anticipates that the wind farm would have a negligible impact on traffic on the local road network, with up to 15 people accessing the site compound off Hebden Road generating up to 30 vehicle trips per day. It is anticipated that the wind farm may be operational by 2032. Its operational traffic generation is anticipated to be modest at 30 vehicle trips per day, with those trips primarily being on roads to the east of New England Highway, and distributed to both the north and south on New England Highway. The additional trips would be well within the day-to day variations in traffic volumes on New England Highway, and have not been considered further in this assessment.

C.13 Muswellbrook Solar Farm

Muswellbrook Solar Farm (SSD-46543209) is an approved large-scale solar photovoltaic (PV) generation facility and BESS, located on Muscle Creek Road, to the east of Muswellbrook. It was approved by the IPC in May 2025.

The traffic impact assessment (EMM Consulting, 2023) identifies that construction would occur over a 28-month period that was assumed to commence in Q3 2024, and that the project would be commissioned by Q2 2027. Construction would primarily occur during standard construction hours 7:00 am to 6:00 pm weekdays, 8:00 am to 1:00 pm Saturdays and no work on Sundays or public holidays.

Construction activity associated with the solar farm would take place over 15 months, with the peak expected to occur around Q1 2025 (based on EMM Consulting [2023] timing expectations), and generate:

- a maximum of 400 light vehicle trips per day (200 inbound and 200 outbound);
- a maximum of 180 heavy vehicle trips per day (90 inbound and 90 outbound);
- an average of 48 heavy vehicle trips per day (24 inbound and 24 outbound);
- a maximum of 167 light vehicle trips during peak hours (167 trips inbound in the morning and 167 trips outbound in the evening); and
- a maximum of 26 heavy vehicle trips during the peak hours (13 inbound and 13 outbound during both morning and evening peak hours).

Construction activity associated with the BESS would take place over 13 months, with the peak of that activity expected to occur around Q4 2026 (based on EMM Consulting [2023] timing expectations), and generate:

- a maximum of 160 light vehicle trips per day (80 inbound and 80 outbound);
- a maximum of 10 heavy vehicle trips per day (five inbound and five outbound);
- an average of four heavy vehicle trips per day (two inbound and two outbound);
- a maximum of 67 light vehicle trips during peak hours (67 trips inbound in the morning and 67 trips outbound in the evening); and
- a maximum of six heavy vehicle trips during the peak hours (three inbound and three outbound during both morning and evening peak hours).

OX2 (2025) indicates that operations are expected to begin by 2028, however it does not identify whether this refers to operation of the solar farm only, or the solar farm and BESS combined. Either way, it suggests that construction activity at the Muswellbrook Solar Farm may occur concurrently with the Modification construction activities in 2026.

EMM Consulting (2023) presents the forecast spread of construction traffic on the road network, noting that vehicles would access the Muswellbrook Solar Farm via two routes, with 80% of vehicles via Muscle Creek Road and 20% via Sandy Creek Road. That suggests that the construction traffic would be expected to use New England Highway and roads to the east of Muswellbrook, such that the potential overlap with traffic to/from Mount Pleasant Operation would be low.

While there is the possibility that construction activity associated with the Muswellbrook Solar Farm to occur during the Modification construction stage in 2026, the potential overlap with Modification traffic on the key access roads for the Mount Pleasant Operation would be low, and as such, it has not been considered further in this assessment.

C.14 Muswellbrook Pumped Hydro Energy Storage Project

A Scoping Report (Muswellbrook Pumped Hydro Pty Ltd [Muswellbrook Pumped Hydro], 2023) has been prepared for the Muswellbrook Pumped Hydro Energy Storage (PHES) Project, partially located within the Muswellbrook Coal Company Limited (MCC) mine site and Bells Mountain, approximately 4 km northeast of Muswellbrook. The PHES project would provide up to 500 megawatts (MW) of electricity-generating capacity and up to eight hours of energy storage. It would comprise a lower reservoir within an existing MCC mine void, an upper reservoir at Bells Mountain and associated electricity generation and transmission infrastructure.

Muswellbrook Pumped Hydro (2023) indicates that construction of the PHES project would employ up to 250 people and the operational facility would require up to 20 people.

Construction of the PHES project is anticipated to start in early 2026 and be completed by the end of 2029, with construction proposed to occur 24 hours per day, seven days per week.

Access to the mine site for construction would likely be off Sandy Creek Road, and a permanent access road to the upper reservoir would be designed and constructed from the power station area. Road upgrades and a new turn-off for entry onto the mine site off Sandy Creek Road would be designed in consultation with MCC and affected residents. Construction workers would arrive and leave the site in either light vehicles or dedicated small/large buses. The majority of the construction workforce could be sourced from the local Muswellbrook community and nearby LGAs, and out of area workers could be accommodated in Muswellbrook, and the nearby towns of Singleton, Denman, Aberdeen, and Scone if required.

The main electrical and mechanical plant would be transported from the Port of Newcastle via New England Highway. Routes for construction materials would be dependent on where such materials are sourced, but would be expected to use New England Highway. With respect to traffic impacts of the PHES project, Muswellbrook Pumped Hydro (2023) indicates that:

"Construction of the project will introduce additional traffic through Muswellbrook and along approximately three kilometres of Sandy Creek Road, including some oversized and over mass vehicles for delivery of PHES infrastructure and equipment. No material change would arise from operational traffic, except during periodic maintenance cycles based on final PHES design."

Based on the available information, it is anticipated that the traffic generated by the workforce during construction of the PHES project would generally be contained on Sandy Creek Road, New England Highway (both north and south of Sandy Creek Road) and Denman Road. Traffic generated by the transportation of equipment and materials would generally be contained on Sandy Creek Road and New England Highway south of Sandy Creek Road.

No information is available regarding the timing of submission of the EIS for the Muswellbrook PHES Project. As it does not meet the definition of a "relevant future project" in DPIE (2022), it has not been considered further in this assessment.

C.15 Upper Hunter BESS

The Upper Hunter BESS is a proposed BESS with a capacity of 400 MW / 800 MWh, located on Campbell Street Aberdeen, which lies to the south-east of Aberdeen within the Upper Hunter Shire LGA. The Scoping Report for the Upper Hunter BESS (Maizewood, 2023) indicates that construction is anticipated to occur over 18 to 24 months, including associated infrastructure, grid connection and commissioning. Construction activities are expected to generate up to 100 FTE jobs, with workers occupying temporary accommodation in the local area, likely to include Aberdeen, Scone, Muswellbrook, Scone, and Singleton. Once operational, the Upper Hunter BESS would require approximately five FTE staff on-site.

A new site entry point would be provided off Campbell Street to provide vehicular access to the site via New England Highway (MacQueen Street), Perth Street and Campbell Street.

Batteries would be manufactured off-site and transported by road from either Port of Newcastle or Port Botany. Access from Port of Newcastle would be via Selwyn Street, George Street, Industrial Drive, Pacific Highway (Maitland Road), New England Highway at Hexham Bridge, Perth Street at Aberdeen, Campbell Street and a new site access point. Access from Port Botany would be via Friendship Road, Denison Street and Wentworth Avenue to M1 at Eastlakes, Pacific Motorway, Hunter Expressway, New England Highway, Perth Street at Aberdeen, Campbell Street and a new site access point.

Maizewood (2022) does not provide details of the timing or travel characteristics of the proposed Upper Hunter BESS, and as it does not meet the definition of a "relevant future project" in DPIE (2022), it has not been considered further in this assessment.

C.16 Upper Hunter South Solar Farm

The Upper Hunter South Solar Farm is a proposed solar farm and BESS, located at 1711 Denman Road, Denman. Amber (2025a) prepared a traffic impact assessment for the construction, operation and decommissioning stages of the Upper Hunter South Solar Farm, which would have its vehicular access via a new connection to Denman Road. Amber (2025) indicates that construction is expected to commence in 2026 and take approximately 18 months, with the peak construction activity occurring over six months.

Transport impacts of the solar farm are expected to be primarily limited to the construction stage, with traffic expected to be generated by the movement of the workforce, deliveries of raw materials and smaller plant (medium and heavy rigid trucks), transport of quarry materials (truck and dog trailer combinations), and the transport of larger plant (19 m long articulated vehicles and 25 m long B-doubles). Non-high risk OSOM vehicle movements are also expected.

On an average day during construction, Amber (2025a) forecasts that there would be 60 light vehicle trips per day and 22 heavy vehicle trips per day, and up to 150 light vehicle trips per day and 74 heavy vehicle trips per day during the peak construction stage. The light vehicle trips would occur during morning and evening peak hours, with workers arriving prior to 7:00 am and departing after 5:00 pm, while the heavy vehicle trips would be spread throughout the day. The majority of vehicle trips are forecast to be on Denman Road north of the site access, and Amber (2025a) indicates that the intersection on Denman Road would be treated with a short channelised right-turn treatment and short auxiliary left-turn treatment. Amber (2025b) indicates that the construction of the Denman BESS (refer to Section C.17) is also anticipated to commence in 2026, noting that the two projects would both use the new connection to Denman Road.

OSOM vehicles are anticipated to be used to transport the transformer from the Port of Newcastle to the Upper Hunter South Solar Farm, with the route proposed to be via Industrial Drive, New England Highway, John Renshaw Drive, Hunter Expressway, Golden Highway and Denman Road. Some travel restrictions apply along the route, generally restricting the times during which the movement of OSOM vehicles meeting specific width or length requirements may occur.

As the Upper Hunter South Solar Farm project is currently on exhibition, and details of the timing of construction are not known, it has not been considered further in this assessment.

C.17 Denman BESS

The Denman BESS is a proposed solar farm and BESS, located at 1711 Denman Road, Denman. Amber (2025b) prepared a traffic impact assessment for the construction, operation and decommissioning stages of the Deman BESS, which would have its vehicular access via a new connection to Denman Road, and internal tracks that would also be used for the Upper Hunter South Solar Farm. Amber (2025b) indicates that construction is expected to occur in four stages, each taking approximately nine months, and notes that construction may occur all at once, with a peak construction period over approximately six to nine months. Amber (2025b) indicates that construction is anticipated to commence in 2026.

Transport impacts of the BESS are expected to be primarily limited to the construction stage, with traffic expected to be generated by the movement of the workforce in light vehicles with car-pooling, deliveries of raw materials and smaller plant (medium and heavy rigid trucks), transport of quarry materials (truck and dog trailer combinations), and the transport of larger plant (19 m long articulated vehicles and 25 m long B-doubles). Non-high risk OSOM vehicle movements are also expected.

On an average day during construction, Amber (2025b) forecasts that there would be 100 light vehicle trips per day and 60 heavy vehicle trips per day, and up to 200 light vehicle trips per day and 112 heavy vehicle trips per day during the peak construction stage. The

light vehicle trips would occur during morning and evening peak hours, with workers arriving prior to 7:00 am and departing after 5:00 pm, while the heavy vehicle trips would be spread throughout the day. The majority of vehicle trips are forecast to be on Denman Road north of the site access, and Amber (2025a) indicates that the intersection on Denman Road would be treated with a short channelised right-turn treatment and short auxiliary left-turn treatment. Amber (2025a) indicates that the construction of the Upper Hunter South Solar Farm (refer to Section C.16) is also anticipated to commence in 2026, noting that the two projects would both use the new connection to Denman Road.

OSOM vehicles are anticipated to be used to transport the transformer from the Port of Newcastle to the Upper Hunter South Solar Farm, with the route proposed to be via Industrial Drive, New England Highway, John Renshaw Drive, Hunter Expressway, Golden Highway and Denman Road. Some travel restrictions apply along the route, generally restricting the times during which the movement of OSOM vehicles meeting specific width or length requirements may occur.

As the Upper Hunter South Solar Farm project is currently on exhibition, and details of the timing of construction are not known, it has not been considered further in this assessment.

C.18 Kayuga Solar Farm

Kayuga Solar Farm is a proposed 80 to 100 MW solar farm to be located on Dorset Road within the Muswellbrook LGA. Dawn Renewables (2024) anticipates the Kayuga Solar Farm would be constructed during 2025 and operational in 2027, thus its construction activity could be anticipated to coincide with the 2026 assessment year for the Modification. SEARs were issued May 2024, however, no information is yet available to consider the potential for activities associated with development of the Kayuga Solar Farm to coincide with those of the Modification. As it does not meet the definition of a "relevant future project" in DPIE (2022), it has not been considered further in this assessment.

C.19 Bowmans Creek Wind Farm Stage 2

A scoping report (Umwelt, 2024) has been submitted with respect to the construction and operation of Bowmans Creek Wind Farm Stage 2 (SSD-73123714), a 120 MW wind farm with 21 wind turbines and associated infrastructure, to increase capacity of the Bowmans Creek Wind Farm described in Section C.12.

Umwelt (2024) indicates that access to the Bowmans Creek Wind Farm Stage 2 would follow the preferred route identified for the Stage 1 project (SSD-10315), with primary access likely to be through the Stage 1 Project Area via Scrumlo Road, Hebden Road (south), New England Highway, and Hunter Expressway, which provides connection to the Port of Newcastle.

The construction phase of Bowmans Creek Wind Farm Stage 2 Project would result in increased traffic resulting from the movement of construction personnel and transport of construction material, as well as heavy vehicle movements (including OSOM vehicles) transporting the wind turbine generators, blades and other materials. Traffic increases associated with the operational phase of the Project are expected to be minimal, generated by the intermittent movement of light vehicles transporting operational staff to and around the site.

No information is available regarding the timing of submission of the EIS for the Bowmans Creek Wind Farm Stage 2. As it does not meet the definition of a "relevant future project" in DPIE (2022), it has not been considered further in this assessment.

C.20 Edderton Solar Project

Edderton Solar Project is a proposed solar farm and BESS, comprising three "power islands" (areas of PV solar panels), known as Mayfield, Bowfield and Plashett. The power islands would be located principally within the Muswellbrook LGA, with a small portion within the Singleton LGA. Vehicular access is expected to be via new accesses on Denman Road (for Mayfield) and Edderton Road (for Bowfield and Plashett). EDF Renewables (2024) anticipates that the Edderton Solar Project would require approximately 400 to 450 FTE construction workers over a period of 20 months, and approximately 10 to 15 FTE workers during the 35-year operational life.

SEARs were issued May 2024, however, no information is yet available to consider the potential for activities associated with construction or operation of the Edderton Solar Project to coincide with those of the Modification. As it does not meet the definition of a "relevant future project" in DPIE (2022), it has not been considered further in this assessment.

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