

MOOLARBEN COAL COMPLEX OC3 EXTENSION PROJECT

ENVIRONMENTAL IMPACT STATEMENT

APPENDIX O

ROAD TRANSPORT ASSESSMENT





Moolarben Stage 3 Road Transport Assessment (Final Oct 2022) Road Transport Assessment

Prepared for:
Moolarben Coal Operations Pty Ltd

2 November 2022

The Transport Planning Partnership

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Client: Moolarben Coal Operations Pty Ltd

Version: Final

Date: 2 November 2022

TPPP Reference: 21195

Quality Record

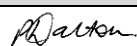
Version	Date	Prepared by	Reviewed by	Signature
Final	02/11/22	PJD	PJD	

Table of Contents

1	Introduction	1
2	Moolarben Coal Complex	5
2.1	Approved Operations.....	5
2.2	Project Description	6
2.3	Assessment Scenarios.....	7
3	Existing Road Environment.....	9
3.1	Road Network	9
3.2	Historic Traffic Volumes	14
3.3	Existing Traffic Volumes	15
3.3.1	Traffic Survey Program.....	15
3.3.2	Daily Traffic Volumes	16
3.3.3	Traffic Composition.....	18
3.3.4	Peak Hourly Traffic Volumes	19
3.3.5	Intersection Turning Movements	20
3.4	Railway Level Crossings	21
3.5	Hunter Valley Corridor Capacity Strategy.....	23
3.6	Ulan Road Strategy	24
3.7	Road Safety History	25
4	Baseline Future Conditions.....	30
4.1	Major Developments.....	30
4.1.1	Wilpinjong Coal Mine	30
4.1.2	Ulan Mine Complex.....	31
4.1.3	Bowdens Silver Project.....	32
4.1.4	Ulan Solar Farm	33
4.2	Background Traffic Growth	33
4.3	Moolarben Coal Complex Traffic.....	34
4.3.1	Existing Operations.....	34
4.3.2	Moolarben UG4 Ancillary Works	37
5	Project Traffic Impacts.....	39
5.1	Project Traffic Generation	39
5.1.1	Traffic Generation in 2025.....	39
5.1.2	Traffic Generation in 2034.....	42
5.2	Future Traffic Volumes	45
5.3	Midblock Level of Service on the Road Network	48

5.4	Intersection Performance	52
5.5	Intersection Treatments.....	55
5.6	Railway Level Crossings	58
6	Conclusions.....	60

Tables

Table 2.1: Moolarben Coal Complex Employment Profile with Project	8
Table 3.1: Historic Average Weekday Traffic	15
Table 3.2: Surveyed Daily Traffic Volumes (vehicles per day)	18
Table 3.3: Surveyed Average Weekday Traffic Classification (vehicles per day).....	18
Table 3.4: Surveyed Average Weekday Peak Hourly Traffic Volumes 2022 (vehicles per hour)	20
Table 3.5: Railway Level Crossings – Ulan to Bylong	23
Table 3.6: General Crash Types on Access Routes (1 October 2016 to 30 September 2021) ...	26
Table 3.7: Ulan Road Crash Summary (1 October 2016 to 30 September 2021)	27
Table 3.8: Cope Road Crash Summary (1 October 2016 to 30 September 2021)	28
Table 4.1: Bowdens Silver Project Daily and Peak Hourly Traffic on Ulan Road north of Lue Road	32
Table 4.2: Moolarben Coal Complex Traffic Generation in 2022.....	35
Table 4.3: Estimated Moolarben Coal Complex Traffic on Public Roads in 2022	36
Table 4.4: UG4 Ancillary Works Operational Traffic (vehicles per hour)	38
Table 5.1: Moolarben Coal Complex (Including the Project) Traffic Generation in 2025.....	40
Table 5.2: Moolarben Coal Complex (Including the Project) Traffic on Public Roads in 2025..	41
Table 5.3: Moolarben Coal Complex (Including the Project) Traffic Generation in 2034.....	43
Table 5.4: Moolarben Coal Complex (Including the Project) Traffic on Public Roads in 2034..	44
Table 5.5: Future Average Weekday Traffic in 2025.....	45
Table 5.6: Future Average Weekday Traffic in 2034.....	46
Table 5.7: Average Weekday Daily Traffic Including the Project (vehicles per day)	47
Table 5.8: Average Weekday Peak Hour Traffic Including the Project (vehicles per hour)	48
Table 5.9: LOS Criteria for Class II Two-Lane Two-Way Roads.....	49
Table 5.10: Midblock Levels of Service in 2022	50
Table 5.11: Midblock Levels of Service in 2025	50
Table 5.12: Midblock Levels of Service in 2034	51
Table 5.13: Summary of Project Impacts on Midblock Levels of Service	52
Table 5.14: Intersection Level of Service Criteria	53

Table 5.15: Intersection Operating Conditions	54
Table 5.16: Sensitivity Analysis of Ulan Road and Ulan-Wollar Road Intersection Operation 2025	55
Table 5.17: Intersection Major Road Treatments in 2025	58

Figures

Figure 1.1 Project Location	2
Figure 1.2 Approved Moolarben Coal Complex and Proposed Open Cut Extension	3
Figure 3.1: Ulan Road and CHPP Access Road Intersection	10
Figure 3.2: Ulan-Wollar Road at Ulan Road and Open Cut Access Road Intersections	11
Figure 3.3: Open Cut and Underground Access Roads	12
Figure 3.4: Eastbound Ulan-Wollar Road at ROM Coal Facility and RSIA Access Roads	13
Figure 3.5: Westbound Ulan-Wollar Road at ROM Coal Facility and RSIA Access Roads	13
Figure 3.6 Local Road Network and Traffic Survey Locations	17
Figure 3.7: Surveyed Average Weekday Traffic by Time of Day (vehicles per hour)	19
Figure 3.8: 2022 Total Intersection Turning Movements 5:00 am to 7:00 pm	21
Figure 3.9: Locations of Public Railway Level Crossings	22
Figure 5.1: Warrants for Turn Treatments on Major Roads at Unsignalised Intersections	57

Appendices

- A. TRAFFIC SURVEY RESULTS
- B. RAILWAY LEVEL CROSSINGS
- C. SIDRA OUTPUTS

References

ARRB (2011), *Ulan Road Strategy*.

ARTC (2021), *2021 Hunter Valley Corridor Capacity Strategy*.

Austrroads (2021), *Guide to Road Design Part 4A: Unsignalised and Signalised Intersections*.

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

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

Austrroads (2020c), *Guide to Traffic Management Part 12: Integrated Transport Assessments for Developments*.

Edify Energy Pty Ltd (2022), *Ulan Solar Farm Scoping Report*.

Glencore (2021), <https://www.glencore.com.au/operations-and-projects/coal/current-operations/ulan-coal>

GTA Consultants (2013), *Wilpinjong Coal Mine Modification Road Transport Assessment*.

GTA Consultants (2015a), *Moolarben Coal Complex UG1 Optimisation Modification Road Transport Assessment*.

GTA Consultants (2015b), *Wilpinjong Extension Project Wilpinjong, NSW Road Transport Assessment*.

R.W. Corkery & Co. (2020), *Bowdens Silver Project Environmental Impact Statement State Significant Development No. 5765*

R.W. Corkery & Co (2021), *Amendment Report for the Bowdens Silver Project*.

Standards Australia (2007), *Manual of Uniform Traffic Control Devices Part 7: Railway Crossings (Australian Standard [AS] 1742.7, 2007)*

The Transport Planning Partnership (2019), *Moolarben Coal Complex UG4 Ancillary Works Modification Road Transport Review*.

The Transport Planning Partnership (2020a), *Moolarben Coal Complex UG4 Ancillary Works Modification Saddlers Creek Road Access*.

The Transport Planning Partnership (2020b), *Bowdens Silver Project Traffic and Transport Assessment*.

Transport and Urban Planning (2009), *Traffic and Transport Impact Assessment for the Ulan Coal Continued Operations Project at Ulan*.

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

Transport for New South Wales (2022)

<https://appln.transport.nsw.gov.au/mapservices/proxy/levelCrossings/map.html> accessed 23 July 2022

1 Introduction

This report has been prepared on behalf of Moolarben Coal Operations Pty Ltd (MCO) to present the findings of an assessment of the road transport implications of impacts associated with the proposed Moolarben Coal Complex (MCC) Open Cut 3 (OC3) Extension Project (hereafter referred to as the Project).

The Moolarben Coal Complex is located approximately 40 kilometres (km) north of Mudgee, New South Wales (NSW) (Figure 1.1). The MCC is operated by MCO on behalf of the Moolarben Joint Venture (Moolarben Coal Mines Pty Ltd [MCM], Yancoal Moolarben Pty Ltd [YM] and a consortium of Korean power companies). MCO, MCM and YM are wholly owned subsidiaries of Yancoal Australia Limited (Yancoal).

Mining operations at the MCC are currently approved until 31 December 2038 with a combined coal production rate of 22 million tonnes per annum (Mtpa) in accordance with Project Approval (05_0117) (Stage 1) (as modified) and Project Approval (08_0135) (Stage 2) (as modified). The MCC comprises four approved open cut mining areas (OC1 to OC4), three approved underground mining areas (UG1, UG2 and UG4) and other mining related infrastructure (including coal processing and transport facilities) (Figure 1.2).

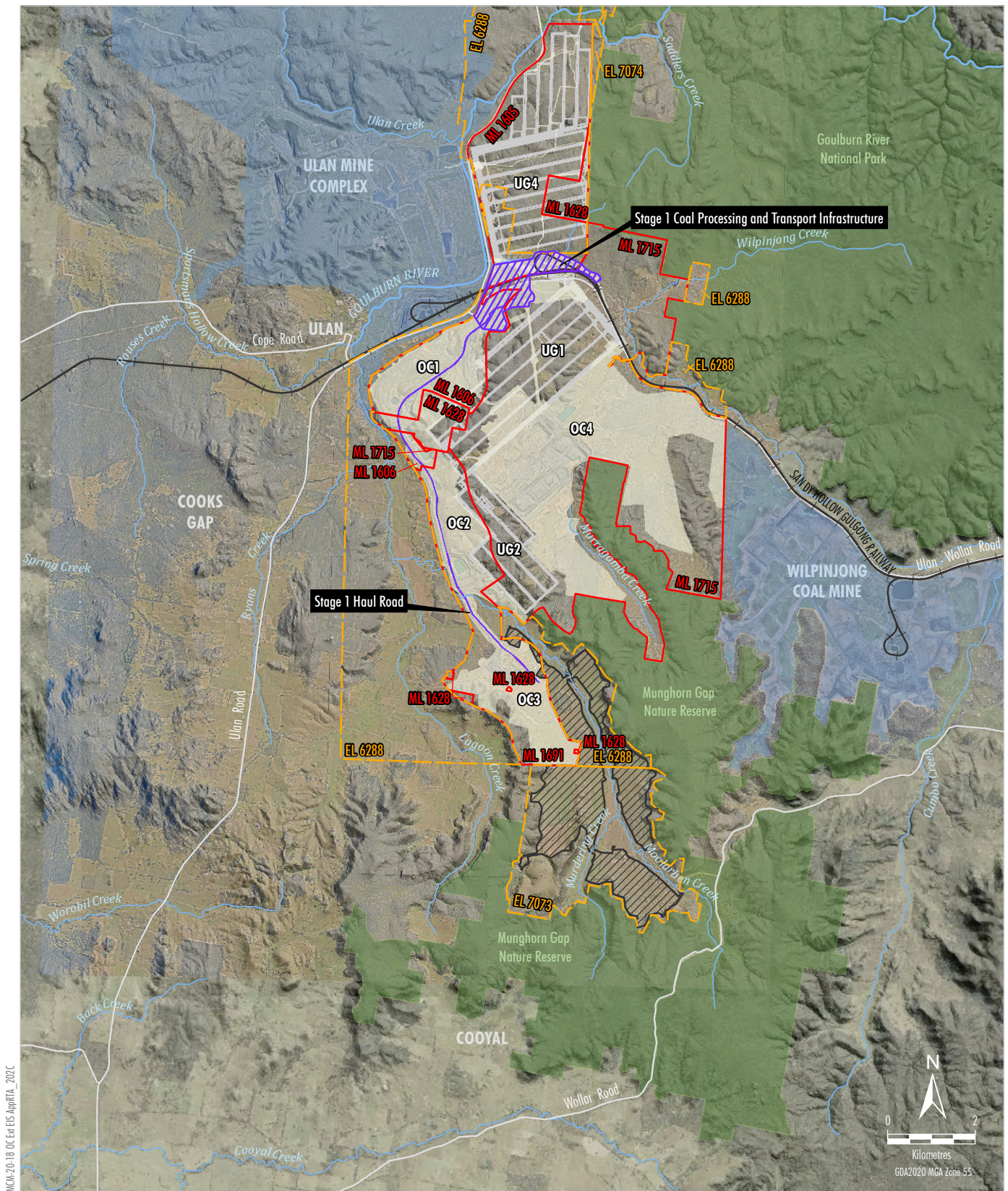
MCO currently operates across multiple open cut mining areas and at current production rates, mining (i.e. run of mine [ROM] coal extraction) within the approved/existing OC3 mining area is forecast to be completed in 2025. Mining of the remaining Stage 1 and Stage 2 mining areas (OC1, OC2 and OC4) would continue beyond 2025 within the currently approved mine life of the MCC (i.e. 31 December 2038).

The proposed OC3 Extension Project (the Project) would allow MCO to recover an additional 40 million tonnes (Mt) of run-of-mine (ROM) coal over a ten year period and would not change the approved mine life of the MCC of 31 December 2038. The Project would not increase workforce numbers beyond the peak employment of the MCC. The Project would involve no change to the total annual product coal transported from the MCC via rail.



YANCOAL
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MOOLARBEN COAL COMPLEX
Project Location

Figure 1.1



MCW-20-18 OC Ext EIS April/A, 2020

- LEGEND**
- National Park/Nature Reserve
 - Other Mining Operation
 - Exploration Licence Boundary
 - Mining Lease Boundary
 - Existing/Approved Development
 - Underground Longwall Layout
 - Moolarben Coal Complex Disturbance Footprint
 - Stage 1 Coal Processing and Transport Infrastructure Footprint
 - OC3 Extension Project
 - Indicative Surface Disturbance Extent

Source: MCO (2022); NSW Spatial Services (2021)
Orthophoto: MCO (Jan 2021)


MOOLARBEN COAL COMPLEX
 Approved Moolarben Coal Complex and
 Proposed Open Cut Extension

Figure 1.2

This Road Transport Assessment forms part of an Environmental Impact Statement (EIS) which has been prepared to accompany a Development Application made for the Project in accordance with Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The Secretary's Environmental Assessment Requirements (SEARs) states the following requirement in regard to the road transport assessment:

Traffic and Transport – including:

- *an assessment of the likely transport impacts of the development on the capacity, condition, safety and efficiency of the surrounding transport network, including cumulative impacts (considering other mining developments in the locality); and*
- *a description of the measures that would be implemented to mitigate and/or manage any impacts, including any proposed road and rail upgrades, road and rail maintenance contributions, and other traffic control measures developed in consultation with the relevant road and rail authorities;*

In addition, the SEARs refer to guidelines which are relevant to the assessment, specifically including the Transport for NSW (TfNSW) (formerly Roads and Traffic Authority [RTA]) *Guide to Traffic Generating Developments* (RTA, 2002), the TfNSW (formerly Roads and Maritime Services [RMS]) *Road Design Guide* (N.D.) and relevant Austroads Standards, and the *Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development* and RMS Supplements. It is noted that TfNSW and other road agencies have adopted the Austroads guides and the Australian Standards as the primary technical references, together with TfNSW Supplements, rather than the RMS Road Design Guide referred to in the SEARs. The specific Austroads guide referred to in the SEARs has been superseded by *Guide to Traffic Management Part 12: Integrated Transport Assessments for Development* (Austroads, 2020c). This study has therefore been prepared in accordance with RTA (2002) and with reference to the relevant current Austroads guides, TfNSW Supplements to the Austroads guides and Australian Standards.

2 Moolarben Coal Complex

2.1 Approved Operations

The MCC operates two stages, Stage 1 and Stage 2 concurrently with the total run-of-mine coal permitted to be extracted being limited to 16 Mtpa from open cut mining operations, 8 Mtpa from the underground mining operations, and 24 Mtpa from the combined operations.

Stage 1 of the MCC comprises open cut operations in OC1, OC2 and OC3, underground operations in UG4, ancillary infrastructure, and the handling, processing and rail transport of coal from both Stage 1 and Stage 2.

Stage 2 of the MCC comprises open cut operations in OC4 and underground operations in UG1 and UG2. All ROM coal produced by the Stage 2 operations is transported to the Stage 1 coal handling, processing and transport facilities.

Mining operations at the MCC are approved until 31 December 2038 in accordance with Project Approval (05_0117) and Project Approval (08_0135)

All product coal is transported from the MCC by rail, with up to 22 Mtpa of product coal permitted to be transported in any calendar year. Train movements are limited to an average of eight laden trains per day over any calendar year, and a maximum of 11 laden trains per day. All ROM coal extracted is transported via haul roads located entirely within the mine site to be handled, processed and loaded on to trains via the Stage 1 infrastructure.

Vehicular access to the MCC is provided (or approved to be provided) via the following key access roads:

- the Coal Handling and Preparation Plant (CHPP) Access Road off Ulan Road, approximately 1 km north of its intersection with Ulan-Wollar Road;
- the Open Cut Access Road off Ulan-Wollar Road approximately 120 metres (m) east of Ulan Road (which serves as the main site access for the MCC);
- the ROM Coal Facilities and existing Underground Remote Services Infrastructure Area (RSIA) Access Road (ROM Facility Access Road) from Ulan-Wollar Road approximately 2.4 km east of Ulan Road; and
- the Stage 2 OC4 Access Road off Ulan-Wollar Road approximately 4.6 km east of Ulan Road (which provides access to the Stage 2 surface facilities).

Vehicular access to a downcast ventilation shaft compound at UG4 is also approved via an access road off Ulan Road approximately 250 m south of the intersection of the Ulan Mine Complex underground access road. This access has not yet been constructed, and will be designed and constructed in accordance with the relevant Austroads and TfNSW guidelines.

MCO has realigned and upgraded sections of Ulan-Wollar Road, and made financial contributions to the upgrading and maintenance of Ulan Road, under the existing *Ulan Road Strategy* (ARRB Group Ltd [ARRB], 2011), along with the proponents of the Ulan Mine Complex and Wilpinjong Coal Mine.

2.2 Project Description

MCO has identified an opportunity to extend open cut mining operations immediately south of the approved OC3 open cut pit as well as develop four new open cut pits to the east and south-east of the approved OC3 mining area, within existing mining tenements. The extended open cut mining operations would provide approximately 10 years of mining (from 2025 to 2034), maximise use of the existing mining fleet and maintain steady production of ROM coal at the MCC post-completion of mining within the approved OC3 mining area.

It is expected the Project would include the following activities:

- extension of open cut mining operations within mining lease (ML) 1691, exploration licence (EL) 6288, and EL 7073 to allow mining of additional coal resources;
- extraction of up to 9 Mtpa of ROM coal with a total of approximately 40 million tonnes (Mt) over the life of the Project;
- mining operations between approximately 2025 to 2034 (which is within the approved life of the MCC ending on 31 December 2038);
- extension of employment of existing open cut workforce;
- construction and operation of ancillary infrastructure, services, plant and equipment in support of mining operations;
- construction and operation of water management and water storage infrastructure in support of mining operations;
- development of an integrated final landform with the approved OC3 mining area;
- ongoing exploration activities in the Project area;
- construction of haul road creek crossings;
- quarrying and/or excavation of borrow pits within approved disturbance areas to retrieve construction materials;
- conventional open cut mining related activities such as drilling and blasting, and other associated activities; and
- rehabilitation, decommissioning and closure.

The Project general arrangement is shown on Figure 1.2.

The Project is an extension of existing operations with no increase to peak employment numbers or mine life of the approved MCC. The Project would not change the approved product coal production limit (22 Mtpa) of the MCC. The Project would also not change the approved train movements from the MCC, average of eight laden trains per day over any calendar year, and a maximum of 11 laden trains per day.

Furthermore, all employees, contractors and deliveries would continue to access the Project area from the existing approved Open Cut Access Road via Ulan-Wollar Road.

Consistent with the existing configuration between Stage 1 and 2, ROM coal extracted for the Project would be hauled via existing MCC haul roads entirely within the mine site to be handled, processed and loaded on to trains via the existing Stage 1 infrastructure. The interaction of the Project's ROM coal with existing MCC operations will be subject to a separate modification to the Stage 1 Project Approval (05_0117).

2.3 Assessment Scenarios

The primary influence on road-based traffic generation of the MCC is the size of the workforce employed, with visitors and deliveries making up a small additional component of overall traffic. The impacts of the Project on the road transport environment have therefore been considered with regard to the variation in the workforce at the MCC, and the effects the Project would have on the workforce level.

The employment profile of the MCC with the Project is presented in Table 2.1 (direct and indirect [e.g. contractors] employment). This indicates that the total employment at the MCC is expected to peak in 2025, with approximately 1,150 people across the MCC.

The Project would not increase peak workforce numbers at the MCC. The MCC has an existing workforce of around 1,000 personnel. The average workforce is forecast to be about 758 across the life of mine. Approximately 80 per cent of the existing workforce (excluding contractors) reside locally, predominately in Mudgee, Gulgong and the surrounds. If the Project were to not proceed, it is expected the workforce could be redeployed to the approved MCC.

In consideration of the Project and its potential impacts on the road transport environment, the following scenarios have therefore been adopted for assessment in this study:

- 2025 representing the overall peak workforce at the MCC (including the Project); and
- 2034 representing the longer-term operation of the Project in the final year of mining of the OC3 Extension.

Table 2.1: Moolarben Coal Complex Employment Profile with Project

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
OC1	-	-	-	20	114	61	-	-	-	-	-	-	-	-	-	-	-
OC2	-	-	-	-	-	61	-	46	-	-	-	-	-	-	-	-	-
OC3	179	229	175	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OC3 Extension	-	-	-	65	64	148	416	198	161	208	216	153	72	-	-	-	-
OC4	429	466	520	599	500	441	324	460	531	483	419	437	427	286	180	160	6
UG Total	300	296	306	370	341	256	213	176	84	-	-	-	-	-	-	-	-
CHPP	89	95	95	95	97	97	97	97	95	93	93	78	62	45	27	27	-
Total	997	1,086	1,096	1,150	1,115	1,063	1,051	977	871	784	729	669	561	331	207	187	6

3 Existing Road Environment

3.1 Road Network

The road network serving the MCC is shown on Figure 1.1 and is briefly described below. The principal access route used for travel to and from the MCC is Ulan Road south to Mudgee, with some use of Ulan Road to the north, and Cope Road for travel to and from the west. It is noted that some of the roads are known by several names. For consistency throughout this report, the names below will be used to refer to the relevant sections of road as described here.

Ulan Road is a Regional road which extends between Castlereagh Highway (B55) at Mudgee and Golden Highway (B84) at Cassilis, via Budgee Budgee and Ulan. North of Budgee Budgee, it is Main Road 214 (MR214), and south of Budgee Budgee it forms part of Main Road 208 (MR208). The posted speed limit on Ulan Road is typically 100 kilometres per hour (km/h), with advisory speed signs on bends, where appropriate. Ulan Road is a sealed, two-lane, two-way road with overtaking lanes in each direction and varying carriageway widths along its length, and is the subject of the *Ulan Road Strategy* (ARRB, 2011) described in Section 3.6.

The Goulburn River Bridge on Ulan Road, north of the MCC has recently been replaced, with funding through the *Restart NSW Fixing Country Bridges Program* and Mid-Western Regional Council. The old bridge was subject to speed and load limits, requiring some heavy and wide-load vehicles to travel via Gulgong to Ulan due to the restrictions at the bridge.

Ulan Road provides direct vehicular access to the MCC via the CHPP Access Road, located approximately 1 km north of Ulan-Wollar Road. At that intersection, Ulan Road includes a short channelised right turn lane in Ulan Road, allowing northbound vehicles to pass around vehicles turning right into the CHPP Access Road, and an auxiliary left turn in Ulan Road for the left-turn into the CHPP Access Road. The layout of the intersection is shown in Figure 3.1.

Access from Ulan Road to the surface of UG4, including the approved northern borefield is via Saddlers Creek Road, with the intersection of Ulan Road and Saddlers Creek Road to be upgraded. MCO is approved to construct an access road from Ulan Road to provide access to the downcast ventilation shaft, with the intersection to be located approximately 250 m south of the Ulan Mine Complex underground access road intersection. The intersection will be designed and constructed in accordance with the relevant Austroads and TfNSW guidelines. TTPP (2019) found that based on the Austroads warrants for rural intersection treatments, the new intersection would be appropriately constructed with the general minimum preferred treatments, being Basic Auxiliary Left (BAL) and Basic Auxiliary Right (BAR) treatments in Ulan Road.

Figure 3.1: Ulan Road and CHPP Access Road Intersection



Ulan-Wollar Road is a local rural road which provides an east-west connection between the villages of Ulan and Wollar. Ulan-Wollar Road provides vehicular access to the Wilpinjong Coal Mine to the east of the MCC, and direct vehicular accesses for the MCC via the Open Cut Access Road, Stage 2 OC4 Access Road and the ROM Coal Facility Access Road. Ulan-Wollar Road has a sealed surface along its entire length, and the default rural speed limit of 100 km/h applies along its length, with some advisory speed signs on curves and railway level crossings.

The Open Cut Access Road provides vehicular access to the Administration, Open Cut and Underground facilities. It intersects with Ulan-Wollar Road approximately 120 m east of Ulan Road. The intersection has a channelised right-turn lane in Ulan-Wollar Road for vehicles turning into the Open Cut Access Road, as shown in Figure 3.2.

The intersection of Ulan-Wollar Road with Ulan Road (Figure 3.2) includes a channelised right-turn and passing bay in Ulan Road, allowing northbound vehicles to pass around vehicles turning right into Ulan-Wollar Road, and an auxiliary left-turn lane (deceleration lane) in Ulan Road for the left-turn into Ulan-Wollar Road, and intersection lighting.

Figure 3.2: Ulan-Wollar Road at Ulan Road and Open Cut Access Road Intersections



Within the MCC, the Open Cut Access Road intersects with the Underground Access Road approximately 50 m from Ulan-Wollar Road, as shown in Figure 3.3. All vehicles travelling to the Administration, Open Cut and Underground mine areas enter the Mine Site via the Open Cut Access Road on Ulan-Wollar Road.

Figure 3.3: Open Cut and Underground Access Roads



Ulan-Wollar Road also provides access to the MCC via the ROM Facility Access Road, located approximately 2.4 km east of Ulan Road. It is a four-way intersection with auxiliary left-turn lanes in Ulan-Wollar Road on both approaches, as shown in Figure 3.4 and Figure 3.5.

Figure 3.4: Eastbound Ulan-Wollar Road at ROM Coal Facility and RSIA Access Roads



Figure 3.5: Westbound Ulan-Wollar Road at ROM Coal Facility and RSIA Access Roads



There is a number of other minor accesses to the MCC on Ulan-Wollar Road, including the Stage 2 OC4 Access Road located approximately 4.6 km east of Ulan Road, which is the access road for the Mine Rescue Centre and the Stage 2 surface facilities. That intersection includes a channelised right-turn lane in Ulan-Wollar Road, allowing eastbound vehicles to pass around vehicles turning right into the minor access road. The Project would result in no material change to the approved use of the Stage 2 OC4 Access Road and therefore it has not been considered further in this assessment.

Saddlers Creek Road is a local road which extends eastwards from Ulan Road, approximately 5.5 km north of Ulan-Wollar Road and 3.0 km north of the underground access road to the Ulan Mine Complex. It is an unsealed two-way road which provides access to a single property and access to the northern UG4 mine area, and does not fulfil any through traffic function. Saddlers Creek Road is approved to provide access for construction and maintenance of surface infrastructure, and its intersection with Ulan Road will be upgraded prior to its use.

Cope Road forms part of Main Road 598 between Castlereagh Highway (HW18) at Gulgong and MR214 at Ulan. It is a sealed two-lane, two-way road with a speed limit of 100 km/h outside of the built-up areas of Gulgong and Ulan. Cope Road was the subject of a major upgrade completed in 2017, which included road widening, pavement rehabilitation and strengthening, resealing, upgrading of nine intersections, safety barriers and drainage works. Cope Road provides the most direct route for MCC traffic travelling to and from Gulgong and surrounds.

3.2 Historic Traffic Volumes

Historic traffic data for roads of relevance to the MCC were collated and are summarised in Table 3.1.

The results in Table 3.1 demonstrate that traffic volumes on each route vary considerably along the route and over time.

Table 3.1: Historic Average Weekday Traffic

	Year	Daily (vehicles per day)	AM Peak Hour (vehicles per hour)	PM Peak Hour (vehicles per hour)
Ulan Road				
north of Hollyoak Bridge	2012	9,727	667	866
south of Wollar Road	2012	3,856	333	348
Wollar Road to Cope Road ^A	2011	2,000 to 2,296	-	-
south of Cope Road	2012	2,736	428	242
Cope Road to Ulan Mine Complex ^A	2011	1,010 to 2,489	-	-
south of Ulan-Wollar Road	2012	3,345	453	261
north of Ulan-Wollar Road	2012	2,633	307	194
south of CHPP Access Road	2015	-	226	184
north of CHPP Access Road	2015	-	162	158
north of CHPP Access Road	2018	2,082	192	181
Ulan-Wollar Road				
east of MCC	2012	838	129	83
east of Slate Gully Road	2012	142	16	14
west of Open Cut Access Road	2015	-	145	118
east of Open Cut Access Road	2015	-	75	97
Cope Road				
west of Ulan Road	2012	1,570	156	129
Saddlers Creek Road				
East of Ulan Road (estimate)	2020	28	4	4

^A Average day, not average weekday

Sources: ARRB (2011), GTA Consultants (2013), GTA Consultants (2015a), TTPP (2019), TTPP (2020a)

3.3 Existing Traffic Volumes

3.3.1 Traffic Survey Program

To quantify existing traffic conditions in the vicinity of the MCC, a program of traffic surveys was commissioned which included automatic tube counter (ATC) surveys and intersection turning movement surveys.

Under the operational conditions at the time of the traffic surveys, workers are required to periodically be tested for Covid, with testing facilities located on both the CHPP Access Road and the Open Cut Access Road. Underground employees are required to attend the CHPP Access Road testing facility prior to their first shift of the week. The Underground workers being tested would therefore first travel to the CHPP access for testing, then leave and travel to the Underground Access Road. Therefore, Open Cut and Administration workers are also tested at the same frequency, however their testing is undertaken at the administration offices located on the Open Cut Access, so there is no impact on their travel behaviour on the public roads.

The ATC surveys were conducted over two weeks during May 2022 on (Figure 3.6):

- the CHPP Access Road east of Ulan Road;
- the Open Cut Access Road south of the intersection with the Underground Access Road;
- the Underground Access Road (one week only) east of the Open Cut Access Road;
- the ROM Facility Access Road south of Ulan-Wollar Road;
- Ulan Road south of the MCC; and
- Ulan-Wollar Road east of the ROM Facility Access Road.

As described above, the surveys on the Open Cut and Underground Access Roads were conducted south and east of their intersection, and therefore include traffic travelling internally between the two roads. These internal movements have been removed from the MCC traffic generation calculated in Sections 4.3 and 5.1 at the Open Cut Access Road off Ulan-Wollar Road to avoid double-counting those vehicle movements which do not access the public road.

Intersection turning movement surveys were conducted on a weekday between 5:00 am and 7:00 pm at the following intersections (Figure 3.6):

- the CHPP Access Road and Ulan Road;
- the Open Cut Access Road and Ulan-Wollar Road;
- the Open Cut Access Road and the Underground Access Road;
- the ROM Facility Access Road and Ulan-Wollar Road; and
- Ulan Road and Ulan-Wollar Road.

3.3.2 Daily Traffic Volumes

Table 3.2 summarises the two-way daily traffic recorded by the ATCs on each of the roads. This demonstrates that weekday volumes are significantly higher than weekend day volumes on all the surveyed roads.

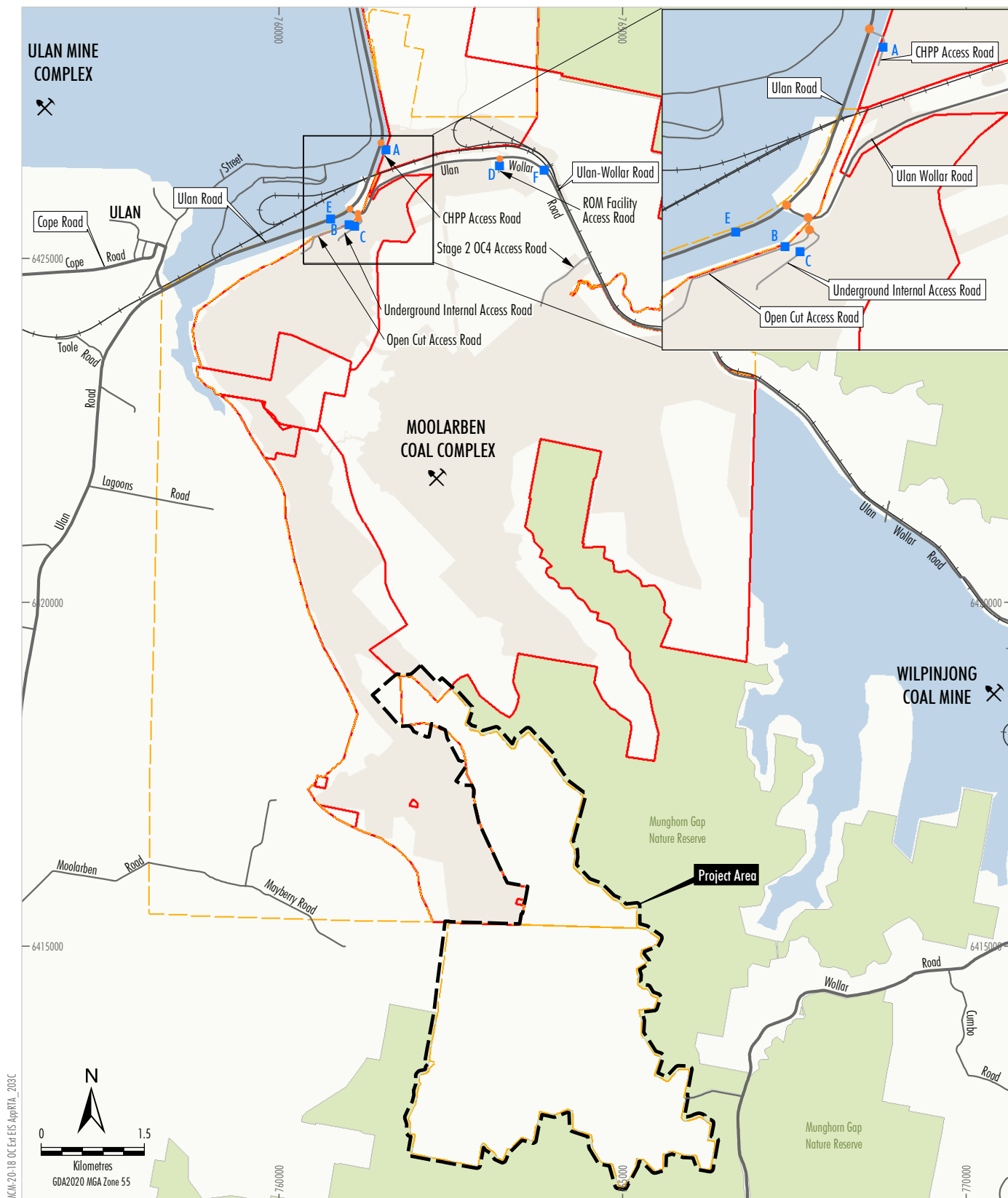


Figure 3.6

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

Day	CHPP Access	Open Cut (Internal)	Underground (Internal)	ROM Facility Access	Ulan Road	Ulan-Wollar Road
Thursday	613	918	-	95	4,060	1,009
Friday	480	820	-	106	3,834	838
Saturday	142	336	-	49	2,027	502
Sunday	145	364	-	24	2,174	474
Monday	639	873	-	160	3,637	877
Tuesday	644	967	-	129	3,899	891
Wednesday	611	976	-	136	4,040	997
Thursday	498	915	524	81	4,136	1,018
Friday	449	834	440	103	3,735	788
Saturday	106	402	180	51	1,883	449
Sunday	130	359	154	22	2,091	471
Monday	567	927	454	58	3,821	885
Tuesday	567	1,039	568	96	3,965	924
Wednesday	- ^A	927	554	118	4,009	808

^A Part day data only

3.3.3 Traffic Composition

The ATCs collected details of the composition of the traffic based on the Austroads Vehicle Classification System. Under that system, light vehicles include motorcycles, cars, vans, four-wheel drives, and utilities (including those towing a trailer or caravan), heavy vehicles include heavy rigid trucks such as single unit trucks and buses, and articulated vehicles such as semi-trailers, rigid trucks with trailers, B-doubles and road trains where permitted. The surveyed composition of traffic using the ATC data is summarised in Table 3.3, which classifies the heavy vehicles as either rigid or articulated.

Table 3.3: Surveyed Average Weekday Traffic Classification (vehicles per day)

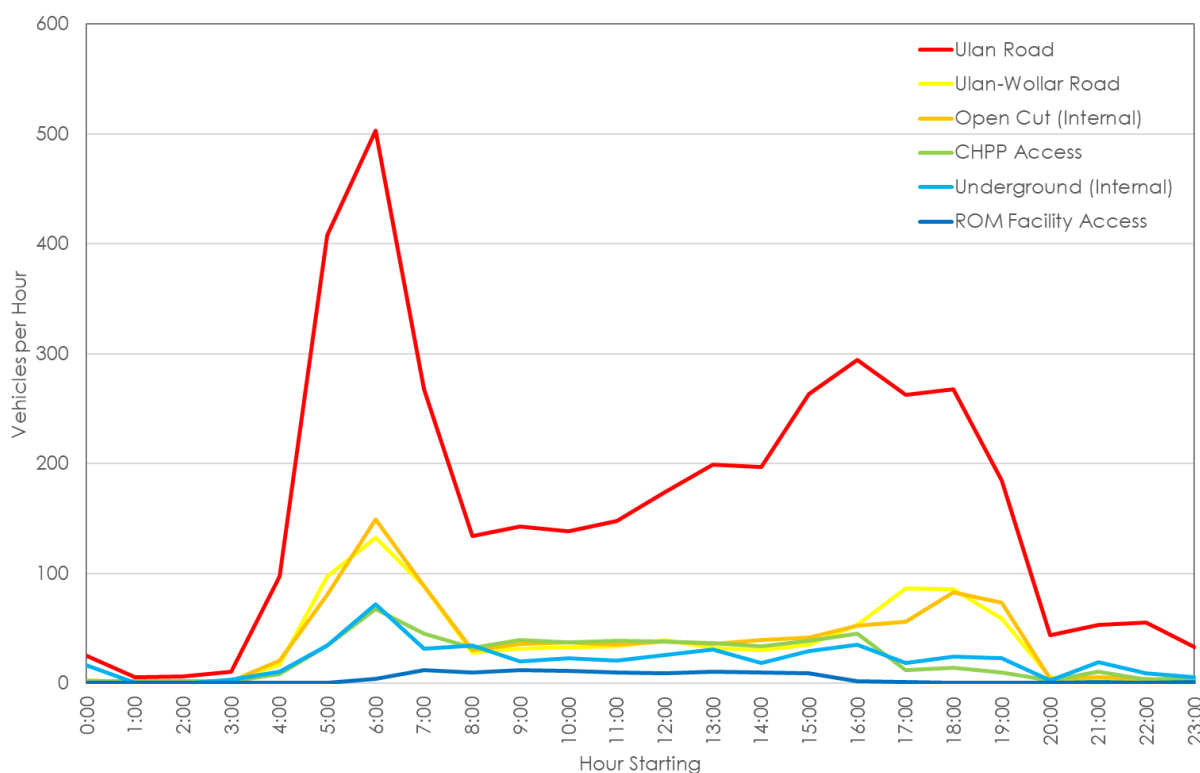
Site	Road	Light Vehicles	Heavy Rigid Vehicles	Articulated Vehicles	Total Vehicles	Percent Heavy Vehicles
A	CHPP Access Road	478	70	12	560	14.6
B	Open Cut Internal Road	842	57	21	920	8.5
C	Underground Internal Road	471	21	16	508	7.3
D	ROM Facility Access Road	69	33	6	108	36.1
E	Ulan Road	3,494	292	128	3,914	10.7
F	Ulan-Wollar Road	779	77	48	904	13.8

The majority of the rigid vehicles on the MCC access roads were two-axle trucks/buses, which includes longer wheelbase utilities and 4WDs that are often used in mining and rural settings. Although identified as heavy vehicles by the Austroads Classification System due to their longer wheelbase, many of these vehicles may have a Gross Vehicle Mass of below 4.5 tonnes (t), and so are considered as light vehicles under NSW's vehicle registration definition.

3.3.4 Peak Hourly Traffic Volumes

The surveyed temporal distribution of traffic throughout the average weekday is presented in Figure 3.7, which demonstrates that there is a significant peak in traffic on the surveyed roads during the morning, generally between 5:00 am and 7:00 am. A peak is also observed in the late afternoon or evening, which is notably lower than the morning peak.

Figure 3.7: Surveyed Average Weekday Traffic by Time of Day (vehicles per hour)



Refer to Figure 3.6 for survey locations.

Table 3.4 presents a summary of the surveyed morning and evening peak hourly traffic volumes over the average weekday. These represent the busiest hour at each surveyed location for traffic travelling in both directions at each location before or after midday.

Table 3.4: Surveyed Average Weekday Peak Hourly Traffic Volumes 2022 (vehicles per hour)

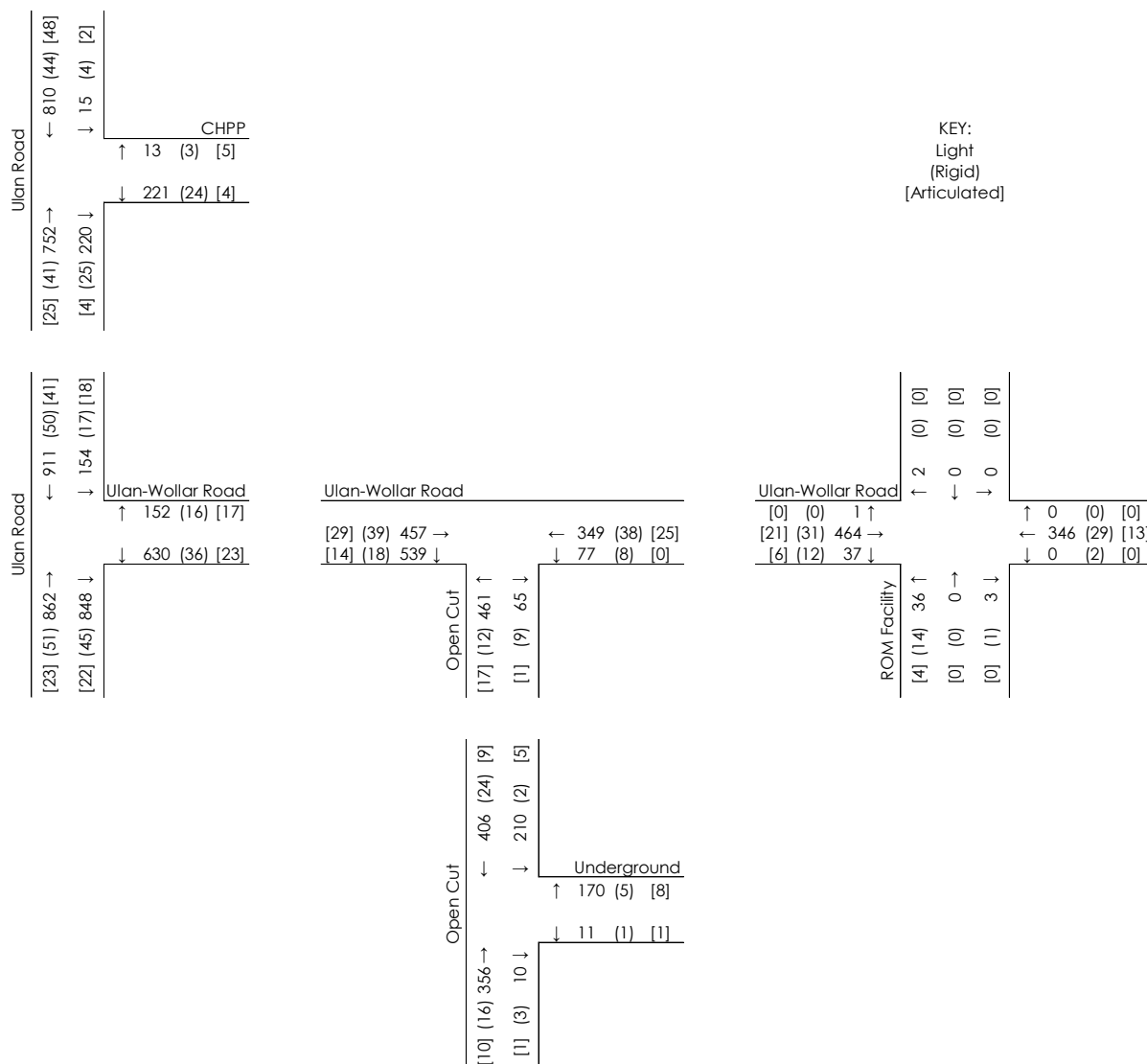
Road and Location	Hour Starting	Light	Heavy Rigid	Articulated	Total
AM Peak Hour					
CHPP Access Road	6:00	60	7	1	68
Open Cut Internal Road	6:00	143	5	1	149
Underground Internal Road	6:00	69	1	2	72
ROM Facility Access Road	7:00	9	3	0	12
Ulan Road	6:00	470	27	6	503
Ulan-Wollar Road	6:00	123	6	4	133
PM Peak Hour					
CHPP Access Road	16:00	43	2	0	45
Open Cut Internal Road	18:00	80	3	0	83
Underground Internal Road	16:00	34	1	0	35
ROM Facility Access Road	13:00	6	3	1	10
Ulan Road	16:00	270	18	6	294
Ulan-Wollar Road	17:00	79	5	2	86

Table 3.4 demonstrates that over the average weekday, the time of the peak hourly volumes does not coincide at all the surveyed locations. The morning peak hour volumes were higher than those of the evening peak hour, representing between 11.1 and 16.2 percent of the daily volumes. The evening peak hour volume was between 6.9 and 9.5 percent of the daily volume.

3.3.5 Intersection Turning Movements

The results of the intersection turning movement survey provide information on the directional distribution of traffic generated by the MCC and at surrounding intersections. Figure 3.8 presents the total turning movements surveyed over the 14-hour period.

Figure 3.8: 2022 Total Intersection Turning Movements 5:00 am to 7:00 pm



3.4 Railway Level Crossings

The MCC generates rail traffic between the rail loop at the CHPP and the Port of Newcastle. The laden coal trains departing the MCC travel eastwards from the rail loop on the Sandy Hollow Guldong Railway to Sandy Hollow, then on the Muswellbrook Merriwa Railway to Muswellbrook, where they join the Main Northern Railway. The Sandy Hollow Guldong Railway has a single line, with balloon loops at Wilpinjong Coal Mine, MCC and Ulan Mine Complex, and passing loops.

The Transport Planning Partnership (TPP) has reviewed the existing public level crossings along the Sandy Hollow Gulgong Railway between Cope Road at Ulan (west of the balloon loop at the MCC) and Bylong Valley Way at Bylong (west of Muswellbrook), the locations of which are shown in Figure 3.9, with their Level Crossing Management (LXM) identification number. This covers a distance of some 50 km of railway, and ten public road level crossings, as identified by TfNSW (2022). Each of the level crossings cross a single track only.

Figure 3.9: Locations of Public Railway Level Crossings



Table 3.5 summarises the key features of the ten level crossings, which are listed in order from west to east and presented in Appendix B.

Signage and road marking requirements associated with railway level crossings are set out in the *Manual of Uniform Traffic Control Devices Part 7: Railway Crossing* (Australian Standard [AS] 1742.7, 2007). AS 1742.7 does not provide guidance on when a crossing should progress from one treatment to another, as such guidance is found in risk assessment models such as the Australian Level Crossing Assessment Model (ALCAM).

Appendix B presents additional observations made of the ten level crossings with particular regard to road traffic controls such as signage and road markings. The observations found that the signage and linemarking across the level crossings is generally consistent with AS 1742.7, with some minor non-conformances. These are minor issues which represent low risks to the safety of the road network, and are not exacerbated by the approved MCC or Project.

Table 3.5: Railway Level Crossings – Ulan to Bylong

LXM ID	Rail Location ^A	Road Location	Description
1304	438.83	Cope Road, Ulan	Active control with lights
1815	437.97	Ulan Colliery Road, Ulan	Active control with lights
Ulan Mine Complex Rail Loop and MCC Rail Loop			
1302	425.21	Unnamed local road, Ulan	Passive control with stop signs
Wilpinjong Coal Mine Vehicular Access			
1301	423.74	Ulan-Wollar Road, Wollar	Active control with lights and booms
Wilpinjong Coal Mine Rail Loop and Wilpinjong passing loop			
1300	420.06	Ulan-Wollar Road, Wollar	Active control with lights and booms
1298	417.34	Unnamed road, Wollar	Passive control with stop signs
1297	415.11	Mogo Road, Wollar	Active control with lights and booms
Wollar passing loop			
1296	401.03	Ringwood Road, Coggan Creek	Passive control with stop signs
Coggan Creek passing loop			
1813	395.90	Unnamed road, Coggan Creek	Active control with lights
1295	388.05	Bylong Valley Way, Bylong	Active control with lights

^A Rail location is measured in km from Central Station, Sydney.

3.5 Hunter Valley Corridor Capacity Strategy

Australian Rail Track Corporation (ARTC) has released the *2021 Hunter Valley Corridor Capacity Strategy* (ARTC, 2021), which identifies future constraints on the coal rail network's capacity, options to resolve those constraints and a proposed course of action to achieve increased coal throughput.

ARTC (2021) indicates that the Ulan line extends from Ulan to Muswellbrook, and is mainly used by coal trains, but also by country ore and grain trains and occasional interstate freight trains. Train lengths on the Ulan line are limited to 1,543 m due to a number of physical constraints, noting that this limit is consistent with that for the whole Hunter Valley, due to constraints at the terminals. ARTC is continuing to review infrastructure requirements to permit longer trains, however such requirements are significant and implications are complex. The introduction of higher capacity (weight per metre of train length) rolling stock is not likely due to major impediments on the Ulan line. It is generally expected that operations on the Ulan line will continue with the existing train lengths and rolling stock capacities for the foreseeable future.

A number of low cost capacity initiatives have been investigated by ARTC for the Ulan line, including providing intermediate signals between Baerami and Kerrabee. This would increase capacity but would be redundant if and when the Advanced Train Management System (ATMS) is implemented or if the Widden Creek loop is built. Increasing the permitted speed of down coal trains on the Ulan line to 100 km/h was reviewed but would provide minimal benefit due to curvature and grade constraints which already limit down trains to below the currently permitted speed of 80 km/h.

Past analysis found that infrastructure enhancements would be required to introduce longer trains on the Ulan line, including extension of the Sandy Hollow, Kerrabee and Baerami loops, as well as signalling works at Sandgate and Kooragang. The cost and capacity benefits of the works would need to be weighed against other options, including an increase in the utilisation rate, delivery of the Widden Creek loop and implementation of ATMS.

A reduction in the purge time at the Bylong tunnel to 16 minutes has been implemented, which benefits capacity, noting that the capacity-limiting section on the Ulan line is between Baerami and Kerrabee, rather than the section in which the Bylong tunnel is located.

No projects are required or proposed to meet the contracted coal volumes beyond the implementation of ATMS, which has been assessed as having the theoretical capacity to increase utilisation by five percent. The Strategy identifies Q2 2025 as a realistic target for implementation of ATMS on the line between Ulan and Mangoola.

3.6 Ulan Road Strategy

Between Mudgee and the entrance to the Ulan Mine Complex underground surface facilities (north of the MCC), Ulan Road has been the subject of the *Ulan Road Strategy* (ARRB, 2011) which details the road surface conditions such as the road surface condition index, pavement deflection testing and visual rating. That assessment found that at that time, nearly 55 percent of Ulan Road was adequate, while the remainder required rehabilitation and widening to desirable design standard. The desirable road standard is a carriageway width of 11.0 m, comprising two 3.5 m sealed lanes, two 1.0 m sealed shoulders and two 1.0 m unsealed shoulders. A minimum design standard for an 8.2 m wide formation (two 3.2 m sealed lanes and two 0 to 0.5 m sealed shoulders and two 0 to 0.5 m unsealed shoulders) is adopted for sections where road widening would be impractical. Together with the local mining industry and the Restart NSW Resources for Regions Program, MCO continues to make financial contributions towards the implementation of the *Ulan Road Strategy* (along with the proponents of the Ulan Mine Complex and Wilpinjong Coal Mine), with the upgraded Ulan Road opened in late 2018.

3.7 Road Safety History

Road crash data published by TfNSW has been reviewed for the five-year period from 1 October 2016 to 30 September 2021 on the roads in the vicinity of the MCC. The data includes those crashes which 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; and
- 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 primary access routes for the MCC, including:

- Ulan Road between the bridge over the Goulburn River north of Ulan Mine Complex and Lue Road near Mudgee;
- Ulan-Wollar Road between Ulan Road and Wollar Road at Wollar;
- Cope Road between Ulan Road and Gulgong; and
- at/near the ten railway level crossings on the Sandy Hollow Gulgong Railway between Ulan and Bylong (refer to Section 3.4).

Over the five-year period reviewed, the data indicates that:

- no crashes occurred on Ulan-Wollar Road;
- no crashes occurred at or near the ten railway level crossings on the Sandy Hollow Gulgong Railway between Ulan and Bylong (refer to Section 3.4);
- 19 crashes occurred along Ulan Road; and
- 10 crashes occurred along Cope Road, all of which occurred within 10 km of Gulgong.

Table 3.6 summarises the general crash types and severities over the investigation period.

Table 3.6: General Crash Types on Access Routes (1 October 2016 to 30 September 2021)

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	Miscellaneous	Total
Ulan Road	48	1	1	-	1	2	1	2	8	2	1	19
Cope Road	24 ^A	-	2	-	-	-	-	2	2	4	-	10
Ulan-Wollar Road	24	-	-	-	-	-	-	-	-	-	-	-
Total Crashes by Type		1	3	-	1	2	1	4	10	6	1	29
People Killed		-	-	-	-	-	-	-	1	-	-	1
People Seriously Injured		1	-	-	-	1	1	-	3	2	-	8
People Moderately Injured		-	1	-	-	3	-	2	6	2	-	14
People Minor/Other Injured		-	1	-	-	-	-	2	-	-	1	4

^A All crashes on Cope Road occurred in the 10 km length section closest to Gulgong.

The *Ulan Road Strategy* investigated crash data provided by TfNSW on a similar length of Ulan Road over the five year period January 2006 to December 2010, which identified 62 crashes on the route, resulting in 48 people being injured. Comparison with the more recent five year period October 2016 to September 2021 suggests that the number of crashes on Ulan Road has reduced significantly, with 19 crashes resulting in 20 people being injured to varying degrees.

Table 3.7 and Table 3.8 provide a breakdown of the characteristics of the reported crashes on Ulan Road and Cope Road respectively during the most recent five-year period.

Two-thirds of crashes on both Ulan Road and Cope Road were single-vehicle crashes. Known causes of run-off-road crashes include:

- driver behaviours such as speed, inattention, avoidance measures, 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.

Table 3.7: Ulan Road Crash Summary (1 October 2016 to 30 September 2021)

	Pedestrian	Adjacent Approaches	Opposing Directions	Same Direction	U-turn/Parking	Overtaking	On Path	Off Path on Straight	Off Path on Curve	Miscellaneous	Total
Total Crashes ^A	1	1	-	1	2	1	2	8	2	1	19
Crash Location											
2-way undivided road	1	-	-	-	1	1	2	6	2	1	14
T-intersection	-	1	-	1	1	-	-	1	-	-	4
Roundabout	-	-	-	-	-	-	-	1	-	-	1
Road Surface Condition											
Dry Road	1	1	-	-	2	1	2	5	2	1	15
Wet Road	-	-	-	1	-	-	-	3	-	-	4
Weather											
Fine	1	1	-	-	2	1	1	5	2	-	13
Overcast	-	-	-	-	-	-	-	-	-	1	1
Fog or mist	-	-	-	-	-	-	1	-	-	-	1
Raining	-	-	-	1	-	-	-	3	-	-	4
Natural Lighting											
Daylight	1	-	-	1	-	1	-	5	-	1	9
Dusk	-	1	-	-	-	-	-	1	1	-	3
Darkness	-	-	-	-	2	-	2	2	1	-	7
Vehicles Involved											
Pedestrian	1	-	-	-	-	-	-	-	-	-	1
Motorcycle	-	-	-	-	1	1	-	-	-	-	2
Car, 4WD, or van	-	1	-	2	3	1	2	7	2	1	19
Light or Rigid Truck	1	1	-	-	-	-	-	1	-	-	4
Articulated Vehicle	-	-	-	-	-	-	-	1	-	-	1
Severity of Crash											
Non-casualty	-	-	-	1	-	-	-	1	-	-	2
Injury	1	1	-	-	2	1	2	7	2	1	17
Factors^B											
Speeding	-	-	-	-	-	-	-	-	2	-	2
Fatigue	-	-	-	-	-	-	-	3	-	-	3
None	1	1	-	1	2	1	2	5	-	1	14

^A Between Lue Road and Goulburn River Bridge.

^B Factors considered to have contributed to the crash. More than one factor can be nominated for a single crash.

Table 3.8: Cope Road Crash Summary (1 October 2016 to 30 September 2021)

	Pedestrian	Adjacent Approaches	Opposing Directions	Same Direction	U-turn/Parking	Overtaking	On Path	Off Path on Straight	Off Path on Curve	Miscellaneous	Total
Total Crashes ^A	-	2	-	-	-	-	2	2	4	-	10
Crash Location											
2-way undivided road	-	-	-	-	-	-	2	2	4	-	8
T-intersection	-	2	-	-	-	-	-	-	-	-	2
Road Surface Condition											
Dry Road	-	2	-	-	-	-	2	2	3	-	9
Wet Road	-	-	-	-	-	-	-	-	1	-	1
Weather											
Fine	-	2	-	-	-	-	2	1	3	-	8
Fog or mist	-	-	-	-	-	-	-	1	-	-	1
Raining	-	-	-	-	-	-	-	-	1	-	1
Natural Lighting											
Daylight	-	1	-	-	-	-	1	1	2	-	5
Dusk	-	1	-	-	-	-	-	-	1	-	2
Darkness	-	-	-	-	-	-	1	1	1	-	3
Vehicles Involved											
Car, 4WD, or van	-	4	-	-	-	-	2	2	3	-	11
Light or Rigid Truck	-	-	-	-	-	-	-	-	1	-	1
Severity of Crash											
Non-casualty	-	1	-	-	-	-	1	-	2	-	4
Injury	-	1	-	-	-	-	1	1	2	-	5
Fatal	-	-	-	-	-	-	-	1	-	-	1
Factors^B											
Speeding	-	-	-	-	-	-	-	-	4	-	4
Fatigue	-	-	-	-	-	-	-	2	-	-	2
None	-	2	-	-	-	-	2	-	-	-	4

^A Between Ulan Road and Gulgong, noting all crashes occurred on the western half of that route.

^B Factors considered to have contributed to the crash. More than one factor can be nominated for a single crash.

Further review of the 19 single-vehicle crashes indicates that:

- speed was a factor in six of the crashes and fatigue was a factor in five crashes;
- four crashes were directly between vehicles and animals, one involved a driver swerving to avoid an animal, one involved a vehicle striking an object falling from another vehicle;
- three occurred during rain (two also in darkness) and two occurred during fog or mist and darkness
- loose gravel was present at three of the crash locations.

Approximately half of crashes on both routes occurred during poor natural lighting conditions (either at dusk or in darkness), and approximately one-quarter of crashes occurred during rain or foggy conditions. Fatigue was nominated as a factor in the fatal crash that occurred on Cope Road.

There was no clustering of crashes at any location on the routes that might suggest there is an inherent concern with the design of the road or intersection at any specific location.

4 Baseline Future Conditions

Changes to traffic conditions may be expected to occur which are unrelated to the MCC or the Project. Such changes may result from other major developments in the region and as a result of non-specific growth in background traffic. These are discussed in this section.

4.1 Major Developments

4.1.1 Wilpinjong Coal Mine

The Wilpinjong Coal Mine is an open cut coal mining operation located approximately 40 km north-east of Mudgee, with vehicular access via Ulan-Wollar Road, east of the MCC. The Wilpinjong Extension Project was approved in April 2017, and permits mining operations to continue on the site until 31 December 2033.

Based on the employment schedule presented in the assessment of the road transport implications of the Wilpinjong Extension Project (GTA Consultants, 2015b), the workforce at the Wilpinjong Coal Mine was anticipated to be 586 people in 2022, and 564 people in 2025 (GTA Consultants, 2015b). This suggests that a small reduction in the workforce could be expected between the conditions surveyed in 2022 and the future assessment scenario in 2025. The reduction in workforce would lead to a similarly small reduction in traffic generated by the Wilpinjong Coal Mine, the majority of which passes the MCC on Ulan-Wollar Road. For the purpose of this assessment, it has robustly been assumed that the traffic generated by the Wilpinjong Coal Mine during the traffic surveys in 2022 would remain unchanged for the 2025 assessment scenario.

Without further approval, the Wilpinjong Coal Mine would cease mining operations by 31 December 2033, and it would not be operational during the 2034 scenario. After cessation of mining operations, decommissioning and rehabilitation activity would continue to generate traffic on the road network, which would reasonably be expected to generate significantly less traffic than the operational activity occurring during the 2022 surveys.

As a robust assessment, it has been assumed that mining activity at the Wilpinjong Coal Mine continues throughout the life of the MCC, and that the workforce at Wilpinjong Coal Mine would remain at its current level over that period rather than reduce as suggested by the workforce schedule presented in GTA Consultants (2015b). On this basis, no change in background traffic has been applied as a result of the expected decrease and cessation of operational mining activity at the Wilpinjong Coal Mine expected in 2033. This is consistent with TfNSW's recommendation with respect to the Bowdens Silver Project assessment, that the assessment not apply reductions to background traffic levels due to other mining projects reducing their traffic generation.

4.1.2 Ulan Mine Complex

The Ulan Mine Complex is located approximately 38 km north of Mudgee, and has vehicular accesses off Ulan Road north of Cope Road (Ulan Open Cut Access Road), and north of Ulan-Wollar Road (Ulan West and Ulan Underground Access Road). An access road is also provided via Ulan village, used for construction access.

The approved Ulan Coal Continued Operations Project (MP08_0184) permits mining operation on the site until 2033. A number of modifications to the Continued Operations Project have since been approved, the most recent of these being Modifications 4, 5 and 7.

The traffic and transport impact assessment for the Ulan Coal Continued Operations Project undertaken by Transport and Urban Planning (2009) is therefore the most recent assessment of the traffic aspects of the Ulan Mine Complex. That study forecast that the peak workforce of 1,084 people (inclusive of construction workforce) would occur in Year 4, with the operational phase of the Project commencing in Year 5 with an operational workforce of 931 people. The operational workforce at the Complex would reduce from the peak over the life of the mine after Year 5, and would remain stable at 375 people from Year 14 to the final year of mining activity, with cessation of mining activity at the Ulan Open Cut at the end of Year 6. The Ulan Mine Complex Open Cut is now in care and maintenance.

Glencore's website (Glencore, 2021) indicates that the Ulan Mine Complex employed 780 people in 2019, which is consistent with the forecast workforce for Year 10 of 758 people (Transport and Urban Planning, 2009). Glencore's "Fast Facts" sheet (dated July 2021) available via the website indicates that Ulan Mine Complex employed 680 people in 2020, which is consistent with the estimated workforce for Year 11 of 662 people (interpolated from Transport and Urban Planning, 2009). It can therefore be expected that (excluding any workforce changes associated with possible modifications), the workforce at Ulan Mine Complex would be approximately 375 people in 2025, and a similar workforce of approximately 375 people would be expected to the end of mining activity at the Ulan Mine Complex.

As a robust assessment, it has been assumed that mining activity at the Ulan Mine Complex continues throughout the life of the MCC, and that the workforce at the Ulan Mine Complex would remain at its current level over that period. On this basis, no change in background traffic has been applied as a result of the expected decrease in activity at Ulan Mine Complex. This is consistent with TfNSW's recommendation with respect to the Bowdens Silver Project assessment, that the assessment not apply reductions to background traffic levels due to other mining projects reducing their traffic generation.

4.1.3 Bowdens Silver Project

The Bowdens Silver Project is a proposed open cut silver mine located 2 km northeast of Lue, and 25 km south of the Project. An EIS (R.W. Corkery & Co. [RWC], 2020) including a traffic and transport assessment (TPPP, 2020b), has been lodged for the Bowdens Silver Project. An Amendment Report (RWC, 2021) has also been prepared with regard to the inclusion of realignment of an existing transmission line. At the time of writing, the project remains under assessment. If approved, there is the potential for traffic generated by the Bowdens Silver Project to interact with traffic generated by the Project, notably on Ulan Road, primarily between Mudgee and Lue Road, but also north of Lue Road.

TPPP (2020b) assessed the traffic generation potential of the Bowdens Silver Project at the peak of construction activity during the site establishment and construction stage, and during peak haulage of material to the TSF embankment during the operational stage. If approved, the traffic generated by the Bowdens Silver Project may use parts of Ulan Road that are also used by traffic generated by the MCC.

Table 4.1 summarises the peak hourly and daily traffic expected to be generated by the Bowdens Silver Project on Ulan Road north of Lue Road from the TPPP (2020b) forecasts. This demonstrates that the Bowdens Silver Project would have a negligible impact on traffic volumes on Ulan Road near the MCC.

TPPP (2020b) identifies 2021 as the peak year for the Site Establishment and Construction Stage, and 2031 as the peak year for the Operational Stage of the Bowdens Silver Project. As that project has not yet been determined, it is possible that if approved, its Site Establishment and Construction Stage traffic may overlap with the overall peak workforce at the MCC (including the Project) scenario (i.e. 2025), while the Operational Stage traffic may overlap with the longer-term scenario at the Project (i.e. 2034).

Table 4.1: Bowdens Silver Project Daily and Peak Hourly Traffic on Ulan Road north of Lue Road

	Light Vehicles	Buses	Heavy Vehicles	OSOM ^A Vehicles	Product Haulage	Total
Site Establishment and Construction Stage						
6:00 am to 7:00 am (vehicles per hour)	3	0	0	0	0	3
6:00 pm to 7:00 pm (vehicles per hour)	3	0	0	0	0	3
Daily (vehicles per day)	6	0	2	0	0	8
Operational Stage						
7:00 am to 8:00 am (vehicles per hour)	1	0	0	0	0	1
4:00 pm to 5:00 pm (vehicles per hour)	1	0	0	0	0	1
Daily (vehicles per day)	4	0	0	0	0	4

^A Oversize Overmass vehicles
Source: TPPP (2020b)

4.1.4 Ulan Solar Farm

A Scoping Report has been prepared for a proposed 50 megawatt Solar Farm with battery storage facility and associated infrastructure, to be located west of Ulan (Edify Energy, 2022). At the time of writing, SEARs for that project have not been issued. The Scoping Report suggests that the Ulan Solar Farm would directly employ up to 120 people during the peak construction phase, and four people full-time during its operational phase. The Ulan Solar Farm would have an operational lifespan of approximately 30 years. Access to and from the Ulan Solar Farm is proposed to be via Cope Road, with three potential access locations identified in the Scoping Report.

The Scoping Report indicates that during construction and decommissioning phases, there would be a temporary increase in traffic on Cope Road, while traffic impacts during operations would be minimal. A traffic impact assessment would be prepared as part of the EIS for the Ulan Solar Farm. As suggested by the Scoping Report, TTPP's experience is that the primary impact of solar farm development on the road network occurs during the construction phase, when the solar panels and supporting infrastructure are transported to the site and construction activities occur. These activities occur over a limited time period only. Solar panels may typically be transported by road-registered heavy vehicles, noting that Cope Road and Ulan Road are approved routes for B-double access.

As the Scoping Report does not present sufficient detail for TTPP to consider the scale, timing or distribution of the traffic that may be generated by the construction activity with any degree of certainty, it has not been considered further in this assessment.

4.2 Background Traffic Growth

The *Ulan Road Strategy* (ARRB, 2011) adopted a rate of 1.8 per cent per annum for growth in general community traffic (i.e. excluding traffic directly associated with mining developments) on Ulan Road over the 21-year period of operation of the mines considered in that study. This study has adopted this growth rate, however has robustly applied it to traffic not generated by MCC's operations (discussed in Section 4.3.1). This effectively assumes growth in general traffic and traffic generated by other existing mining operations (Ulan Coal Complex and Wilpinjong Coal Mine) above that surveyed in 2022.

4.3 Moolarben Coal Complex Traffic

4.3.1 Existing Operations

The existing traffic characteristics of the MCC have been reviewed with regard to the surveyed conditions in May 2022. The ATC survey results demonstrate that the average weekday peak hours for total trips generated by the MCC occur between 6:00 am and 7:00 am, and between 4:00 pm and 5:00 pm.

The existing average weekday trips generated by the MCC to and from the public road network is summarised in Table 4.2, which is inclusive of trips generated to and from on-site Covid testing facilities. Table 4.2 demonstrates that the MCC's morning peak hour traffic generation is significantly greater than the evening peak hour. Approximately 14 percent of the daily traffic generation occurs during the morning peak hour, and approximately 7 percent occurs during the evening peak hour.

Under the existing operational conditions, workers are required to periodically be tested for Covid, with testing facilities located on both the CHPP Access Road and the Open Cut Access Road. Underground employees are required to attend the CHPP Access Road testing facility prior to their first shift of the week. The Underground workers being tested would therefore first travel to the CHPP access for testing, then leave and travel to the Underground Access Road. Therefore, Open Cut and Administration workers are also tested at the same frequency, however their testing is undertaken at the administration offices located on the Open Cut Access, so there is no impact on their travel behaviour on the public roads.

On the basis of the Covid testing protocols for the Underground workforce, it can be expected that on Mondays, Wednesdays and Fridays, approximately one-third of the Underground workforce would currently travel to work via the CHPP Access rather than directly to the Open Cut Access. Table 2.1 indicates that the Underground workforce makes up approximately one-third of the total workforce that would enter and exit the site via the Open Cut Access. This is consistent with the intersection surveys results which indicate that over the 14-hour period, one-third of traffic entering and exiting the Open Cut Access at Ulan-Wollar Road travelled to and from the Underground Access Road.

Table 4.2: Moolarben Coal Complex Traffic Generation in 2022

MCC Access Road	Light Vehicles	Heavy Rigid Vehicles	Articulated Vehicles	Total Vehicles
Average Weekday Daily (vehicles per day)				
CHPP Access Road east of Ulan Road ^A	478	70	12	560
Open Cut Access Road south of Ulan-Wollar Road ^B	1,263	70	33	1,366
ROM Facility Access Road south of Ulan-Wollar Road	69	33	6	108
Total^A	1,810	173	51	2,034
6:00 am to 7:00 am (vehicles per hour)				
CHPP Access Road east of Ulan Road ^A	60	7	1	68
Open Cut Access Road south of Ulan-Wollar Road ^B	211	6	2	219
ROM Facility Access Road south of Ulan-Wollar Road	4	1	0	5
Total^A	275	14	3	292
4:00 pm to 5:00 pm (vehicles per hour)				
CHPP Access Road east of Ulan Road ^A	43	3	0	46
Open Cut Access Road south of Ulan-Wollar Road ^B	81	5	0	86
ROM Facility Access Road south of Ulan-Wollar Road	2	0	0	2
Total^A	126	8	0	134

^A Includes trips to and from the Covid testing facilities by Underground workers.

^B Combined Open Cut Access Road (internal) and Underground Access Road (internal), excluding the trips made between the two internal survey locations without accessing the public road network.

Table 4.3 robustly assumes that, with the exception of the aforementioned trips associated with Covid testing of the Underground workforce, all vehicular trips made in and out of each of the MCC access roads have an origin or destination outside of the MCC. It is noted that this does not account for vehicle trips that may be made directly between MCC's access roads for day-to-day operational requirements, as these are difficult to identify or quantify with any certainty. As a result, this assessment will tend to overestimate the contribution that the MCC makes to the wider public road network.

Table 4.3: Estimated Moolarben Coal Complex Traffic on Public Roads in 2022

	Light Vehicles	Heavy Rigid Vehicles	Articulated Vehicles	Total Vehicles
Average Weekday Daily (vehicles per day)				
Ulan Road north of CHPP Access Road	106	23	19	148
Ulan Road north of Ulan-Wollar Road	528	70	24	622
Ulan Road south of Ulan-Wollar Road	1,404	126	28	1,558
Ulan-Wollar Road east of Ulan Road	1,172	74	38	1,284
Ulan-Wollar Road east of Open Cut Access	223	56	7	286
Ulan-Wollar Road east of ROM Facility Access	160	29	1	190
AM Peak Hour 6:00 am to 7:00 am (vehicles per hour)				
Ulan Road north of CHPP Access Road	14	0	1	15
Ulan Road north of Ulan-Wollar Road	68	7	2	77
Ulan Road south of Ulan-Wollar Road	245	13	2	260
Ulan-Wollar Road east of Ulan Road	205	6	2	213
Ulan-Wollar Road east of Open Cut Access	14	0	0	14
Ulan-Wollar Road east of ROM Facility Access	10	1	0	11
PM Peak Hour 4:00 pm to 5:00 pm (vehicles per hour)				
Ulan Road north of CHPP Access Road	2	1	0	3
Ulan Road north of Ulan-Wollar Road	43	3	0	46
Ulan Road south of Ulan-Wollar Road	100	6	0	106
Ulan-Wollar Road east of Ulan Road	75	5	0	80
Ulan-Wollar Road east of Open Cut Access	10	0	0	10
Ulan-Wollar Road east of ROM Facility Access	8	0	0	8

4.3.2 Moolarben UG4 Ancillary Works

The UG4 Ancillary Works Modification was approved in 2020, and involves some minor amendments to site access arrangements, including construction of a new site vehicular access to the ventilation shaft compound via Ulan Road; construction phase access for the northern dewatering site via Saddlers Creek Road with an upgrade of its intersection with Ulan Road; new internal access tracks from the CHPP Access Road to dewatering sites at the southern end of UG4; and a new internal access road and road crossing of Bora Creek from the existing CHPP Access Road to the RSIA.

TTPP (2019) assessed the road transport implications of the UG4 Ancillary Works Modification, during its construction and operational phases. The operation of the UG4 Ancillary Works Modification is expected to result in no change to the number of vehicle trips generated by the MCC, but it may result in some redistribution of existing vehicle trips between its access roads compared with conditions surveyed during May 2022. The total peak hour operational traffic changes forecast to result from the UG4 Ancillary Works Modification on a peak day are presented Table 4.4, as described in TTPP (2019). These forecasts assume peak activity at each and every one of the sites would coincide, and so are not anticipated to occur on a day-to-day basis.

Considering the Project's assessment periods relative to the ongoing UG4 mining operations, there is the potential for the UG4 Ancillary Works redistribution of traffic to coincide with the Project assessment periods. However, as the forecasts assume coincidence of peak activity at each and every one of the sites, which would not occur on a day-to-day basis, this Project assessment does not include the impacts of this traffic on average weekday daily or peak hour conditions. A sensitivity test of the operation of the intersection of Ulan Road with Ulan-Wollar Road has however been conducted to assess what impact these peak conditions might be expected to have on its operation at the time of the peak workforce at the MCC (including the Project). The sensitivity assessment is presented in Section 5.4.

Table 4.4: UG4 Ancillary Works Operational Traffic (vehicles per hour)

	Dewatering Sites		RSIA	Ventilation Shaft	Total
	Southern	Northern			
MCC Access Roads					
New Ulan Road Access Road north of CHPP Access Road	-	-	-	6 [4]	6 [4]
CHPP Access Road	6 [4]	-	6 [4]	-	12 [8]
Open Cut Access Road	-	-	6 [4]	6 [4]	12 [8]
ROM Coal Facility Access Road^	-6 [-4]	-6 [-4]	-	-	-12 [-8]
Public Roads					
Saddlers Creek Road	-	6 [4]	-	-	6 [4]
Ulan Road North of Saddlers Creek Road	-	-	-	-	-
Ulan Road North of New Access Road	-	6 [4]	-	-	6 [4]
Ulan Road between New Access Road and CHPP Access Road	-	6 [4]	-	6 [4]	12 [8]
Ulan Road between CHPP Access Road and Ulan-Wollar Road	6 [4]	6 [4]	6 [4]	6 [4]	24 [16]
Ulan Road South of Ulan-Wollar Road	-	-	-	-	-
Ulan-Wollar Road between Ulan Road and Open Cut Access Road^	-6 [-4]	-6 [-4]	6 [4]	6 [4]	-
Ulan-Wollar Road between Open Cut Access Road and ROM Coal Facility Access Road^	-6 [-4]	-6 [-4]	-	-	-12 [-8]
Ulan-Wollar Road East of ROM Coal Facility Access Road	-	-	-	-	-

Source TTPP (2019)

Light vehicles [heavy vehicles], total assumes peak operational activity at all sites coincides.

^A Negative values result from redistribution of trips which would otherwise use the ROM Coal Facility Access Road.

5 Project Traffic Impacts

As the Project would not materially impact the generation or distribution of traffic associated with the MCC, this assessment does not compare future traffic conditions with and without the Project in order to gauge the impacts of the Project on the road transport environment. Rather, TTPP has assessed the future traffic conditions that are expected to occur for the MCC including the Project, to gauge whether any mitigation measures are warranted to accommodate the ongoing operations at the MCC and surrounding developments.

If the Project were to not proceed, it is expected the workforce could be redeployed to the approved MCC (e.g. at OC4) (Section 2.3) and therefore would also enter and exit the MCC via the Open Cut access road, and the resulting traffic generation and its distribution would be generally the same as the MCC (including the Project) at peak employment, as presented in Table 5.1 and Table 5.2.

5.1 Project Traffic Generation

The surveyed traffic generation of the MCC (Section 4.3.1) demonstrates that light vehicles make up the majority of vehicle trips generated over the average weekday. This reflects the dominance of workforce travel on the total trip generation.

For the purpose of this assessment, the traffic generation of the MCC during the assessment scenario years has been estimated based on the surveyed traffic generation in 2022, varied pro rata to the change in the workforce.

Rigid and articulated heavy vehicles are used for miscellaneous deliveries and transport activities at the MCC, and the Project would not introduce any larger vehicles than are currently used on a day-to-day basis. Heavy vehicle deliveries are primarily sourced from Mudgee or beyond, such as Newcastle and the Hunter Valley.

5.1.1 Traffic Generation in 2025

At the time of peak employment at the MCC (including the Project), the workforce is anticipated to be approximately 1,150 people, an increase of 153 people or approximately 15 percent above the workforce of 997 people in 2022, whose transport activity was captured during the traffic surveys in 2022. The increased activity at the MCC (including the Project) at peak employment may also increase the number of visitors and deliveries. The increase in workforce and activity levels would primarily be related to the mining operations that are accessed via the Open Cut Access Road, thus the increase in traffic generated by the workforce, visitors and deliveries would be focussed on that access.

On this basis, Table 5.1 summarises the average weekday daily and peak hourly traffic expected to be generated by the MCC (including the Project) in 2025. This assumes that Covid testing continues to occur at the CHPP access with similar protocols as those currently in place.

Table 5.1: Moolarben Coal Complex (Including the Project) Traffic Generation in 2025

MCC Access Road	Light Vehicles	Heavy Rigid Vehicles	Articulated Vehicles	Total Vehicles
Average Weekday Daily (vehicles per day)				
CHPP Access Road east of Ulan Road ^A	478	70	12	560
Open Cut Access Road south of Ulan-Wollar Road	1,540	97	41	1,678
ROM Facility Access Road south of Ulan-Wollar Road	69	33	6	108
Total^A	2,087	200	59	2,346
AM Peak Hour 6:00 am to 7:00 am (vehicles per hour)				
CHPP Access Road east of Ulan Road ^A	60	7	1	68
Open Cut Access Road south of Ulan-Wollar Road	254	8	2	264
ROM Facility Access Road south of Ulan-Wollar Road	4	1	0	5
Total^A	318	16	3	337
PM Peak Hour 4:00 pm to 5:00 pm (vehicles per hour)				
CHPP Access Road east of Ulan Road ^A	43	3	0	46
Open Cut Access Road south of Ulan-Wollar Road	100	6	0	106
ROM Facility Access Road south of Ulan-Wollar Road	2	0	0	2
Total^A	145	9	0	154

^A Includes trips to and from the Covid testing facilities by Underground workers.

The daily and peak hour distribution of traffic in 2025 generated by the MCC (including the Project) on the public roads has been estimated using the results of the intersection surveys in 2022, and are summarised in Table 5.2. This assumes that Covid testing continues to occur at the CHPP access with similar protocols as those currently in place. A sensitivity analysis of the operating conditions when Covid testing ceases at the CHPP Access Road is provided in Section 5.4.

Table 5.2: Moolarben Coal Complex (Including the Project) Traffic on Public Roads in 2025

	Light Vehicles	Heavy Rigid Vehicles	Articulated Vehicles	Total Vehicles
Average Weekday Daily (vehicles per day)				
Ulan Road north of CHPP Access Road	121	26	22	169
Ulan Road north of Ulan-Wollar Road	545	73	28	646
Ulan Road south of Ulan-Wollar Road	1,593	140	32	1,765
Ulan-Wollar Road east of Ulan Road	1,416	91	46	1,553
Ulan-Wollar Road east of Open Cut Access	256	65	7	328
Ulan-Wollar Road east of ROM Facility Access	193	38	1	232
AM Peak Hour 6:00 am to 7:00 am (vehicles per hour)				
Ulan Road north of CHPP Access Road	17	0	1	18
Ulan Road north of Ulan-Wollar Road	69	7	2	78
Ulan Road south of Ulan-Wollar Road	272	16	2	290
Ulan-Wollar Road east of Ulan Road	243	9	2	254
Ulan-Wollar Road east of Open Cut Access	19	1	0	20
Ulan-Wollar Road east of ROM Facility Access	15	0	0	15
PM Peak Hour 4:00 pm to 5:00 pm (vehicles per hour)				
Ulan Road north of CHPP Access Road	5	1	0	6
Ulan Road north of Ulan-Wollar Road	46	3	0	49
Ulan Road south of Ulan-Wollar Road	128	8	0	136
Ulan-Wollar Road east of Ulan Road	94	7	0	101
Ulan-Wollar Road east of Open Cut Access	10	0	0	10
Ulan-Wollar Road east of ROM Facility Access	8	0	0	8

5.1.2 Traffic Generation in 2034

In the future assessment year 2034, the workforce at the MCC (including the Project) is anticipated to be approximately 561 people, a decrease of 436 people, or approximately 56 percent of the workforce employed during the traffic surveys in 2022. It is estimated that there would be an approximately 56 percent reduction in total traffic generated by the MCC from the current levels.

The total decrease in workforce and activity levels would include a 30 percent reduction in the workforce at the CHPP, with the remaining reductions being related to the cessation of underground mining operations and the mining operations that are accessed via the Open Cut Access Road. It is therefore expected that in 2034 there would be a 30 percent reduction in traffic accessing the CHPP Access Road for day-to-day operational activities, with the remainder of the reduction in traffic generated by the workforce, visitors and deliveries occurring at the Open Cut Access Road. No traffic would be using the CHPP Access Road for Covid testing. On this basis, the estimated traffic generation of the MCC (including the Project) in 2034 is summarised in Table 5.3.

Table 5.3: Moolarben Coal Complex (Including the Project) Traffic Generation in 2034

MCC Access Road	Light Vehicles	Heavy Rigid Vehicles	Articulated Vehicles	Total Vehicles
Average Weekday Daily (vehicles per day)				
CHPP Access Road east of Ulan Road	237	49	8	294
Open Cut Access Road south of Ulan-Wollar Road	595	15	14	664
ROM Facility Access Road south of Ulan-Wollar Road	69	33	6	108
Total	901	97	28	1,066
AM Peak Hour 6:00 am to 7:00 am (vehicles per hour)				
CHPP Access Road east of Ulan Road	25	5	1	31
Open Cut Access Road south of Ulan-Wollar Road	101	2	1	116
ROM Facility Access Road south of Ulan-Wollar Road	4	1	0	5
Total	130	8	2	152
PM Peak Hour 4:00 pm to 5:00 pm (vehicles per hour)				
CHPP Access Road east of Ulan Road	24	2	0	26
Open Cut Access Road south of Ulan-Wollar Road	41	2	0	43
ROM Facility Access Road south of Ulan-Wollar Road	2	0	0	2
Total	67	4	0	71

The daily and peak hour distribution of traffic in 2034 generated by the MCC (including the Project) on the public roads has been estimated using the results of the intersection surveys in 2022, and are summarised in Table 5.4.

Table 5.4: Moolarben Coal Complex (Including the Project) Traffic on Public Roads in 2034

	Light Vehicles	Heavy Rigid Vehicles	Articulated Vehicles	Total Vehicles
Average Weekday Daily (vehicles per day)				
Ulan Road north of CHPP Access Road	57	12	11	80
Ulan Road north of Ulan-Wollar Road	262	49	14	325
Ulan Road south of Ulan-Wollar Road	763	77	17	857
Ulan-Wollar Road east of Ulan Road	583	40	21	644
Ulan-Wollar Road east of Open Cut Access	144	35	6	185
Ulan-Wollar Road east of ROM Facility Access	81	8	0	89
AM Peak Hour 6:00 am to 7:00 am (vehicles per hour)				
Ulan Road north of CHPP Access Road	7	0	0	7
Ulan Road north of Ulan-Wollar Road	28	5	1	34
Ulan Road south of Ulan-Wollar Road	110	8	2	120
Ulan-Wollar Road east of Ulan Road	98	3	1	102
Ulan-Wollar Road east of Open Cut Access	10	1	0	11
Ulan-Wollar Road east of ROM Facility Access	6	0	0	6
PM Peak Hour 4:00 pm to 5:00 pm (vehicles per hour)				
Ulan Road north of CHPP Access Road	3	1	0	4
Ulan Road north of Ulan-Wollar Road	25	2	0	27
Ulan Road south of Ulan-Wollar Road	60	4	0	64
Ulan-Wollar Road east of Ulan Road	39	2	0	41
Ulan-Wollar Road east of Open Cut Access	5	0	0	5
Ulan-Wollar Road east of ROM Facility Access	3	0	0	3

5.2 Future Traffic Volumes

The future average weekday traffic volumes on the MCC (including the Project) access roads and surrounding public roads in 2025 are summarised in Table 5.5. This includes the cumulative effects of the additional traffic expected to be generated by other mining operations (Sections 4.1.1 to 4.1.3) and background growth in non-MCC traffic (Section 4.2).

Table 5.5: Future Average Weekday Traffic in 2025

	Light Vehicles	Heavy Rigid Vehicles	Articulated Vehicles	Total Vehicles
Average Weekday Daily (vehicles per day)				
Ulan Road north of CHPP Access Road	2,264	132	107	2,503
Ulan Road north of Ulan-Wollar Road	2,787	182	137	3,106
Ulan Road south of Ulan-Wollar Road	4,341	261	140	4,742
Ulan-Wollar Road east of Ulan Road	2,402	173	99	2,674
Ulan-Wollar Road east of Open Cut Access	1,273	135	69	1,477
Ulan-Wollar Road east of ROM Facility Access	1,120	99	47	1,266
AM Peak Hour 6:00 am to 7:00 am (vehicles per hour)				
Ulan Road north of CHPP Access Road	214	5	7	226
Ulan Road north of Ulan-Wollar Road	286	10	9	305
Ulan Road south of Ulan-Wollar Road	656	24	5	685
Ulan-Wollar Road east of Ulan Road	438	14	6	458
Ulan-Wollar Road east of Open Cut Access	218	5	4	227
Ulan-Wollar Road east of ROM Facility Access	206	3	4	213
PM Peak Hour 4:00 pm to 5:00 pm (vehicles per hour)				
Ulan Road north of CHPP Access Road	176	11	3	190
Ulan Road north of Ulan-Wollar Road	219	8	4	231
Ulan Road south of Ulan-Wollar Road	372	16	7	395
Ulan-Wollar Road east of Ulan Road	181	10	3	194
Ulan-Wollar Road east of Open Cut Access	81	2	2	85
Ulan-Wollar Road east of ROM Facility Access	66	4	0	70

The future average weekday traffic volumes on the MCC (including the Project) access roads and surrounding public roads in 2034 are summarised in Table 5.6. This includes the cumulative effects of the additional traffic expected to be generated by other mining operations (Sections 4.1.1 to 4.1.3) and background growth in non-MCC traffic (Section 4.2).

Table 5.6: Future Average Weekday Traffic in 2034

	Light Vehicles	Heavy Rigid Vehicles	Articulated Vehicles	Total Vehicles
Average Weekday Daily (vehicles per day)				
Ulan Road north of CHPP Access Road	2,198	118	94	2,410
Ulan Road north of Ulan-Wollar Road	2,502	158	121	2,781
Ulan Road south of Ulan-Wollar Road	3,509	197	123	3,829
Ulan-Wollar Road east of Ulan Road	1,569	121	74	1,764
Ulan-Wollar Road east of Open Cut Access	1,161	105	68	1,334
Ulan-Wollar Road east of ROM Facility Access	1,008	69	46	1,123
AM Peak Hour 6:00 am to 7:00 am (vehicles per hour)				
Ulan Road north of CHPP Access Road	202	5	6	213
Ulan Road north of Ulan-Wollar Road	242	8	8	258
Ulan Road south of Ulan-Wollar Road	491	16	5	512
Ulan-Wollar Road east of Ulan Road	293	8	5	306
Ulan-Wollar Road east of Open Cut Access	209	5	4	218
Ulan-Wollar Road east of ROM Facility Access	197	3	4	204
PM Peak Hour 4:00 pm to 5:00 pm (vehicles per hour)				
Ulan Road north of CHPP Access Road	175	11	3	189
Ulan Road north of Ulan-Wollar Road	199	7	4	210
Ulan Road south of Ulan-Wollar Road	305	12	7	324
Ulan-Wollar Road east of Ulan Road	126	5	3	134
Ulan-Wollar Road east of Open Cut Access	76	2	2	80
Ulan-Wollar Road east of ROM Facility Access	61	4	0	65

For comparison between existing and future traffic volumes, Table 5.7 summarises the total average weekday daily traffic volumes at key locations for the surveyed 2022 conditions, and for the 2025 and 2034 scenarios including the Project.

Table 5.7: Average Weekday Daily Traffic Including the Project (vehicles per day)

Road and Location	2022	2025	2034
CHPP Access Road east of Ulan Road	560	560	294
Open Cut Access Road south of Ulan-Wollar Road	1,366	1,678	625
ROM Facility Access Road south of Ulan-Wollar Road	108	108	108
Ulan Road north of CHPP Access Road	2,025	2,503	2,410
Ulan Road north of Ulan-Wollar Road	2,603	3,106	2,781
Ulan Road south of Ulan-Wollar Road	3,955 ^A	4,742	3,829
Ulan-Wollar Road east of Ulan Road	2,188	2,674	1,764
Ulan-Wollar Road east of Open Cut Access	1,214	1,477	1,334
Ulan-Wollar Road east of ROM Facility Access	1,024 ^A	1,266	1,123

^A Volumes on public roads are calculated based on the assumed distribution of MCC traffic, and over-estimate total traffic compared with the surveyed volumes as no discount has been applied for "internal" operational trips made directly between the site's access roads (Section 4.3.1).

Similarly, Table 5.8 summarises the total average weekday peak hourly traffic volumes at key locations for the surveyed 2022 conditions, and for the 2025 and 2034 scenarios including the Project.

Table 5.8: Average Weekday Peak Hour Traffic Including the Project (vehicles per hour)

Road and Location	AM Peak Hour 6:00 am to 7:00 am			PM Peak Hour 4:00 pm to 5:00 pm		
	2022	2025	2034	2022	2025	2034
CHPP Access Road east of Ulan Road	68	68	31	46	46	27
Open Cut Access Road south of Ulan-Wollar Road	219	264	103	86	107	42
ROM Facility Access Road south of Ulan-Wollar Road	5	5	5	2	2	2
Ulan Road north of CHPP Access Road	179	226	213	149	190	189
Ulan Road north of Ulan-Wollar Road	255	305	258	191	231	210
Ulan Road south of Ulan-Wollar Road	574 ^A	685	512	312 ^A	395	324
Ulan-Wollar Road east of Ulan Road	375	458	306	153	194	134
Ulan-Wollar Road east of Open Cut Access	180	227	218	68	85	80
Ulan-Wollar Road east of ROM Facility Access	169 ^A	213	204	56 ^A	70	65

^A Volumes on public roads are calculated based on the assumed distribution of MCC traffic, and over-estimate total traffic compared with the surveyed volumes as no discount has been applied for "internal" operational trips made directly between the site's access roads (Section 4.3.1).

5.3 Midblock Level of Service on the Road Network

The capacity of a road is defined as the maximum 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 will be affected by factors such as the pavement width and restricted lateral clearances, the presence of heavy vehicles and grades.

Level of Service (LOS) is defined as a qualitative measure describing the operational conditions within a traffic stream as perceived by drivers and/or passengers. A LOS definition generally describes these conditions in terms of factors such as speed and travel time, freedom to manoeuvre, traffic interruptions, comfort, convenience and safety. LOS A provides 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.

Austrroads (2020a) provides guidelines for the capacity and performance of two-lane, two-way rural roads, which in turn, refers to the *Highway Capacity Manual* (HCM), (Transportation Research Board, 2016). The LOS experienced by drivers on two-way rural roads is dependent on the drivers' expectations regarding the road, and three classes of road are defined in the HCM.

Class I roads are those on which motorists expect to travel at relatively high speeds. They 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.

The assessment considers Ulan Road and Ulan-Wollar Road as Class II roads, on which drivers do not necessarily expect to travel at relatively high speeds. On Class II roads, LOS is defined only in terms of Percent Time Spent Following (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. The LOS criteria for Class II two-lane two-way roads are as shown in Table 5.9.

Table 5.9: LOS Criteria for Class II Two-Lane Two-Way Roads

Level of Service	Percent Time Spent Following
A	≤ 40
B	> 40 – 55
C	> 55 – 70
D	> 70 – 85
E	≥ 85

Source: Austrroads (2020a)

The resulting PTSF and LOS on Ulan Road and Ulan-Wollar Road are summarised in Table 5.10 for the surveyed 2022 conditions, in Table 5.11 for the overall peak workforce at the MCC (including the Project) scenario in 2025, and in Table 5.12 for the longer term operational scenario in 2034.

Table 5.10: Midblock Levels of Service in 2022

Road and Location	Northbound or Eastbound				Southbound or Westbound			
	6:00 – 7:00 am		4:00 – 5:00 pm		6:00 – 7:00 am		4:00 – 5:00 pm	
	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS
Ulan Road north of CHPP Access Road	26.9	A	15.5	A	33.3	A	37.6	A
Ulan Road north of Ulan-Wollar Road	40.6	B	13.0	A	30.5	A	44.0	B
Ulan Road south of Ulan-Wollar Road	64.2	C	11.0	A	23.5	A	55.1	C
Ulan-Wollar Road east of Open Cut Access	51.9	B	49.1	B	11.3	A	20.3	A
Ulan-Wollar Road east of ROM Facility Access	51.4	B	49.0	B	10.7	A	18.0	A

The results indicate that during the surveyed peak hours in 2022 at the MCC, Ulan Road and Ulan-Wollar Road currently operate at satisfactory levels of service. It should be noted that the presence of overtaking lanes on Ulan Road to the south allows additional opportunities for overtaking, which are not included in the LOS determined above.

Table 5.11: Midblock Levels of Service in 2025

Road and Location	Northbound or Eastbound				Southbound or Westbound			
	6:00 – 7:00 am		4:00 – 5:00 pm		6:00 – 7:00 am		4:00 – 5:00 pm	
	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS
Ulan Road north of CHPP Access Road	30.2	A	17.3	A	37.5	A	40.7	B
Ulan Road north of Ulan-Wollar Road	44.5	B	15.6	A	35.7	A	45.9	B
Ulan Road south of Ulan-Wollar Road	65.1	C	13.2	A	28.8	A	59.2	C
Ulan-Wollar Road east of Open Cut Access	55.3	C	6.0	A	12.0	A	44.0	B
Ulan-Wollar Road east of ROM Facility Access	54.9	B	6.6	A	11.0	A	43.3	B

The results indicate that during peak hours in 2025 at the MCC (including the Project), Ulan Road and Ulan-Wollar Road would operate at satisfactory levels of service. It should be noted that the presence of overtaking lanes on Ulan Road to the south allows additional opportunities for overtaking, which are not included in the LOS determined above.

Table 5.12: Midblock Levels of Service in 2034

Road and Location	Northbound or Eastbound				Southbound or Westbound			
	6:00 – 7:00 am		4:00 – 5:00 pm		6:00 – 7:00 am		4:00 – 5:00 pm	
	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS
Ulan Road north of CHPP Access Road	30.9	A	17.4	A	34.6	A	40.5	B
Ulan Road north of Ulan-Wollar Road	39.3	A	15.5	A	33.8	A	43.7	B
Ulan Road south of Ulan-Wollar Road	62.4	C	12.0	A	28.4	A	54.8	B
Ulan-Wollar Road east of Open Cut Access	55.1	C	5.0	A	11.2	A	44.3	B
Ulan-Wollar Road east of ROM Facility Access	54.8	B	5.3	A	10.4	A	42.1	B

The results indicate that during peak hours in 2034 at the MCC (including the Project), Ulan Road and Ulan-Wollar Road would operate at satisfactory levels of service. It should be noted that the presence of overtaking lanes on Ulan Road to the south allows additional opportunities for overtaking, which are not included in the LOS determined above, and which would reduce the PTSF below that presented above. The future midblock levels of service do not raise any concerns regarding the future efficiency and safety of the road network with the future traffic demands.

Table 5.13 provides a summary of the existing and future midblock levels of service, which demonstrates that drivers would continue to experience conditions with satisfactory levels of service occurring throughout the life of the MCC with the Project.

Table 5.13: Summary of Project Impacts on Midblock Levels of Service

Road and Location	AM Peak Hour 6:00 am to 7:00 am			PM Peak Hour 4:00 pm to 5:00pm		
	2022	2025	2034	2022	2025	2034
Northbound or Eastbound Traffic						
Ulan Road north of CHPP Access Road	A	A	A	A	A	A
Ulan Road north of Ulan-Wollar Road	B	B	A	A	A	A
Ulan Road south of Ulan-Wollar Road	C	C	C	A	A	A
Ulan-Wollar Road east of Open Cut Access	B	C	C	B	A	A
Ulan-Wollar Road east of ROM Facility Access	B	B	B	B	A	A
Southbound or Westbound Traffic						
Ulan Road north of CHPP Access Road	A	A	A	A	B	B
Ulan Road north of Ulan-Wollar Road	A	A	A	B	B	B
Ulan Road south of Ulan-Wollar Road	A	A	A	C	C	B
Ulan-Wollar Road east of Open Cut Access	A	A	A	A	B	B
Ulan-Wollar Road east of ROM Facility Access	A	A	A	A	B	B

5.4 Intersection Performance

The operating characteristics of the key intersections have been assessed using SIDRA INTERSECTION 9, an analysis program that determines characteristics of intersection operating conditions including the degree of saturation, average delays and intersection level of service. 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 measure of intersection performance defined by TfNSW. Table 5.14 presents the criteria adopted by TfNSW for assessing the level of service of intersections.

Table 5.14: 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

Table 5.15 presents a summary of the peak hour operating characteristics of the key intersections as surveyed in 2022, during the overall peak workforce at the MCC (including the Project) scenario (i.e. 2025) and with the longer-term operation of the Project scenario in 2034. Detailed results, including 95th percentile vehicle queues per movement are presented in Appendix C.

The SIDRA results demonstrate that in 2025 (i.e. overall peak workforce at the MCC [including the Project]) and 2034 (i.e. longer-term operation of the Project scenario) at the MCC (including the Project), the key intersections would operate at good levels of service, with spare capacity and short delays to drivers. The Levels of Service experienced at the intersections would remain the same as the existing conditions in 2022.

As described in Section 4.3.2, the UG4 Ancillary Works is anticipated to result in some minor redistribution of traffic between access for the MCC. The forecasts of the potential implications of that redistribution (Table 4.4) assume that peak traffic generation associated with each of the UG4 Ancillary Works activities would occur at each and every impacted access simultaneously. While that was assumed to determine any capacity constraints associated with those activities, such conditions would not occur on a day-to-day basis, and indeed may not ever occur.

The principal impact of the redistribution of traffic for UG4 Ancillary Works activities would occur at the intersection of Ulan Road with Ulan-Wollar Road, as all redistributed traffic would pass through that intersection. The sensitivity of the operation of that intersection has therefore been tested assuming the unlikely coincidence of the cumulative peak hour activity associated with the UG4 Ancillary Works (Table 4.4) coincides with the peak hours associated with the traffic generation of the MCC during the Project assessment years.

Table 5.15: Intersection Operating Conditions

Intersection	6:00 – 7:00 am			4:00 – 5:00 pm		
	X-Value	Average Delay ^A	Level of Service	X-Value	Average Delay ^A	Level of Service
2022 Surveyed						
CHPP Access Road and Ulan Road	0.06	8.0	A	0.06	7.8	A
Open Cut Access Road and Ulan-Wollar Road	0.10	7.8	A	0.05	7.8	A
ROM Facility Access and Ulan-Wollar Road	0.08	10.4	A	0.04	7.8	A
Ulan Road and Ulan-Wollar Road	0.23	8.4	A	0.11	8.2	A
2025 with Peak Workforce at the MCC (including the Project)						
CHPP Access Road and Ulan Road	0.07	8.3	A	0.09	8.4	A
Open Cut Access Road and Ulan-Wollar Road	0.11	7.8	A	0.07	8.5	A
ROM Facility Access and Ulan-Wollar Road	0.11	8.6	A	0.05	7.8	A
Ulan Road and Ulan-Wollar Road	0.28	9.2	A	0.16	9.7	A
2034 with Longer-term Operational Scenario						
CHPP Access Road and Ulan Road	0.07	8.5	A	0.09	8.7	A
Open Cut Access Road and Ulan-Wollar Road	0.11	7.8	A	0.06	8.2	A
ROM Facility Access and Ulan-Wollar Road	0.10	8.5	A	0.05	7.8	A
Ulan Road and Ulan-Wollar Road	0.20	8.8	A	0.11	9.1	A

^A Seconds per vehicle for movement with the highest average delay per vehicle.

When the Covid testing procedures cease, the Underground workers currently attending the testing facility at the CHPP Access Road would instead travel directly to the Underground Access Road (via the Open Cut Access Road) rather than via the CHPP Access Road. With the majority of the workforce approaching from the south on Ulan Road, compared with the surveyed conditions, this would increase the demand for right-turn movements into Ulan-Wollar Road and decrease the demand for northbound through movements on Ulan Road as well as left-turn movements from Ulan Road to Ulan-Wollar Road. TTPP has conducted a sensitivity assessment of the operation of the intersection of Ulan Road and Ulan-Wollar Road in 2025 to assess its operating conditions when Covid testing ceases at the CHPP Access Road.

The results of the sensitivity analyses are summarised in Table 5.16.

Table 5.16: Sensitivity Analysis of Ulan Road and Ulan-Wollar Road Intersection Operation 2025

Peak Hour	X-Value	Average Delay ^A	Level of Service
With UG4 Ancillary Works Peak Traffic Redistribution			
6:00 – 7:00 am	0.29	13.3	A
4:00 – 5:00 pm	0.11	12.3	A
With Cessation of Covid testing at CHPP Access for Underground Workers			
6:00 – 7:00 am	0.29	9.2	A
4:00 – 5:00 pm	0.16	9.5	A

^A Seconds per vehicle for movement with the highest average delay per vehicle.

The results demonstrate that in 2025 (i.e. overall peak workforce at the MCC [including the Project]), the operation of the intersection of Ulan Road with Ulan-Wollar Road is not sensitive to the effects of the cessation of Covid testing or the redistribution of traffic associated with the UG4 Ancillary Works activities. Under those conditions, the intersection would continue to operate at good levels of service, with spare capacity and short delays to drivers.

The future intersection operating conditions do not raise any concerns regarding the capacity, future performance and safety of the intersections with the future traffic demands.

5.5 Intersection Treatments

The assessment of intersection operating conditions (Section 5.4) demonstrates that the existing intersections have adequate capacity to accommodate the forecast traffic demands, with delays to drivers being short.

Nevertheless, the forecast demands at the time of the peak workforce at the MCC including the Project (i.e. 2025) have been compared against the Austroads warrants for major road treatments at rural road intersections. The current Austroads (2021) rural intersection design treatments are briefly described below.

The general minimum preferred treatments at rural road intersections are BAL and 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.

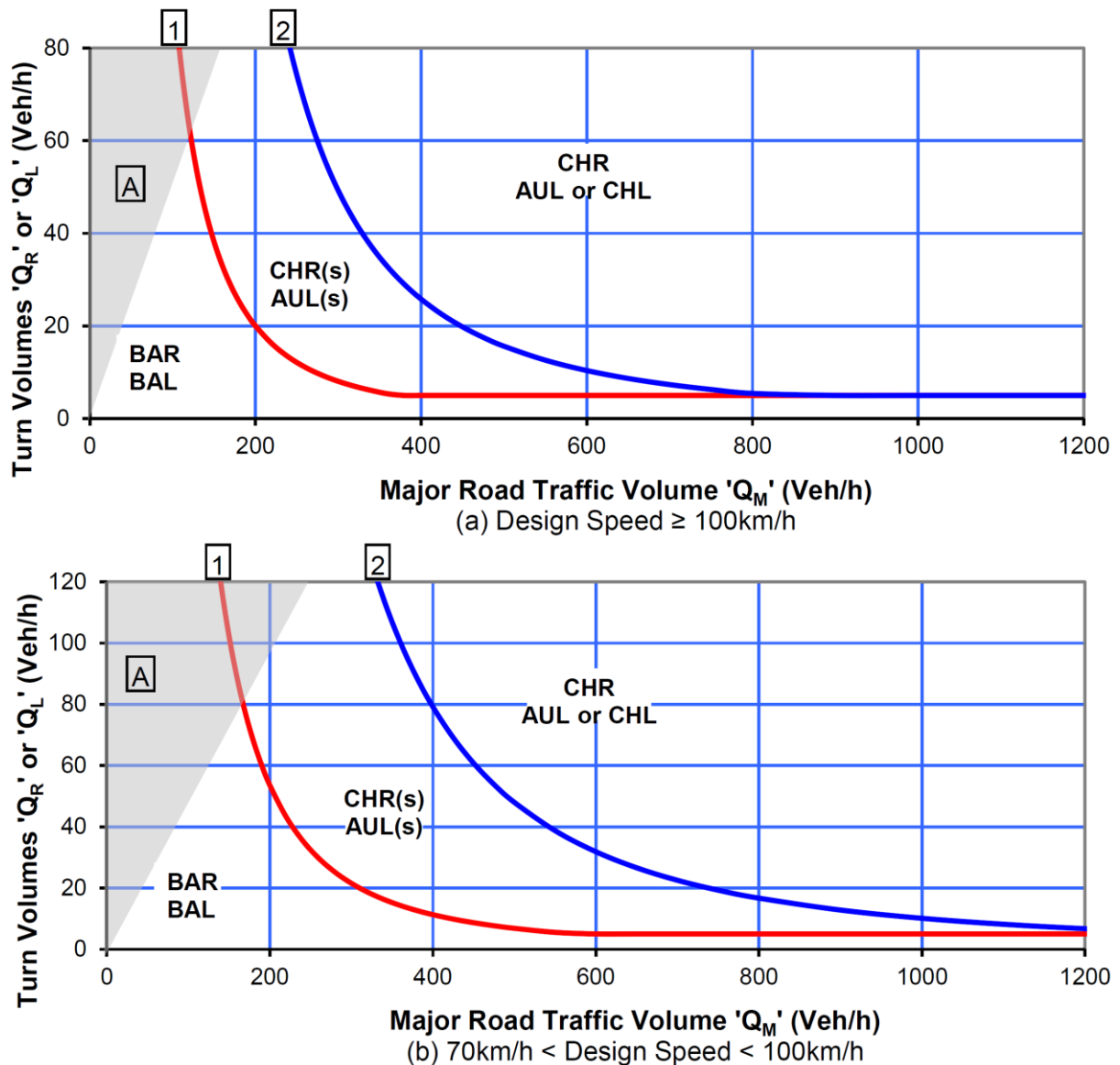
Auxiliary lane turn treatments have short lengths of auxiliary lane provided to improve safety, especially on high speed roads. The Auxiliary Right-turn treatment (AUR) on the major road is not used in NSW, rather a channelised right-turn (CHR) treatment with a short turn bay known as a CHR(S) treatment is used. This is a modification of the channelised treatment described below. Auxiliary Left-turn (AUL) treatments on the major road are normal indented turn lanes, used only by vehicles turning left.

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. Channelised left-turn (CHL) treatments on the major 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 guidelines for the level of treatment in the major road at an intersection are given in Austroads (2020b), which contains details of the warrants for rural road turn treatments for high-speed rural roads that would apply to the roads along the transport routes for the MCC (including the Project). The warranted treatment is based on an assessment of the combination of through and turning movements at the intersection, with higher turning volumes generally requiring higher levels of treatment above the minimum. The warrants are applicable to greenfields intersections, however may also be appropriate to consider when determining upgrade requirements for existing intersections.

The graph relevant to the 100 km/h speeds at the majority of the surveyed intersections is presented in Figure 5.1, together with the graph relevant to intermediate speeds of 70 km/h to 100 km/h. At the intersection of Ulan-Wollar Road with the Open Cut Access Road, the through speeds on Ulan-Wollar Road would be significantly lower than 100 km/h, as all vehicles would be approaching eastbound from a turn from Ulan Road or westbound through the curve immediately to the east of the intersection, which has an advisory speed of 55 km/h. For the purpose of this review, the warrant for intermediate speed environments has been used at that intersection. In those graphs, Q_L and Q_R are the number of vehicles turning left and right respectively from the major road, and Q_M is the major road flow, which calculated depending on whether the left or right-turn treatment is being considered.

Figure 5.1: Warrants for Turn Treatments on Major Roads at Unsignalised Intersections



BAL = Basic Left-turn; BAR = Basic Right-turn; AUL = Auxiliary Left-turn; CHL = Channelised Left-turn; CHR = Channelised Right-turn, (s) = short
 Curve 1 is the boundary between a BAR and CHR(s) treatment and between a BAL and an AUL(s) treatment.
 Curve 2 is the boundary between a CHR(s) and a CHR treatment and between an AUL(s) and AUL or CHL treatment.
 In Area A, more than 50% of approaching traffic turns left or right, and realignment may be considered to suit the major movement.
 Source: Austroads (2020b)

The comparison of forecast peak hour turning movements in 2025 at the MCC (including the Project) against the warrants is summarised in Table 5.17. As 2025 represents the peak conditions for future traffic on the road network (Section 5.2), consideration of the warrants against 2025 conditions, TPP has not conducted the assessment for the lower traffic anticipated in 2034.

Table 5.17: Intersection Major Road Treatments in 2025

Intersection	6:00am to 7:00am			4:00pm to 5:00pm			Existing Treatment	Warrant Met
	Q _L	Q _M	Warrant	Q _R	Q _M	Warrant		
Left Turn Treatment in Major Road								
CHPP Access Road and Ulan Road	4	100	BAL	0	53	BAL	AUL	Yes
Open Cut Access Road and Ulan-Wollar Road	5	179	BAL	5	7	BAL	BAL	Yes
ROM Facility Access and Ulan-Wollar Road	0	179	BAL	0	9	BAL	AUL	Yes
Ulan Road and Ulan-Wollar Road	27	158	BAL	4	45	BAL	AUL	Yes
Right Turn Treatment in Major Road								
CHPP Access Road and Ulan Road	54	226	CHR(S)	6	188	BAR	CHR	Yes
Open Cut Access Road and Ulan-Wollar Road	229	217	CHR(S)	14	82	BAR	CHR(S)	Yes
ROM Facility Access and Ulan-Wollar Road	3	213	BAR	0	70	BAR	AUL^	Yes
Ulan Road and Ulan-Wollar Road	379	293	CHR	10	220	BAR	CHR	Yes

^A This is a four way intersection, with an AUL treatment for the left turn west to north, which allows an eastbound vehicle to pass around a vehicle which has slowed to turn right to the south.

The comparison indicates that at the surveyed intersections in 2025 at the MCC (including the Project), the existing major road treatments meet or exceed the Austroads warrants for major road treatments for greenfields intersections.

5.6 Railway Level Crossings

The Project would not change the existing limits on train movements associated with the MCC, which are an average of eight laden trains per day over any calendar year, and a maximum of 11 laden trains per day. The operation of the MCC (including the Project) would therefore have no impact on the number of train movements at the 10 level crossings considered in Section 3.4, nor on the findings of the *Hunter Valley Corridor Capacity Strategy*. Notwithstanding, a review has been undertaken to identify any potential deficiencies or planned changes to the existing level crossings that may be used by MCC-generated traffic.

The review of the existing signage and linemarking associated with the ten level crossings (Appendix B) found that the signage and linemarking across the level crossings is generally consistent with AS 1742.7, with some minor non-conformances. Those minor matters may be appropriately addressed through regular maintenance programs, e.g., to upgrade outdated signage and refresh faded pavement markings.

The road traffic generated by the MCC (including the Project) may be expected to contribute to the road traffic at the level crossings on:

- Cope Road (LXM 1304) for drivers travelling to and from Ulan and Gulgong; and
- Ulan-Wollar Road (LXM 1301 and LXM 1300) and Bylong Valley Way (LXM 1295) for drivers travelling to and from Wollar and farther east.

Traffic generated by MCC (including the Project) is unlikely to contribute to road traffic at the remaining level crossings included in the review.

GTA Consultants (2015a) suggests that based on an origin-destination survey conducted at and around Wilpinjong Coal Mine (GTA Consultants, 2013), approximately 15 percent of the MCC-generated traffic on Ulan Road south of Ulan-Wollar Road may be expected to travel on Cope Road. These would be light vehicles, as heavy vehicle deliveries are primarily sourced from Mudgee or beyond. No traffic generated by the MCC was found to travel to and from the east on Ulan-Wollar Road.

Since that time, changes to traffic distributions are likely to have occurred for various reasons such as the opening of the Ulan Village Green accommodation facility and the sealing of Ulan-Wollar Road east of Wilpinjong Coal Mine. Nevertheless, on this basis, MCC may be expected to contribute in the order of 40 vehicles (37 inbound and 3 outbound) during the AM peak hour and 20 vehicles (3 inbound and 17 outbound) during the PM peak hour at the Cope Road level crossing in 2025. This compares with an estimated 35 (33 inbound and 2 outbound) and 17 (2 inbound and 15 outbound) vehicles during the AM and PM peak hours respectively in 2022.

The primary impact of traffic increases at the Cope Road level crossing would be the potential for queueing of westbound (outbound) vehicles on the eastern side of the level crossing when a train closes the crossing. In 2025 with the overall peak workforce at the MCC (including the Project), compared with the existing operational conditions, the MCC (including the Project) would generate one additional outbound vehicle during the AM peak hour and two additional outbound vehicles during the PM peak hour. The effect of this minor increase in outbound traffic on any queue generated during occupation of the level crossing by a train in those peak hours would be negligible.

The level crossings to the east on Ulan-Wollar Road and Bylong Valley Way do not have any specific existing concerns regarding queueing of vehicles during closure of the level crossing, so any increase in use of those routes by vehicles generated by the MCC (including the Project) would not impact the operation of the level crossing or the nearby road network.

6 Conclusions

This study has investigated the future road transport environment associated with the MCC and the proposed extension to the approved open cut operations (i.e. the Project). The study has found that the future operating conditions of the surrounding road network would be acceptable, with no significant impacts identified on the performance, capacity, efficiency and safety of the road network.

No specific management or mitigation measures are considered to be warranted by the future operations of the MCC, including the Project and other mining operations in the region. MCO will continue to contribute to road maintenance in accordance with Project Approval (05_0117) and Project Approval (08_0135).

Based on the analysis and discussions presented in this report, it is concluded that the existing road network would satisfactorily accommodate the future traffic demands of the MCC including the Project.

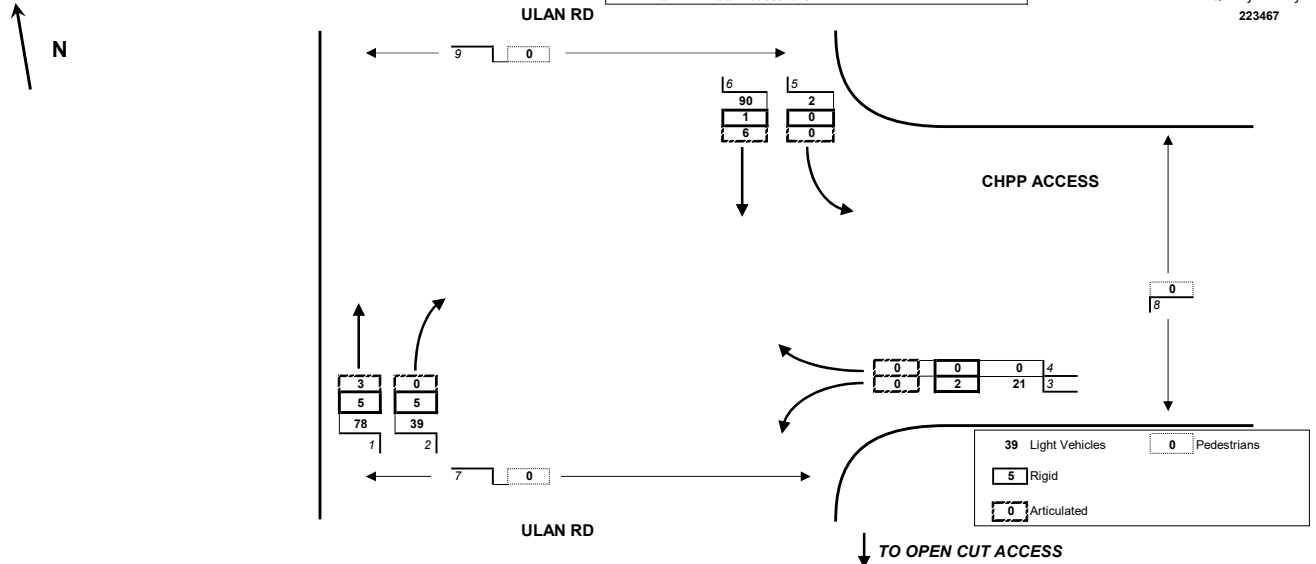
Appendix A

Traffic Survey Results

7:30 <<< HOUR ENDING

Thursday

Summary: ULAN RD / CHPP ACCESS	
230	Total Light Vehicles
13	Total Rigid
9	Total Articulated
0	Total Pedestrians

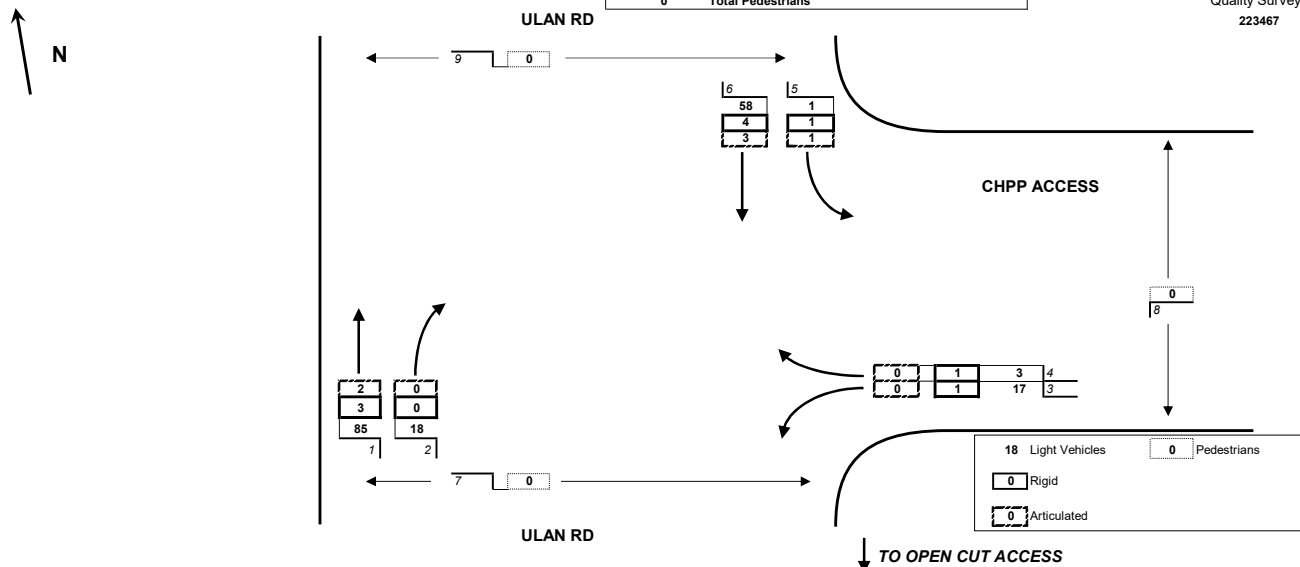


5/5/2022 - ULAN RD / CHPP ACCESS, MOOLARBEN

Light Vehicles							Total Vehicles		Pedestrians		
	1	2	3	4	5	6	15 MIN	HOURL	7	8	9
05:15	25	3	0	0	0	1	29		0	0	0
05:30	62	1	0	0	0	3	66		0	0	0
05:45	48	13	1	0	0	3	65		0	0	0
06:00	12 <	14	0	0	0	3	29	189	0	0	0
06:15	20	9	1	0	1	13	44	204	0	0	0
06:30	14	8	4	0	0	18	44	182	0	0	0
06:45	25	13	1	0	2 <	33	74	191	0	0	0
07:00	16	16 <	1	0	0 <	29 <	62	224	0	0	0
07:15	19	4	6	0	0	12	41	221	0	0	0
07:30	18	6	13	0	0	16	53	230 <	0	0	0
07:45	10	3	3	0	0	5	21	177	0	0	0
08:00	10	4	3 <	0	0	13	30	145	0	0	0
08:15	7	7	5	0	0	8	27	131	0	0	0
08:30	10	5	4	0	0	8	27	105	0	0	0
08:45	10	2	4	1	1	5	23	107	0	0	0
09:00	6	0	4	0	0	8	18	95	0	0	0
09:15	12	6	3	0	0	7	28	96	0	0	0
09:30	7	10	0	0	2 <	9	28	97	0	0	0
09:45	15	4	7	0	1 <	4	31	105	0	0	0
10:00	9	2	4	3 <	0 <	4	22	109	0	0	0
Rigid							Total Vehicles				
	1	2	3	4	5	6	15 MIN	HOURL			
05:15	0	0	0	0	0	0	0				
05:30	0	0	0	0	0	0	0				
05:45	0	0	0	0	0	0	0				
06:00	0	0	0	0	0	0	0	0			
06:15	0	2	0	0	0	0	2	2			
06:30	0	1	0	0	0	0	1	3			
06:45	1	1	0	0	0	0	2	5			
07:00	3	1 <	0	0	0	0	4	9			
07:15	0	2 <	1	0	0	0	3	10			
07:30	1	1 <	1	0	0	1	4	13			
07:45	2	1 <	1	0	0	2	6	17			
08:00	2	1 <	0	0	0	3 <	6	19			
08:15	1	0	3	0	0	0 <	4	20 <			
08:30	2 <	0	1	0	0	1 <	4	20 <			
08:45	1	1	0	0	0	0	2	16			
09:00	0	1	2 <	0	0	1	4	14			
09:15	0	1	0	0	0	3	4	14			
09:30	1	0	0	0	0	1	2	12			
09:45	1	0	0	0	0	0	1	11			
10:00	1	0	0	0	0	2 <	3	10			
Articulated							Total Vehicles				
	1	2	3	4	5	6	15 MIN	HOURL			
05:15	0	0	0	0	0	1	1				
05:30	0	0	0	0	0	2	2				
05:45	0	0	0	0	0	0	0				
06:00	0	0	0	0	0	0	0	3			
06:15	0	0	0	0	0	0	0	2			
06:30	1	0	0	0	0	1	2	2			
06:45	0	0	0	0	0	2	2	4			
07:00	0	0	0	0	0	1	1	5			
07:15	2	0	0	0	0	2 <	4	9			
07:30	1	0	0	0	0	1 <	2	9			
07:45	0	0	0	0	0	0	0	7			
08:00	1	0	0	0	0	0	1	7			
08:15	1	1 <	0	0	1 <	1	4	7			
08:30	0	0 <	1	0	0 <	2	3	8			
08:45	1	0 <	0	0	0 <	0	1	9			
09:00	0	0 <	0	0	0 <	1	1	9			
09:15	4	0	0	0	0	0	4	9			
09:30	1 <	0	1	1 <	0	1	4	10			
09:45	1 <	0	0	0 <	0	0	1	10			
10:00	0 <	0	1 <	0 <	0	0	1	10			
Light + Heavy Vehicles							Total Vehicles				
	1	2	3	4	5	6	15 MIN	HOURL			
05:15	25	3	0	0	0	1	29				
05:30	62	1	0	0	0	3	66				
05:45	48	13	1	0	0	3	65				
06:00	12 <	14	0	0	0	3	29	189			
06:15	20	11	1	0	1	13	46	206			
06:30	14	9	4	0	0	18	45	185			
06:45	26	14	1	0	2 <	33	76	196			
07:00	19	17 <	1	0	0 <	29 <	66	233			
07:15	19	6	7	0	0	12	44	231			
07:30	19	7	14	0	0	17	57	243 <			
07:45	12	4	4	0	0	7	27	194			
08:00	12	5	3	0	0	16	36	164			
08:15	8	7	8 <	0	0	8	31	151			
08:30	12	5	5	0	0	9	31	125			
08:45	11	3	4	1	1	5	25	123			
09:00	6	1	6	0	0	9	22	109			
09:15	12	7	3	0	0	10	32	110			
09:30	8	10	0	0	2 <	10	30	109			
09:45	16	4	7	0	1 <	4	32	116			
10:00	10	2	4	3 <	0 <	6	25	119			

Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

Summary: ULAN RD / CHPP ACCESS	
182	Total Light Vehicles
10	Total Rigid
6	Total Articulated
0	Total Pedestrians

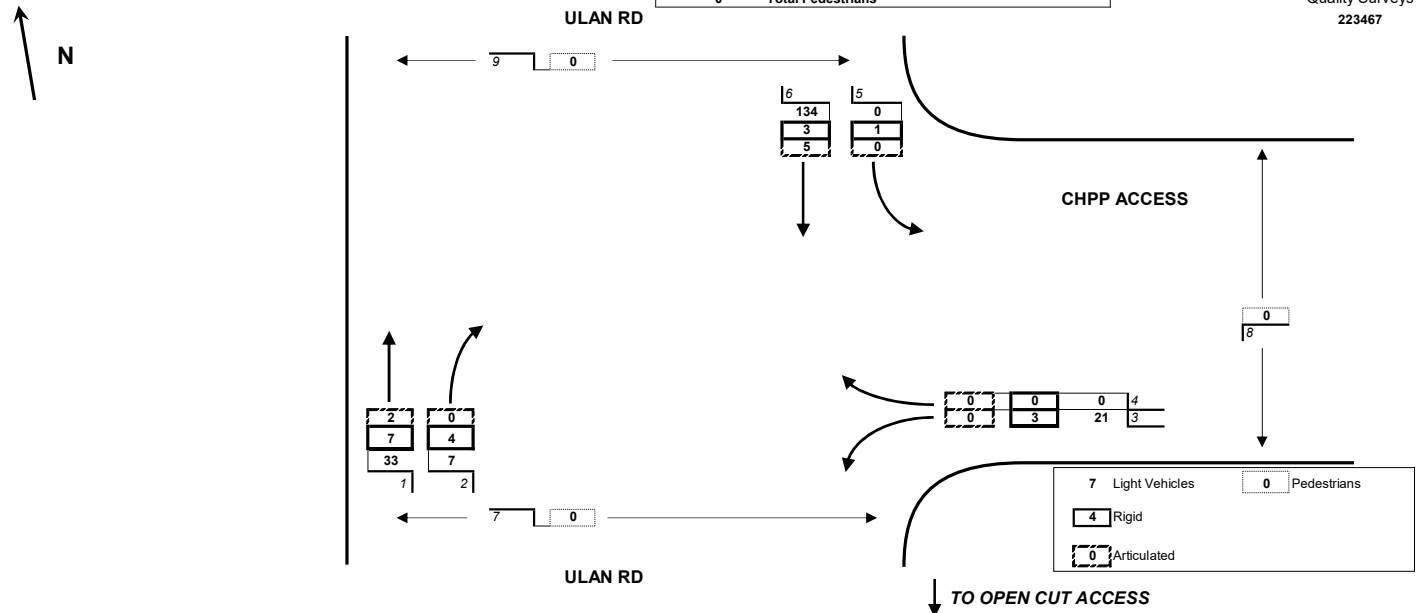


4/5/2022 - ULAN RD / CHPP ACCESS, MOOLARBEN

Light Vehicles							Total Vehicles		Pedestrians		
	1	2	3	4	5	6	15 MIN	HOURLY	7	8	9
10:15	15	2	6	1	0	7	31		0	0	0
10:30	15	4	1	0	1	18	39		0	0	0
10:45	18	6	7	0	0	5	36		0	0	0
11:00	19	3	4	0	0	6	32	138	0	0	0
11:15	10	2	1	1	1	8	23	130	0	0	0
11:30	12	3	4	0	1	8	28	119	0	0	0
11:45	14	5	3	0	0	7	29	112	0	0	0
12:00	15	2	3	0	0	5	25	105	0	0	0
12:15	11	4	2	0	0	17	34	116	0	0	0
12:30	9	1	4	0	0	11	25	113	0	0	0
12:45	21	2	3	0	0	13	39	123	0	0	0
13:00	20	2	6	0	0	12	40	138	0	0	0
13:15	20	8	4	1	0	14	47	151	0	0	0
13:30	18	3	3	0	1	14	39	165	0	0	0
13:45	27	5	4	2	0	18	56	182	0	0	0
14:00	12	2	3	1	1	12	31	173	0	0	0
14:15	10	3	4	0	0	8	25	151	0	0	0
14:30	5	2	2	1	0	16	26	138	0	0	0
14:45	4	2	2	0	0	19	27	109	0	0	0
15:00	8	1	5	0	0	31	45	123	0	0	0
Rigid							Total Vehicles				
	1	2	3	4	5	6	15 MIN	HOURLY			
10:15	0	0	0	0	0	0	0				
10:30	1	0	1	0	0	1	3				
10:45	0	0	0	0	0	1	1				
11:00	0	1	0	0	0	0	1	5			
11:15	1	0	0	1	2	0	4	9			
11:30	0	0	1	0	0	2	3	9			
11:45	1	0	2	0	0	0	3	11			
12:00	0	1	0	0	0	0	1	11			
12:15	0	1	0	0	0	2	3	10			
12:30	1	1	0	0	0	3	5	12			
12:45	0	1	1	0	0	0	2	11			
13:00	1	0	1	0	0	0	2	12			
13:15	1	0	0	0	0	0	1	10			
13:30	1	0	0	1	0	1	3	8			
13:45	0	0	0	0	1	3	4	10			
14:00	3	0	0	0	0	0	3	11			
14:15	0	2	1	0	0	2	5	15			
14:30	1	0	1	0	0	0	2	14			
14:45	1	1	0	0	0	2	4	14			
15:00	0	0	2	0	0	3	5	16			
Articulated							Total Vehicles				
	1	2	3	4	5	6	15 MIN	HOURLY			
10:15	0	0	0	1	0	3	4				
10:30	1	0	0	0	0	1	2				
10:45	1	0	0	0	0	0	1				
11:00	1	0	0	0	0	0	3	10			
11:15	0	0	0	0	0	0	0	6			
11:30	0	0	0	0	0	0	0	4			
11:45	0	1	0	0	0	1	2	5			
12:00	3	0	0	0	0	1	4	6			
12:15	2	0	0	1	0	0	3	9			
12:30	0	0	0	0	0	1	1	10			
12:45	0	1	0	0	0	1	2	10			
13:00	0	0	0	0	0	0	0	6			
13:15	0	0	0	0	1	0	1	4			
13:30	1	0	0	0	0	1	2	5			
13:45	1	0	0	0	0	2	3	6			
14:00	0	0	0	0	0	1	1	7			
14:15	0	1	0	0	0	1	2	8			
14:30	0	0	0	2	0	2	4	10			
14:45	0	0	0	0	0	1	1	8			
15:00	0	0	1	0	0	1	2	9			
Light + Heavy Vehicles							Total Vehicles				
	1	2	3	4	5	6	15 MIN	HOURLY			
10:15	15	2	6	1	0	7	31				
10:30	16	4	2	0	1	19	42				
10:45	18	6	7	0	0	6	37				
11:00	19	4	4	0	0	6	33	143			
11:15	11	2	1	2	3	8	27	139			
11:30	12	3	5	0	1	10	31	128			
11:45	15	5	5	0	0	7	32	123			
12:00	15	3	3	0	0	5	26	116			
12:15	11	5	2	0	0	19	37	126			
12:30	10	2	4	0	0	14	30	125			
12:45	21	3	4	0	0	13	41	134			
13:00	21	2	7	0	0	12	42	150			
13:15	21	8	4	1	0	14	48	161			
13:30	19	3	3	1	1	15	42	173			
13:45	27	5	4	2	1	21	60	192			
14:00	15	2	3	1	1	12	34	184			
14:15	10	5	5	0	0	10	30	166			
14:30	6	2	3	1	0	16	28	152			
14:45	5	3	2	0	0	21	31	123			
15:00	8	1	7	0	0	34	50	139			

Note: Arrows "<" indicate the end time for the peak hour for each turning movement.

Summary: ULAN RD / CHPP ACCESS	
195	Total Light Vehicles
18	Total Rigid
7	Total Articulated
0	Total Pedestrians

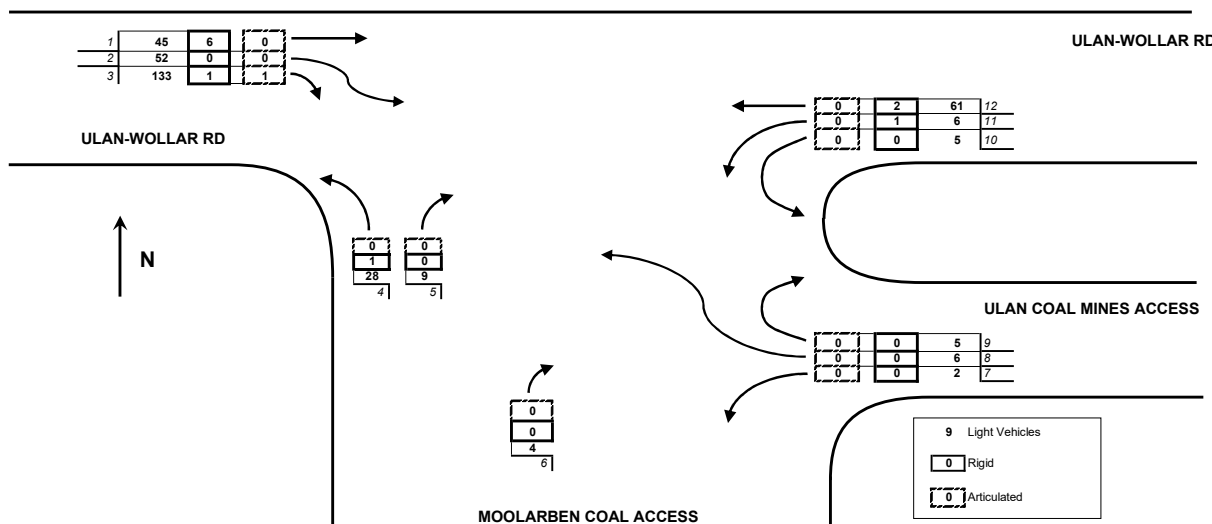


4/5/2022 - ULAN RD / CHPP ACCESS, MOOLARBEN

Light Vehicles							Total Vehicles		Pedestrians		
	1	2	3	4	5	6	15 MIN	HOURLY	7	8	9
15:15	6	1	9	0	0	48	64		0	0	0
15:30	12	1	6	0	0	28	47		0	0	0
15:45	7	3	0	0	0	29	39		0	0	0
16:00	8	2	6	0	0	29 <	45	195	0	0	0
16:15	7	3	18	0	0	28	56	187	0	0	0
16:30	7	1	12	0	0	29	49	189	0	0	0
16:45	14	2	10 <	1	0	27	54	204 <	0	0	0
17:00	8	0	6 <	0	0	20	34	193	0	0	0
17:15	11	1	5	1 <	0	15	33	170	0	0	0
17:30	8 <	2	3	0 <	1	15	29	150	0	0	0
17:45	9	1	2	0	0	7	19	115	0	0	0
18:00	9	0	4	0	1 <	15	29	110	0	0	0
18:15	3	1	3	0	0 <	20	27	104	0	0	0
18:30	1	3	0	0	0	26	30	105	0	0	0
18:45	1	6	1	0	1 <	18	27	113	0	0	0
19:00	3	1 <	1	0	0	5	10	94	0	0	0
Rigid							Total Vehicles				
	1	2	3	4	5	6	15 MIN	HOURLY			
15:15	3	2	0	0	1	0	6				
15:30	1	1	1	0	0	1	4				
15:45	3	0	2	0	0	0	5				
16:00	0 <	1 <	0 <	0	0 <	2	3	18 <			
16:15	0	0	0 <	0	0	0	0	12			
16:30	1	0	0	0	0	0	1	9			
16:45	3	0	0	1 <	0	0	4	8			
17:00	1	0	1	0 <	0	2	4	9			
17:15	0	0	0	0 <	0	0	0	9			
17:30	0	0	0	0 <	0	1	1	9			
17:45	1	0	0	0	0	1 <	2	7			
18:00	0	0	1	0	0	1	2	5			
18:15	0	0	0	0	0	1 <	1	6			
18:30	0	0	0	0	0	0	0	5			
18:45	0	0	0	0	0	1	1	4			
19:00	0	0	0	0	0	0	0	2			
Articulated							Total Vehicles				
	1	2	3	4	5	6	15 MIN	HOURLY			
15:15	0	0	0	0	0	0	0				
15:30	1	0	0	0	0	3	4				
15:45	1	0	0	0	0	0	1				
16:00	0 <	0	0	0	0	2	2	7			
16:15	0 <	0	0	0	0	0	0	7			
16:30	0	0	0	0	0	0	0	3			
16:45	0	0	0	0	0	2	2	4			
17:00	0	0	0	0	0	0	0	2			
17:15	0	0	0	0	0	0	0	2			
17:30	0	0	0	0	0	1	0	2			
17:45	0	0	0	0	0	1	1	1			
18:00	0	0	0	0	0	2	2	3			
18:15	0	0	0	0	0	1	1	4			
18:30	0	0	0	0	0	2 <	2	6			
18:45	0	0	0	0	0	0	0	5			
19:00	0	0	0	0	0	1	1	4			
Light + Heavy Vehicles							Total Vehicles				
	1	2	3	4	5	6	15 MIN	HOURLY			
15:15	9	3	9	0	1	48	70				
15:30	13	2	7	0	0	29	51				
15:45	10	3	2	0	0	29	44				
16:00	8	3 <	6	0	0	31 <	48	213 <			
16:15	7	3 <	18	0	0	28	56	199			
16:30	8	1	12	0	0	29	50	198			
16:45	17	2	10	2	0	27	58	212			
17:00	9	0	7 <	0	0	22	38	202			
17:15	11 <	1	5	1 <	0	15	33	179			
17:30	8 <	2	3	0 <	1	16	30	159			
17:45	10	1	2	0	0	8	21	122			
18:00	9	0	5	0	1 <	16	31	115			
18:15	3	1	3	0	0 <	21	28	110			
18:30	1	3	0	0	0	26	30	110			
18:45	1	6	1	0	1 <	19	28	117			
19:00	3	1 <	1	0	0	5	10	96			

Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

Summary:	ULAN-WOLLAR RD	/	ULAN COAL MINES ACCESS
243	Total Light Vehicles		
7	Total Rigid		
1	Total Articulated		

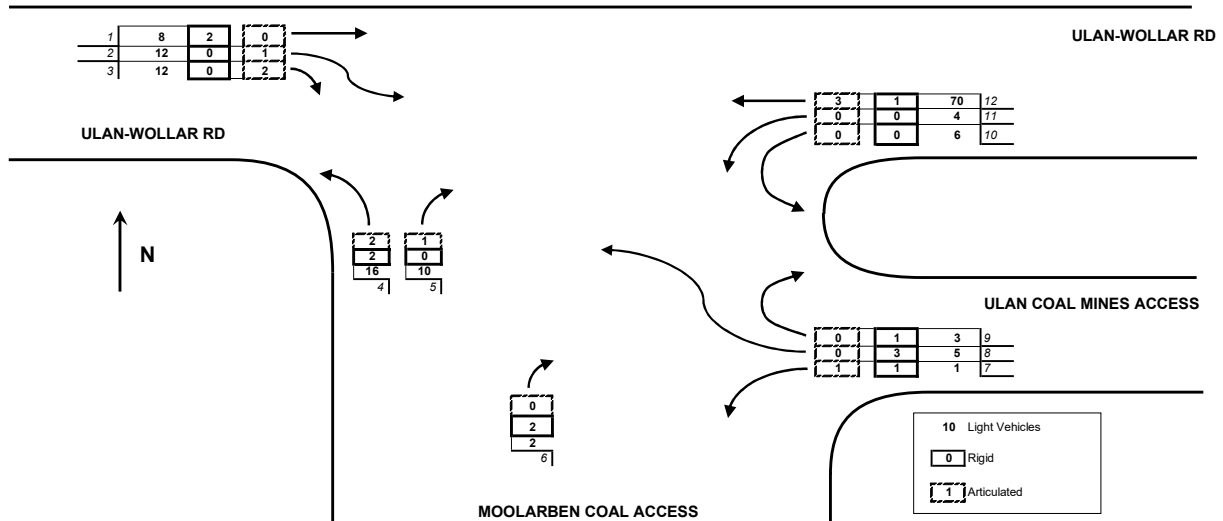


12/5/2022 - ULAN-WOLLAR RD / ULAN COAL MINES ACCESS, MOOLARBEN

Light Vehicles													Total Vehicles	
1	2	3	4	5	6	7	8	9	10	11	12		15 MIN	HOURLY
05:15	3	1	9	0	0	0	0	1	0	0	0	0	14	
05:30	1	6	16	16	1	0	0	1	0	0	1	0	42	
05:45	6	9	14	2	0	0	0	0	0	0	0	0	31	
06:00	4	15	17	4	0	0	0	0	1	0	1	1	42	129
06:15	2	16	17	0	0	0	0	2	1	0	1	3	42	157
06:30	3	20	56	2	2	1	0	1	4	1	0	0	90	205
06:45	9	25	60	3	4	2	0	0	0	1	4	6	114	288
07:00	14	4	8	0	1	1	0	1	0	2	2	9	42	288
07:15	19	3	9	23	2	0	2	4	1	1	0	46	110	356
07:30	3	3	9	12	2	1	2	8	1	1	0	5	47	313
07:45	6	2	4	3	0	1	1	1	0	1	1	1	21	220
08:00	2	4	5	4	2	0	1	2	0	0	1	4	25	203
08:15	1	2	5	2	0	1	0	1	0	0	0	2	14	107
08:30	3	1	2	0	1	1	0	1	0	0	0	3	12	72
08:45	2	0	2	1	0	0	0	20	1	0	0	3	29	80
09:00	1	0	2	2	0	0	1	2	0	0	1	2	11	66
09:15	3	0	1	0	0	0	1	2	3	1	0	1	12	64
09:30	3	0	4	3	2	3	0	2	0	0	0	5	22	74
09:45	6	1	2	2	0	1	0	0	0	0	2	0	14	59
10:00	7	4	3	5	2	1	1	0	0	0	2	6	31	79
Rigid													Total Vehicles	
1	2	3	4	5	6	7	8	9	10	11	12		15 MIN	HOURLY
05:15	0	0	0	0	0	0	0	0	0	0	0	1	1	
05:30	0	0	0	1	0	0	0	0	0	0	0	0	1	
05:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	2
06:15	0	1	0	0	0	0	0	0	0	0	0	0	1	
06:30	2	0	0	0	0	0	0	0	0	0	0	0	2	3
06:45	3	0	0	1	0	0	0	0	0	0	0	1	5	8
07:00	0	0	1	0	0	0	0	0	0	0	1	0	2	10
07:15	1	0	0	0	0	0	0	0	0	0	0	1	2	11
07:30	1	0	0	0	0	0	0	0	0	0	0	0	1	10
07:45	2	0	0	0	0	0	0	0	0	0	0	0	2	7
08:00	0	0	1	0	0	0	0	0	0	0	0	0	1	6
08:15	1	0	0	1	0	0	0	1	0	0	0	0	3	7
08:30	2	0	0	0	0	0	0	0	0	0	0	0	2	8
08:45	1	1	0	0	0	0	0	0	0	0	0	2	4	10
09:00	0	0	0	0	0	0	0	0	0	0	0	3	3	12
09:15	1	0	0	0	0	0	0	0	0	0	0	0	1	10
09:30	0	1	0	1	0	0	0	0	0	0	0	2	4	12
09:45	0	0	0	0	0	0	0	0	0	0	0	1	1	9
10:00	0	1	0	0	0	0	0	0	0	0	0	0	1	7
Articulated													Total Vehicles	
1	2	3	4	5	6	7	8	9	10	11	12		15 MIN	HOURLY
05:15	0	1	0	0	0	0	0	0	0	0	0	0	1	
05:30	0	0	0	0	0	0	0	1	0	0	0	0	1	
05:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	2
06:15	0	1	1	0	0	0	0	0	0	0	0	0	2	3
06:30	0	0	0	0	0	0	0	0	0	0	0	0	0	2
06:45	0	0	0	0	0	0	0	0	0	0	0	0	0	2
07:00	0	0	1	0	0	0	0	0	0	0	0	0	1	3
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	1
07:30	0	0	0	1	0	0	0	0	0	0	0	0	2	3
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	3
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	2
08:15	2	0	0	0	0	0	0	0	0	0	0	0	2	4
08:30	0	0	0	0	0	1	0	0	0	0	0	0	1	3
08:45	0	0	0	1	0	0	0	0	0	0	0	0	1	4
09:00	1	0	0	0	0	0	0	0	0	1	1	1	3	7
09:15	1	0	0	1	0	0	0	0	0	0	0	1	3	8
09:30	1	0	0	0	0	0	0	0	0	0	0	0	1	8
09:45	2	0	1	0	0	0	0	0	0	0	0	0	3	10
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Light + Heavy Vehicles													Total Vehicles	
1	2	3	4	5	6	7	8	9	10	11	12		15 MIN	HOURLY
05:15	3	1	9	0	0	0	0	1	0	0	0	1	15	
05:30	1	6	16	17	1	0	0	1	0	0	1	0	43	
05:45	6	9	14	2	0	0	0	0	0	0	0	0	31	
06:00	4	15	17	4	0	0	0	0	1	0	1	1	42	131
06:15	2	17	17	0	0	0	0	2	1	0	1	3	43	159
06:30	5	20	56	2	2	1	0	1	4	1	0	0	92	208
06:45	12	25	60	4	4	2	0	0	0	1	4	7	119	296
07:00	14	4	9	0	1	1	0	1	0	2	3	9	44	298
07:15	20	3	9	23	2	0	2	4	1	1	0	47	112	367
07:30	4	3	9	12	2	1	2	8	1	1	0	5	48	323
07:45	8	2	4	3	0	1	1	1	0	1	1	1	23	227
08:00	2	4	6	4	2	0	1	2	0	0	1	4	26	209
08:15	2	2	5	3	0	1	0	2	0	0	0	2	17	114
08:30	5	1	2	0	1	0	0	1	0	0	0	3	14	80
08:45	3	1	2	1	0	0	0	20	1	0	0	5	33	90
09:00	1	0	2	2	0	0	1	2	0	0	1	5	14	78
09:15	4	0	1	0	0	0	1	2	3	1	0	1	13	74
09:30	3	1	4	4	2	3	0	2	0	0	0	7	26	86
09:45	6	1	2	2	0	1	0	0	0	0	2	1	15	68
10:00	7	5	3	5	2	1	1	0	0	0	2	6	32	86

Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

Summary: ULAN-WOLLAR RD / ULAN COAL MINES ACCESS		
41	Total Light Vehicles	
7	Total Rigid	
4	Total Articulated	

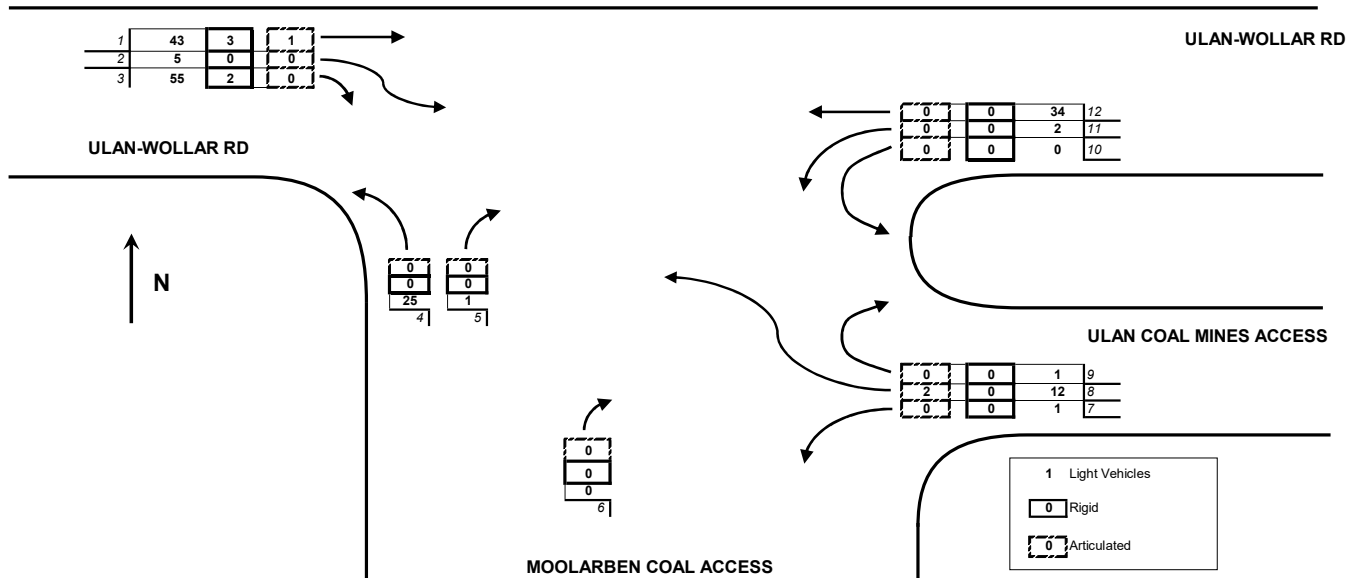


12/5/2022 - ULAN-WOLLAR RD / ULAN COAL MINES ACCESS, MOOLARBEN

Light Vehicles													Total Vehicles	
1	2	3	4	5	6	7	8	9	10	11	12		15 MIN	HOURLY
10:15	3	0	1	3	1	0	0	1	1	0	0	3	13	
10:30	4	1	8	2	0	0	1	2	0	1	2	3	24	
10:45	0	1	4	4	0	1	0	1	1	1	1	4	18	
11:00	0	2	3	2	1	0	1	0	0	0	0	0	9	64
11:15	6 <	2	3 <	1	1	1	0	3	0	1	1	3	22	73
11:30	1	0	3	2	1	0	0	1	3	0	0	2	13	62
11:45	1	0	1	3	3	1	0	1	1	3	1	4	19	63
12:00	1	1	2	2	3	1 <	0	2 <	2	0	1	5	20	74
12:15	3	1	3	7	3	0	1	2	1 <	3	0	42	66	118
12:30	2	3	2	3	2 <	1 <	0	1	0	1 <	0	11	26	131
12:45	2	7	5	4	2	0	0	0	2	3	12 <	7	37	149 <
13:00	0	2	0	1	0	0	0	1	0	0	1	2	7	136
13:15	0	2	1	7	0	0	0	1	0	0	2	9	22	92
13:30	0	10 <	0	3	2	0	1	2	0	0	2 <	8	28	94
13:45	1	4	1	2	1	1	3 <	2	0	1	0	6	22	79
14:00	2	2	1	5 <	0	2 <	0 <	1	0	1	1	2	17	89
14:15	2	2	3	2	1	0 <	0 <	1	0	0	0	4	15	82
14:30	2	0	3	2	3	0 <	1 <	0	0	1	0	3	15	69
14:45	2	0	1	2	0	0	0	2	0	0	0	5	12	59
15:00	0	0	2	3	2	1	0	2	0	0	1	2	13	55
Rigid													Total Vehicles	
1	2	3	4	5	6	7	8	9	10	11	12		15 MIN	HOURLY
10:15	1	0	0	0	0	0	0	1	0	0	0	1	3	
10:30	2	0	1	0	0	0	0	0	0	0	0	2	5	
10:45	0	0	0	0	1	0	0	0	0	0	0	1	2	
11:00	2 <	0	1	0	0 <	0	0	1	0	0	0	2 <	6	16 <
11:15	0	0	1	0	0 <	0	0	0	0	0	0	1	1	14
11:30	0	1 <	1	0	0 <	0	0	1	0	0	0	2	5	14
11:45	0	0 <	0	0	0	0	0	0	0	0	0	0	0	12
12:00	0	0 <	0	1	0	1	0	0	0	0	0	1	3	9
12:15	1	0 <	0	1	0	1 <	1 <	1	0	0	0	0	5	13
12:30	1	0	0	0	0	0 <	0 <	1	1 <	0	0	0	3	11
12:45	0	0	0	0	0	0 <	0 <	1 <	0 <	0	0	0	1	12
13:00	0	0	0	0	0	0 <	0 <	0 <	0 <	0	0	0	0	9
13:15	1	0	0	1	0	0	0	0	0 <	0	0	1	3	7
13:30	0	0	1	1	0	0	0	0	0	0	0	1	3	7
13:45	0	0	1	1 <	0	0	1 <	0	0	0	0	1	4	10
14:00	0	0	1	0 <	0	0	0 <	0	0	0	0	1	2	12
14:15	1	0	2 <	0	0	0	0 <	0	0	0	0	1	4	13
14:30	0	0	0	1	0	0	0 <	0	0	0	0	1	2	12
14:45	0	0	0	0	0	0	0	0	0	0	0	2	2	10
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Articulated													Total Vehicles	
1	2	3	4	5	6	7	8	9	10	11	12		15 MIN	HOURLY
10:15	0	1	0	0	0	0	0	1	0	0	0	1	3	
10:30	1	0	0	0	0	0	0	0	0	0	0	0	1	
10:45	0	0	1	0	0	0	0	0	0	0	0	2	3	
11:00	2 <	0 <	0	1	0	0	0	0 <	0	1 <	0	0 <	4	11
11:15	0 <	0	1	0	0	0	1 <	0	0	0 <	0	0	2	10
11:30	1 <	0	1 <	2	0	0	0 <	0	0	0 <	0	0	4	13
11:45	0 <	0	0	0	0	0	0 <	0	0	0 <	0	1	1	11
12:00	0	0	1 <	1	0	0	0 <	0	0	0	0	1	3	10
12:15	0	1 <	1 <	1 <	0	1 <	0	0	0	0	0	0	4	12
12:30	0	0 <	0	0	0 <	0	1 <	0	0	0	0	1 <	2	10
12:45	0	0 <	0	0	0 <	0	0 <	0	0	0	0	1 <	1	10
13:00	0	0 <	0	0	0 <	0	0 <	0	0	0	0	0	0	7
13:15	0	0	0	0	0	0	0 <	0	0	0	0	0	0	3
13:30	1	0	0	1	0	1 <	0	0	0	0	0	0	3	4
13:45	0	0	0	0	0	0 <	0	0	0	0	0	1	1	4
14:00	0	0	0	0	0	0 <	0	0	0	0	0	0	0	4
14:15	0	0	0	0	0	0 <	0	0	0	0	0	1	1	5
14:30	0	1 <	0	0	0	0	0	0	0	0	0	0	1	3
14:45	1	0 <	0	0	0	0	0	0	0	0	0	1	2	4
15:00	0	0 <	0	0	0	0	0	1 <	0	0	0	0	1	5
Light + Heavy Vehicles													Total Vehicles	
1	2	3	4	5	6	7	8	9	10	11	12		15 MIN	HOURLY
10:15	4	0	1	3	1	0	0	2	1	0	0	4	16	
10:30	6	1	9	2	0	0	1	2	0	1	2	5	29	
10:45	0	1	4	4	1	1	0	1	1	1	1	5	20	
11:00	2	2	4	2	1	0	1	1	0	0	0	2	15	80
11:15	6 <	2	4 <	1	1	1	0	3	0	1	1	3	23	87
11:30	1	1	4	2	1	0	0	2	3	0	0	4	18	76
11:45	1	0	1	3	3	1	0	1	1	3	1	4	19	75
12:00	1	1	2	3	3	2	0	2 <	2	0	1	6	23	83
12:15	4	1	3	8	3	1	2	3 <	1 <	3	0	42	71	131
12:30	3	3	2	3	2 <	1 <	0	2 <	1	1 <	0	11	29	142
12:45	2	7	5	4	2	0	0	1 <	0	2	3	12 <	38	161 <
13:00	0	2	0	1	0	0	0	1	0	0	1	2	7	145
13:15	1	2	1	8	0	0	0	2	1	0	2	10	25	99
13:30	0	10 <	1	4	2	0	1	2	0	0	2 <	9	31	101
13:45	1	4	2	3	1	1	4 <	2	0	1	0	7	26	89
14:00	2	2	2	5 <	0	2	0 <	1	0	1	1	3	19	101
14:15	3	2	5	2	1	0	0 <	1	0	0	0	5	19	95
14:30	2	0	3	3	3	0	1 <	0	0	1	0	4	17	81
14:45	2	0	1	2	0	0	0	2	0	0	0	7	14	69
15:00	0	0	2	3	2	1	0	2	0	0	1	2	13	63

Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

117 Total Light Vehicles
5 Total Rigid
3 Total Articulated



12/5/2022 - ULAN-WOLLAR RD / ULAN COAL MINES ACCESS, MOOLARBEN

Light Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	Total Vehicles 15 MIN	HOUR
15:15	3	0	1	9	1	0	1	1	1	0	3	2	22	
15:30	3	0	0	5	2	0	0	1	0	1	4	7	23	
15:45	5	0	0	2	1	0	0	9	0	0	1	8	26	
16:00	2	1	2	9	1 <	0	1 <	15	0	1 <	1 <	4	37	108
16:15	1	0	0	17	0	0	0	16	0	0 <	1	4	39	125
16:30	3	0	1	17	0	1	0	11 <	2 <	0	1	15	51	153
16:45	0	0	0	7 <	1	0	0	1	0 <	0	0	17	26	153
17:00	4	2	0	6	0	2 <	2 <	6	0 <	2 <	1	9	34	150
17:15	2	0	2	6	0	0 <	0 <	2	0 <	0 <	0	13 <	25	136
17:30	4	0	3	12	0	0	0 <	2	0	0 <	1	9	31	116
17:45	16	1	0	9	1	1 <	0 <	1	0	0 <	1	4	34	124
18:00	24	0	5	12	0	0	1	5	0	0	1	5	53	143
18:15	18 <	0	11	4	0	0	0	3	0	0	1	9	46	164
18:30	1	5 <	21	5	1	0	0	4	1	0	0	3	41	174
18:45	0	0	18	4	0	0	0	0	0	0	0	17	39	179 <
19:00	2	0	32 <	1	0	0	2 <	3	0	0	0	0	40	166

Rigid

	1	2	3	4	5	6	7	8	9	10	11	12	Total Vehicles 15 MIN	HOUR
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
16:00	0	0	0	1 <	0	0	0	0	0	0	0	0	1	1
16:15	0	0	0	0 <	0	1 <	0	0	0	0	0	0	1	2
16:30	1	0	0	0 <	0	0 <	0	0	0	0	0	0	1	3
16:45	0	0	0	0 <	0	0 <	0	0	0	0	0	2	2	5
17:00	1	0	0	0	0	0 <	0	0	0	0	0	1	2	6 <
17:15	0	0	0	0	0	0	0	0	0	0	0	1	1	6 <
17:30	0	0	0	0	0	0	0	0	0	0	0	1 <	1	6 <
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	4
18:00	3 <	0	0	0	0	0	0	0	0	0	0	0	3	5
18:15	0 <	0	1	0	0	0	0	0	0	0	0	0	1	5
18:30	0 <	0	1 <	0	0	0	0	0	0	0	0	0	1	5
18:45	0 <	0	0 <	0	0	0	0	0	0	0	0	0	0	5
19:00	0	0	0 <	0	0	0	0	0	0	0	0	0	0	2

Articulated

	1	2	3	4	5	6	7	8	9	10	11	12	Total Vehicles 15 MIN	HOUR
15:15	1	0	1	0	0	0	0	0	0	0	0	1	3	
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
16:00	0 <	0	0 <	0	0	0	0	0	0	0	0	0 <	0	3
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	1 <	0	0	0	0	0	0	0	0	0	0	1	1
16:45	0	0 <	0	1 <	0	0	0	0	0	0	0	0	1	2
17:00	0	0 <	0	0 <	0	0	0	0	0	0	0	0	0	2
17:15	0	0 <	0	0 <	0	0	0	0	0	0	0	0	0	2
17:30	0	0	0	0 <	0	0	0	0	0	0	0	0	0	1
17:45	0	0	0	0	0	0	0	0	0	0	0	1 <	1	1
18:00	1 <	0	0	0	0	0	0	1	0	0	0	0 <	2	3
18:15	0 <	0	0	0	0	0	0	0	0	0	0	0 <	0	3
18:30	0 <	0	0	0	0	0	0	0	0	0	0	0 <	0	3
18:45	0 <	0	0	0	0	0	0	1 <	0	0	0	0	1	3
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Light + Heavy Vehicles

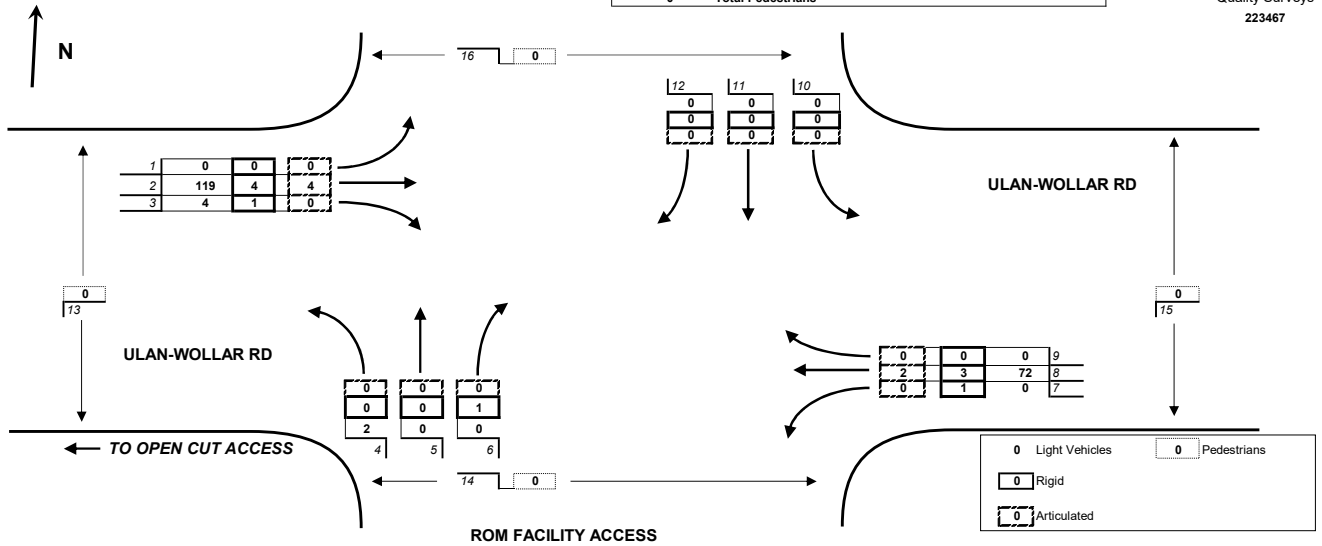
	1	2	3	4	5	6	7	8	9	10	11	12	Total Vehicles 15 MIN	HOUR
15:15	3	0	1	9	1	0	1	1	1	0	3	2	22	
15:30	3	0	0	5	2	0	0	1	0	1	4	7	23	
15:45	5	0	0	2	1	0	0	9	0	0	1	8	26	
16:00	2	1	2	10	1 <	0	1 <	15	0	1 <	1 <	4	38	109
16:15	1	0	0	17	0	1	0	16	0	0 <	1	4	40	127
16:30	4	0	1	17	0	1	0	11 <	2 <	0	1	15	52	156
16:45	0	0	0	7 <	1	0	0	1	0 <	0	0	19	28	158
17:00	5	2	0	6	0	2 <	2 <	6	0 <	2 <	1	10	36	156
17:15	2	0	2	6	0	0	0 <	2	0 <	0 <	0	14 <	26	142
17:30	4	0	3	12	0	0	0 <	2	0	0 <	1	10	32	122
17:45	16	1	0	9	1	1	0 <	1	0	0 <	1	4	34	128
18:00	27	0	5	12	0	0	1	5	0	0	1	5	56	148
18:15	18 <	0	12	4	0	0	0	3	0	0	1	9	47	169
18:30	1	5 <	22	5	1	0	0	4	1	0	0	3	42	179
18:45	0	0	18	4	0	0	0	0	0	0	0	17	39	184 <
19:00	2	0	32 <	1	0	0	2 <	3	0	0	0	0	40	168

Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

7:30 <<< HOUR ENDING

Thursday

Summary: ROM FACILITY ACCESS / ULAN-WOLLAR RD	
197	Total Light Vehicles
10	Total Rigid
6	Total Articulated
0	Total Pedestrians



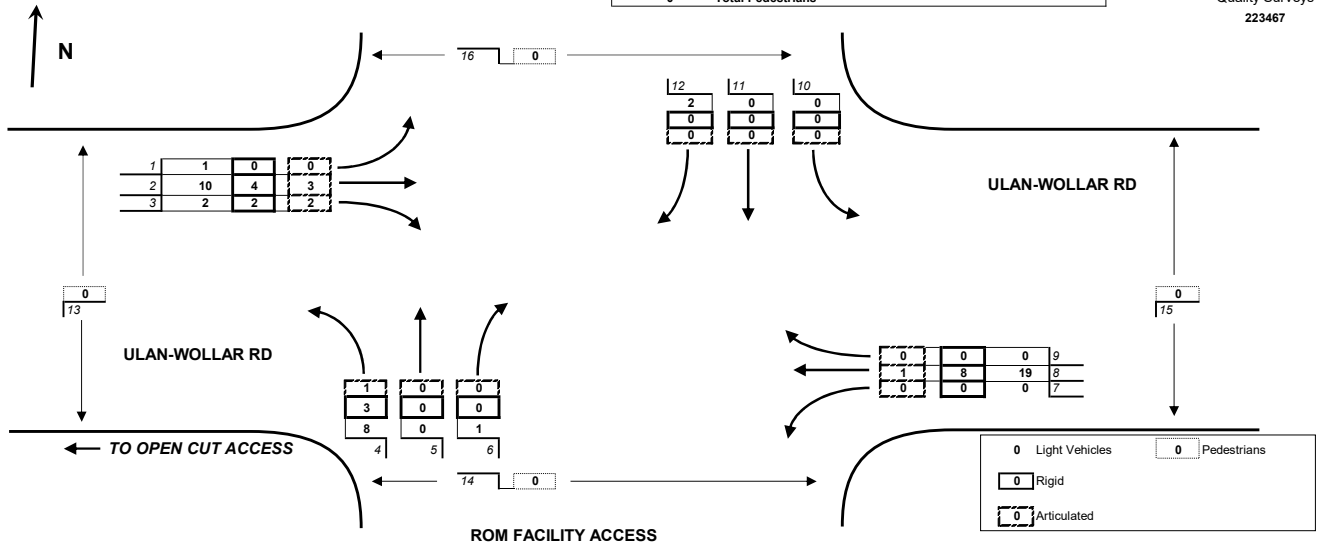
5/5/2022 - ROM FACILITY ACCESS / ULAN-WOLLAR RD, MOOLARBEN

Light Vehicles													Total Vehicles		Pedestrians						
	1	2	3	4	5	6	7	8	9	10	11	12	15 MIN	HOURLY	13	14	15	16			
05:15	0	11	0	0	0	0	0	0	0	0	0	0	11		0	0	0	0			
05:30	0	18	0	0	0	0	0	0	0	0	0	0	18		0	0	0	0			
05:45	0	26	0	0	0	0	0	1	0	0	0	0	27		0	0	0	0			
06:00	0	33	0	0	0	0	0	0	0	0	0	0	33	89	0	0	0	0			
06:15	0	56	0	0	0	0	0	2	0	0	0	0	58	136	0	0	0	0			
06:30	0	17	1	1	0	0	0	1	0	0	0	0	20	138	0	0	0	0			
06:45	0	30	<	0	1	0	0	10	0	0	0	0	41	152	0	0	0	0			
07:00	0	33	<	0	0	0	0	14	0	0	0	0	47	166	0	0	0	0			
07:15	0	39	1	0	0	0	0	45	0	0	0	0	85	193	0	0	0	0			
07:30	0	17	3	1	0	0	0	3	<	0	0	0	24	197	<	0	0	0			
07:45	0	11	2	1	0	0	0	1	0	0	0	0	15	171	0	0	0	0			
08:00	0	5	1	<	2	0	0	2	0	0	0	0	10	134	0	0	0	0			
08:15	0	2	0	0	0	0	0	2	0	0	0	0	4	53	0	0	0	0			
08:30	0	6	0	0	0	0	0	2	0	0	0	0	8	37	0	0	0	0			
08:45	0	4	1	0	0	0	0	3	0	0	0	0	8	30	0	0	0	0			
09:00	0	3	0	1	0	0	0	3	0	0	0	0	7	27	0	0	0	0			
09:15	0	5	1	2	0	0	0	2	0	0	0	0	10	33	0	0	0	0			
09:30	0	2	2	0	0	0	0	2	0	0	0	0	6	31	0	0	0	0			
09:45	0	3	2	1	0	0	0	1	0	0	0	0	7	30	0	0	0	0			
10:00	0	1	0	3	<	0	0	4	0	0	0	0	8	31	0	0	0	0			
Rigid													Total Vehicles								
	1	2	3	4	5	6	7	8	9	10	11	12	15 MIN	HOURLY							
05:15	0	0	0	0	0	0	0	0	0	0	0	0	0								
05:30	0	0	0	0	0	0	0	0	0	0	0	0	0								
05:45	0	0	0	0	0	0	0	0	0	0	0	0	0								
06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
06:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
06:30	0	1	0	0	0	0	0	0	0	0	0	0	1	1							
06:45	0	0	0	0	0	0	0	0	0	0	0	0	0	1							
07:00	0	1	0	0	0	0	1	<	0	0	0	0	2	3							
07:15	0	2	0	0	0	1	<	0	3	0	0	0	6	9							
07:30	0	1	1	0	0	0	<	0	0	0	0	0	2	10							
07:45	0	2	<	0	0	0	<	0	1	0	0	0	3	13	<						
08:00	0	0	0	0	0	0	<	0	1	0	0	0	1	12							
08:15	0	0	0	0	0	0	0	1	0	0	0	0	1	7							
08:30	0	4	<	0	0	0	0	1	0	0	0	0	5	10							
08:45	0	1	1	0	0	0	0	0	0	0	0	0	2	9							
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	8							
09:15	0	0	1	<	0	0	0	0	0	0	0	0	1	8							
09:30	0	0	0	<	0	0	0	0	0	0	0	0	0	3							
09:45	0	1	0	2	<	0	0	0	0	0	0	0	3	4							
10:00	0	0	0	0	<	0	0	0	0	0	0	0	0	4							
Articulated													Total Vehicles								
	1	2	3	4	5	6	7	8	9	10	11	12	15 MIN	HOURLY							
05:15	0	1	0	0	0	0	0	0	0	0	0	0	1								
05:30	0	0	0	0	0	0	0	0	0	0	0	0	0								
05:45	0	0	0	0	0	0	0	0	0	0	0	0	0								
06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	1							
06:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
06:30	0	1	0	0	0	0	0	0	0	0	0	0	1	1							
06:45	0	2	0	0	0	0	0	0	0	0	0	0	2	3							
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	3							
07:15	0	2	<	0	0	0	0	2	0	0	0	0	4	7							
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	6							
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	4							
08:00	0	0	0	0	0	0	0	2	<	0	0	0	2	6							
08:15	0	0	0	0	0	0	0	1	0	0	0	0	1	3							
08:30	0	1	1	<	0	0	0	0	0	0	0	0	2	5							
08:45	0	0	0	<	0	0	0	0	0	0	0	0	0	5							
09:00	0	1	0	<	1	<	0	0	0	0	0	0	2	5							
09:15	0	1	0	<	0	<	0	0	0	0	0	0	1	5							
09:30	0	0	0	0	<	0	0	0	1	0	0	0	1	4							
09:45	0	0	1	<	0	<	0	0	1	0	0	0	2	6							
10:00	0	0	0	<	0	0	0	0	0	0	0	0	0	4							
Light + Heavy Vehicles													Total Vehicles								
	1	2	3	4	5	6	7	8	9	10	11	12	15 MIN	HOURLY							
05:15	0	11	0	0	0	0	0	0	0	0	0	0	11								
05:30	0	18	0	0	0	0	0	0	0	0	0	0	18								
05:45	0	26	0	0	0	0	0	1	0	0	0	0	27								
06:00	0	33	0	0	0	0	0	0	0	0	0	0	33	89							
06:15	0	56	0	0	0	0	0	2	0	0	0	0	58	136							
06:30	0	18	1	1	0	0	0	1	0	0	0	0	21	139							
06:45	0	30	0	1	0	0	0	10	0	0	0	0	41	153							
07:00	0	34	<	0	0	0	0	14	0	0	0	0	49	169							
07:15	0	41	1	0	0	1	<	0	<	48	0	0	91	202							
07:30	0	18	4	1	0	0	<	0	<	3	<	0	26	207	<						
07:45	0	13	2	1	0	0	<	0	<	2	0	0	18	184							
08:00	0	5	1	<	2	0	0	<	0	3	0	0	11	146							
08:15	0	2	0	0	0	0	0	0	3	0	0	0	5	60							
08:30	0	10	0	0	0	0	0	0	3	0	0	0	13	47							
08:45	0	5	2	0	0	0	0	0	3	0	0	0	10	39							
09:00	0	3	0	1	0	0	0	0	3	0	0	0	7	35							
09:15	0	5	2	2	0	0	0	0	2	0	0	0	11	41							
09:30	0	2	2	0	0	0	0	0	2	0	0	0	6	34							
09:45	0	4	2	3	0	0	0	0	1	0	0	0	10	34							
10:00	0	1	0	3	<	0	0	0	4	0	0	0	8	35							

11:30 <<< HOUR ENDING

Wednesday

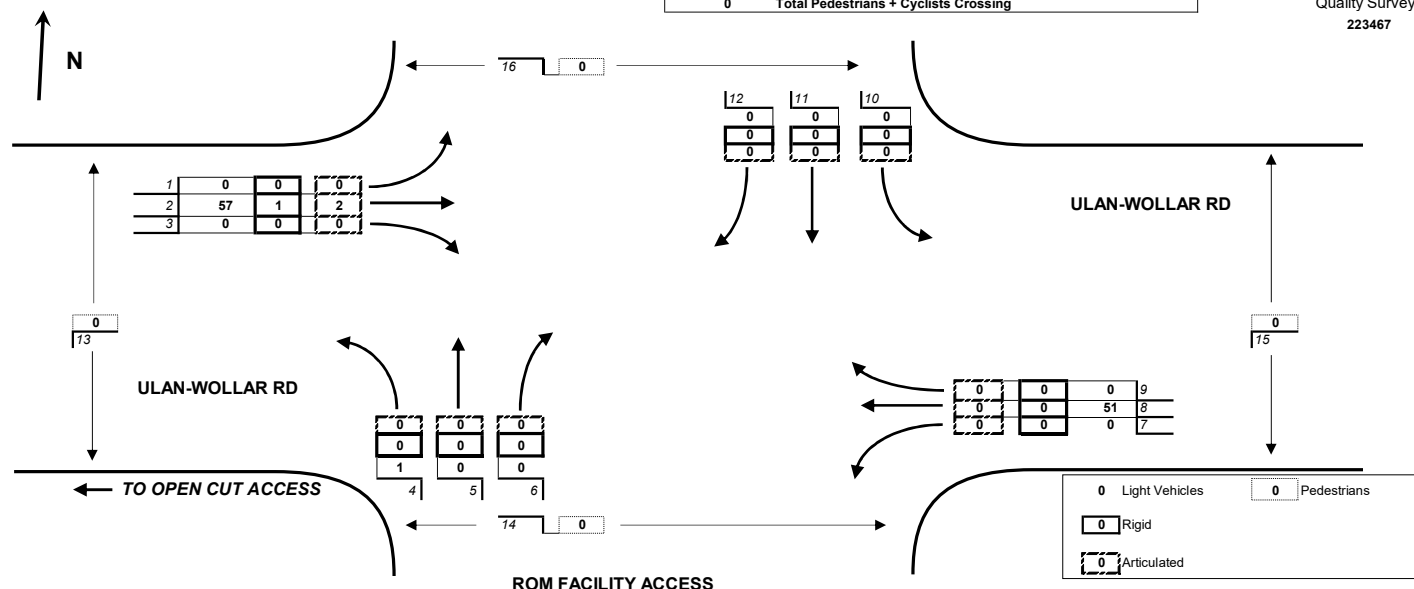
Summary: ROM FACILITY ACCESS / ULAN-WOLLAR RD	
43	Total Light Vehicles
17	Total Rigid
7	Total Articulated
0	Total Pedestrians



4/5/2022 - ROM FACILITY ACCESS / ULAN-WOLLAR RD, MOOLARBEN

Light Vehicles													Total Vehicles		Pedestrians			
	1	2	3	4	5	6	7	8	9	10	11	12	15 MIN	HOURL	13	14	15	16
10:15	0	6	3	0	0	0	0	3	0	0	0	0	12		0	0	0	0
10:30	0	4	4	1	0	0	0	3	0	0	0	0	12		0	0	0	0
10:45	0	2	0	0	0	0	0	2	0	0	0	0	4		0	0	0	0
11:00	0	2 <	0 <	2	0	0	0	8	0	0	0	0	12	40	0	0	0	0
11:15	1 <	5	1	2	0	1	0	5	0	0	0	0	15	43	0	0	0	0
11:30	0 <	1	1	4 <	0	0	0	4	0	0	0	2 <	12	43	0	0	0	0
11:45	0 <	1	0	0 <	0	0	0	0	0	0	0	0 <	1	40	0	0	0	0
12:00	0 <	5	0	1	0	2 <	0	8	0	0	0	0	16	44 <	0	0	0	0
12:15	0	0	0	1	0	0	0	5	0	0	0	0	6	35	0	0	0	0
12:30	0	2	2	0	0	0	0	9 <	0	0	0	0	13	36	0	0	0	0
12:45	0	2	1	0	0	0	0	0 <	0	0	0	0	3	38	0	0	0	0
13:00	0	3	1	2	0	0	0	3	0	0	0	0	9	31	0	0	0	0
13:15	0	2	0	1	0	0	0	3	0	0	0	0	6	31	0	0	0	0
13:30	0	5	0	0	0	0	0	1	0	0	0	0	6	24	0	0	0	0
13:45	0	3	0	0	0	0	0	7	0	0	0	0	10	31	0	0	0	0
14:00	0	1	1	0	0	0	0	1	0	0	0	0	3	25	0	0	0	0
14:15	0	0	0	0	0	0	0	3	0	0	0	0	3	22	0	0	0	0
14:30	0	1	2	1	0	0	0	3	0	0	0	0	7	23	0	0	0	0
14:45	0	4	2	1	0	0	0	4	0	0	0	0	11	24	0	0	0	0
15:00	0	6	3 <	2	0	0	0	4	0	0	0	0	15	36	0	0	0	0
Rigid													Total Vehicles					
	1	2	3	4	5	6	7	8	9	10	11	12	15 MIN	HOURL				
10:15	0	1	0	1	0	0	0	1	0	0	0	0	3					
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0					
10:45	0	3	1	1	0	0	0	4	0	0	0	0	9					
11:00	0	0 <	0	1 <	0	0	0	1	0	0	0	0	2	14				
11:15	0	0	1	0	0	0	0	0	0	0	0	0	1	12				
11:30	0	1 <	0	1 <	0	0	0	3 <	0	0	0	0	5	17 <				
11:45	0	1	1	0	0	0	0	0	0	0	0	0	2	10				
12:00	0	0	1 <	0	0	0	0	2	0	0	0	0	3	11				
12:15	0	0	0	1	0	0	0	0	0	0	0	0	1	11				
12:30	0	2	1 <	0	0	0	0	1	0	0	0	0	4	10				
12:45	0	1	0	1	0	0	0	0	0	0	0	0	2	10				
13:00	0	1 <	1	0	0	0	1 <	0	0	0	0	0	3	10				
13:15	0	0 <	0	0	0	0	0 <	1	0	0	0	0	1	10				
13:30	0	1	0	2 <	0	0	0 <	0	0	0	0	0	3	9				
13:45	0	0	1	0	0	0	0 <	0	0	0	0	0	1	8				
14:00	0	1	0	1 <	0	0	0	1	0	0	0	0	3	8				
14:15	0	1	1	0 <	0	0	0	2	0	0	0	0	4	11				
14:30	0	1	0	1	0	0	0	1	0	0	0	0	3	11				
14:45	0	1 <	1	0	0	0	0	1	0	0	0	0	3	13				
15:00	0	0	0	1	0	0	0	1	0	0	0	0	2	12				
Articulated													Total Vehicles					
	1	2	3	4	5	6	7	8	9	10	11	12	15 MIN	HOURL				
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0					
10:30	0	1	0	0	0	0	0	0	0	0	0	0	1					
10:45	0	0	2	0	0	0	0	0	0	0	0	0	2					
11:00	0	1	0 <	1 <	0	0	0	1	0	0	0	0	3	6				
11:15	0	0	0 <	0 <	0	0	0	0	0	0	0	0	0	6				
11:30	0	2	0 <	0 <	0	0	0	0	0	0	0	0	2	7				
11:45	0	1 <	0	0 <	0	0	0	1	0	0	0	0	2	7				
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	4				
12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	4				
12:30	0	0	1	0	0	0	0	1	0	0	0	0	2	4				
12:45	0	1	0	0	0	0	0	0	0	0	0	0	1	3				
13:00	0	0	0	1 <	0	0	0	0	0	0	0	0	1	4				
13:15	0	0	0	0 <	0	0	0	0	0	0	0	0	0	4				
13:30	0	0	0	0 <	0	0	0	0	0	0	0	0	0	2				
13:45	0	0	0	0 <	0	0	0	0	0	0	0	0	0	1				
14:00	0	2	0	0	0	0	0	0	0	0	0	0	2	2				
14:15	0	2 <	0	0	0	0	0	0	0	0	0	0	2	4				
14:30	0	0 <	1	0	0	0	0	0	0	0	0	0	1	5				
14:45	0	0 <	0	0	0	0	0	2	0	0	0	0	2	7				
15:00	0	0	0	1 <	0	0	0	1 <	0	0	0	0	2	7				
Light + Heavy Vehicles													Total Vehicles					
	1	2	3	4	5	6	7	8	9	10	11	12	15 MIN	HOURL				
10:15	0	7	3	1	0	0	0	4	0	0	0	0	15					
10:30	0	4	4	1	0	0	0	3	0	0	0	0	12					
10:45	0	5	1	1	0	0	0	6	0	0	0	0	13					
11:00	0	2 <	0	3	0	0	0	9	0	0	0	0	14	54				
11:15	1 <	5	2	2	0	1	0	5	0	0	0	0	16	55				
11:30	0 <	2	1	5 <	0	0	0	7 <	0	0	0	2 <	17	60 <				
11:45	0 <	2	1	0	0	0	0	0	0	0	0	0 <	3	50				
12:00	0 <	5	1	1	0	2 <	0	10	0	0	0	0 <	19	55				
12:15	0	0	0	2	0	0	0	5	0	0	0	0 <	7	46				
12:30	0	4	3	0	0	0	0	10	0	0	0	0	17	46				
12:45	0	3	1	1	0	0	0	0	0	0	0	0	5	48				
13:00	0	4	2	2	0	0	1 <	3	0	0	0	0	12	41				
13:15	0	2	0	1	0	0	0 <	4	0	0	0	0	7	41				
13:30	0	6	0	2	0	0	0 <	1	0	0	0	0	9	33				
13:45	0	3	1	0	0	0	0 <	7	0	0	0	0	11	39				
14:00	0	2	1	1	0	0	0	2	0	0	0	0	6	33				
14:15	0	1	1	0	0	0	0	5	0	0	0	0	7	33				
14:30	0	2	2	2	0	0	0	4	0	0	0	0	10	34				
14:45	0	5	3	1	0	0	0	5	0	0	0	0	14	37				
15:00	0	6	3 <	3	0	0	0	5	0	0	0	0	17	48				

Wednesday



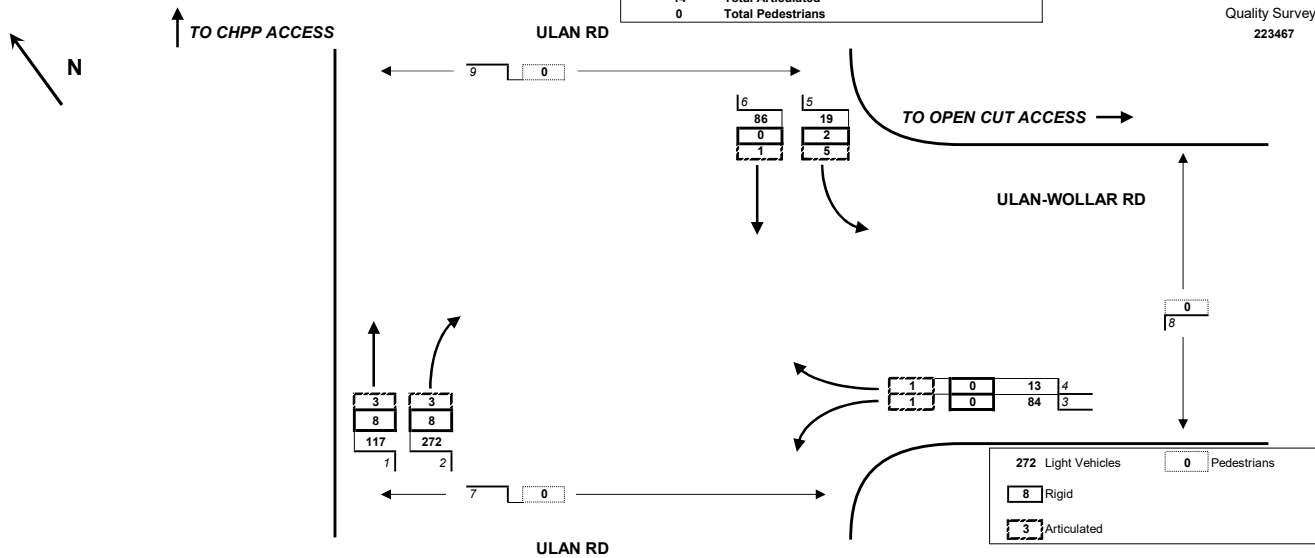
Light Vehicles

	1	2	3	4	5	6	7	8	9	10	11	12	15 MIN	HOUR		13	14	15	16	
15:15	0	1	0	1	0	0	0	8	0	0	0	0	10			0	0	0	0	
15:30	0	3	0	1	0	0	0	3	0	0	0	0	7			0	0	0	0	
15:45	0	1	0	1	0	0	0	4	0	0	0	0	6			0	0	0	0	
16:00	0	1	0	1 <	0	0	0	12	0	0	0	0	14	37		0	0	0	0	
16:15	0	2	0	0	0	0	0	18	0	0	0	0	20	47		0	0	0	0	
16:30	0	0	0	0	0	0	0	11	0	0	0	0	11	51		0	0	0	0	
16:45	0	1	0	0	0	0	0	8	0	0	0	0	9	54		0	0	0	0	
17:00	0	2	0	0	0	0	0	12	0	0	0	0	14	54		0	0	0	0	
17:15	0	6	1	0	0	0	0	10	0	0	0	0	17	51		0	0	0	0	
17:30	0	10	1 <	0	0	0	0	10	0	0	0	0	21	61		0	0	0	0	
17:45	0	3	0 <	0	0	0	0	8	0	0	0	0	11	63		0	0	0	0	
18:00	0	28	0 <	0	0	0	0	9	0	0	0	0	37	86		0	0	0	0	
18:15	0	27 <	0	0	0	0	0	9	0	0	0	0	36	105		0	0	0	0	
18:30	0	2	0	0	0	0	0	10	0	0	0	0	12	96		0	0	0	0	
18:45	0	0	0	1	0	0	0	23	0	0	0	0	24	109 <		0	0	0	0	
19:00	0	0	0	0	0	0	0	17 <	0	0	0	0	17	89		0	0	0	0	
Rigid													Total Vehicles							
	1	2	3	4	5	6	7	8	9	10	11	12	15 MIN	HOUR						
	15:15	0	0	0	0	0	0	0	0	0	0	0	0							
	15:30	0	1	0	1	0	0	0	0	0	0	0	2							
	15:45	0	0	0	0	0	0	2	0	0	0	0	2							
	16:00	0	0 <	0	0 <	0	0	0	0	0	0	0	0	4						
	16:15	0	0 <	0	0 <	0	0	0	1 <	0	0	0	1	5 <						
	16:30	0	1 <	0	0	0	0	0	0 <	0	0	0	1	4						
	16:45	0	0 <	0	0	0	0	0	0	0	0	0	0	2						
	17:00	0	0 <	0	0	0	0	0	0	0	0	0	0	2						
	17:15	0	0 <	0	0	0	0	0	0	0	0	0	0	1						
	17:30	0	0	0	0	0	0	0	0	0	0	0	0	0						
	17:45	0	0	0	0	0	0	0	0	0	0	0	0	0						
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
18:15	0	1 <	0	0	0	0	0	0	0	0	0	0	1	1						
18:30	0	0 <	0	0	0	0	0	0	0	0	0	0	0	1						
18:45	0	0 <	0	0	0	0	0	0	0	0	0	0	0	1						
19:00	0	0 <	0	0	0	0	0	0	0	0	0	0	0	1						
Articulated													Total Vehicles							
	1	2	3	4	5	6	7	8	9	10	11	12	15 MIN	HOUR						
	15:15	0	0	0	0	0	0	0	0	0	0	0	0							
	15:30	0	0	0	0	0	0	0	0	0	0	0	0							
	15:45	0	0	0	0	0	0	0	0	0	0	0	0							
	16:00	0	0	0	0	0	0	0	0	0	0	0	0	0						
	16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
	16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
	16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
	17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
	17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
	17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
	17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
18:00	0	1	0	0	0	0	0	0	0	0	0	0	1	1						
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	1						
18:30	0	1 <	0	0	0	0	0	0	0	0	0	0	1	2						
18:45	0	0 <	0	0	0	0	0	0	0	0	0	0	0	2						
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	1						
Light + Heavy Vehicles													Total Vehicles							
	1	2	3	4	5	6	7	8	9	10	11	12	15 MIN	HOUR						
	15:15	0	1	0	1	0	0	8	0	0	0	0	10							
	15:30	0	4	0	2	0	0	3	0	0	0	0	9							
	15:45	0	1	0	1	0	0	6	0	0	0	0	8							
	16:00	0	1	0	1 <	0	0	12	0	0	0	0	14	41						
	16:15	0	2	0	0	0	0	19	0	0	0	0	21	52						
	16:30	0	1	0	0	0	0	11	0	0	0	0	12	55						
	16:45	0	1	0	0	0	0	8	0	0	0	0	9	56						
	17:00	0	2	0	0	0	0	12	0	0	0	0	14	56						
	17:15	0	6	1	0	0	0	10	0	0	0	0	17	52						
	17:30	0	10	1 <	0	0	0	10	0	0	0	0	21	61						
	17:45	0	3	0 <	0	0	0	8	0	0	0	0	11	63						
18:00	0	28	0 <	0	0	0	9	0	0	0	0	37	86							
18:15	0	28 <	0	0	0	0	9	0	0	0	0	37	106							
18:30	0	2	0	0	0	0	10	0	0	0	0	12	97							
18:45	0	0	0	1	0	0	23	0	0	0	0	24	110 <							
19:00	0	0	0	0	0	0	17 <	0	0	0	0	17	90							

Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

7:15 <<< HOUR ENDING

Thursday



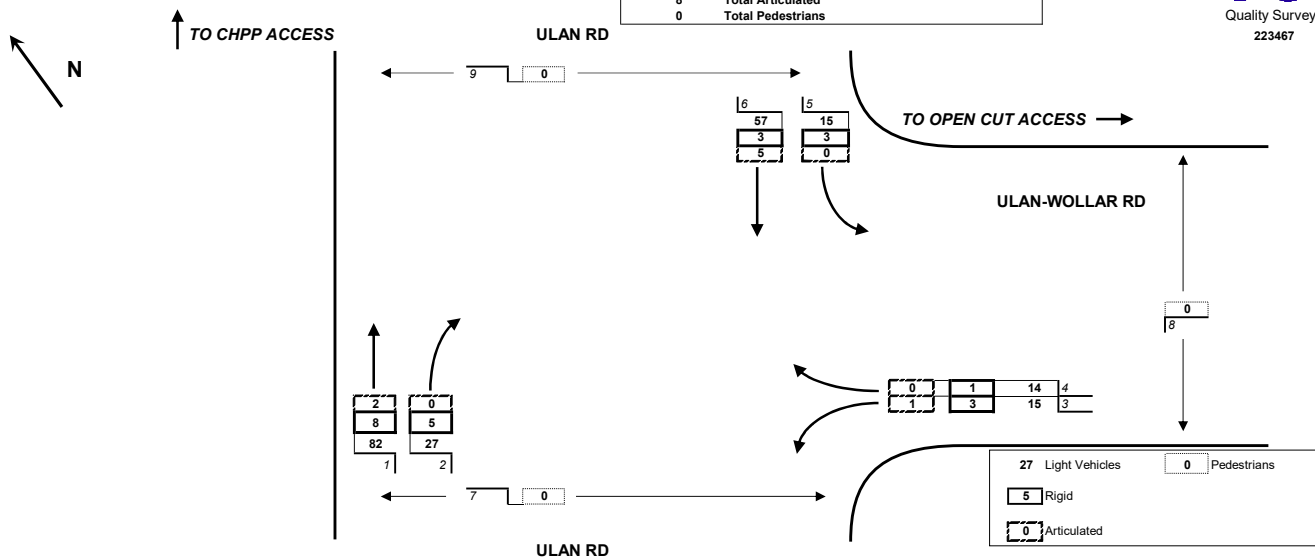
5/5/2022 - ULAN RD / ULAN-WOLLAR RD, MOOLARBEN

Light Vehicles							Total Vehicles		Pedestrians		
	1	2	3	4	5	6	15 MIN	HOURL	7	8	9
05:15	26	19	0	1	1	2	49		0	0	0
05:30	65	38	9	0	2	1	115		0	0	0
05:45	88	55	4	2	0	4	153		0	0	0
06:00	24	66	1	1	2	2	96	413	0	0	0
06:15	31 <	80	5	2	6	9	133	497	0	0	0
06:30	27	78	0	2	8	14	129	511	0	0	0
06:45	41	102 <	11	2	4 <	30	190	548	0	0	0
07:00	26	48	11	3	1	30	119	571	0	0	0
07:15	23	44	62	6	6	12	153	591 <	0	0	0
07:30	15	19	26 <	8	8	22 <	98	560	0	0	0
07:45	10	15	8	8	2	5	48	418	0	0	0
08:00	8	7	7	5 <	4 <	14	45	344	0	0	0
08:15	10	0	3	4	3	7	27	218	0	0	0
08:30	9	5	1	5	7	6	33	153	0	0	0
08:45	11	1	12	2	3	5	34	139	0	0	0
09:00	5	3	9	2	2	11	32	126	0	0	0
09:15	12	7	7	1	3	8	38	137	0	0	0
09:30	15	6	2	5	0	10	38	142	0	0	0
09:45	17	2	2	1	4	7	33	141	0	0	0
10:00	11	4	3	3	2	7	30	139	0	0	0
Rigid							Total Vehicles				
	1	2	3	4	5	6	15 MIN	HOURL			
05:15	0	0	0	0	0	0	0				
05:30	0	0	0	0	0	0	0				
05:45	1	1	0	0	0	0	2				
06:00	0	2	0	0	0	0	2	4			
06:15	0	0	0	0	0	0	0	4			
06:30	0	4	0	0	0	0	4	8			
06:45	3	0	0	0	0	0	3	9			
07:00	4	2	0	0	0	0	6	13			
07:15	1 <	2 <	0	0	2	0	5	18			
07:30	0 <	1	0	0	1	1	3	17			
07:45	0	2	0	1	0	0	3	17			
08:00	1	0	1	1	0	1	4	15			
08:15	1	1	0	0	1	0	3	13			
08:30	1	1	1	1 <	3	3	10	20			
08:45	2	1	0	0	0	1	4	21			
09:00	1	0	0	0	1 <	1	3	20			
09:15	1	2	0	1	0	2 <	6	23 <			
09:30	2	0	1	0	0	1	4	17			
09:45	0	2	1	0	0	0	3	16			
10:00	3	1	1 <	0	0	2	7	20			
Articulated							Total Vehicles				
	1	2	3	4	5	6	15 MIN	HOURL			
05:15	0	0	0	0	0	0	0				
05:30	0	0	0	0	0	3	3				
05:45	0	0	0	0	0	0	0				
06:00	1	0	0	0	0	0	1	4			
06:15	0	0	0	0	0	0	0	4			
06:30	1	2	0	0	1	0	4	5			
06:45	0	0	0	0	2	0	2	7			
07:00	1	0	0	0	1	0	2	8			
07:15	1	1 <	1	1	1 <	1	6	14			
07:30	0	0	0	1	1 <	0	2	12			
07:45	0	1	0	0	0	2	3	13			
08:00	0	0	0	3	1	0	4	15			
08:15	0	0	2	2 <	0	1	5	14			
08:30	0	1	0	0	2	1 <	4	16			
08:45	2	1	0	0	0	0	3	16			
09:00	1	1 <	1 <	0	1	0	4	16			
09:15	2	0 <	0	2	0	0	4	15			
09:30	1 <	0	0	1	0	1	3	14			
09:45	0	0	0	1	0	0	1	12			
10:00	0	1	1	0	2	0	4	12			
Light + Heavy Vehicles							Total Vehicles				
	1	2	3	4	5	6	15 MIN	HOURL			
05:15	26	19	0	1	1	2	49				
05:30	65	38	9	0	2	1	115				
05:45	88	56	4	2	0	4	155				
06:00	24	68	1	1	2	2	98	417			
06:15	31 <	80	5	2	6	9	133	501			
06:30	27	82	0	2	8	14	133	519			
06:45	44	102 <	11	2	4	30	193	557			
07:00	30	50	11	3	1	30	125	584			
07:15	24	46	62	6	8	12	158	609 <			
07:30	15	20	26 <	8	9	23 <	101	577			
07:45	10	17	8	9	2	5	51	435			
08:00	9	7	8	6 <	4 <	15	49	359			
08:15	11	1	3	4	4	7	30	231			
08:30	10	6	2	6	10	9	43	173			
08:45	13	2	12	2	3	6	38	160			
09:00	6	3	9	2	3	12	35	146			
09:15	13	9	7	2	3	10	44	160			
09:30	17	6	3	5	0	11	42	159			
09:45	17	4	3	1	4	7	36	157			
10:00	14	5	4	3	2	9	37	159			

Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

13:45 <<< HOUR ENDING

Wednesday

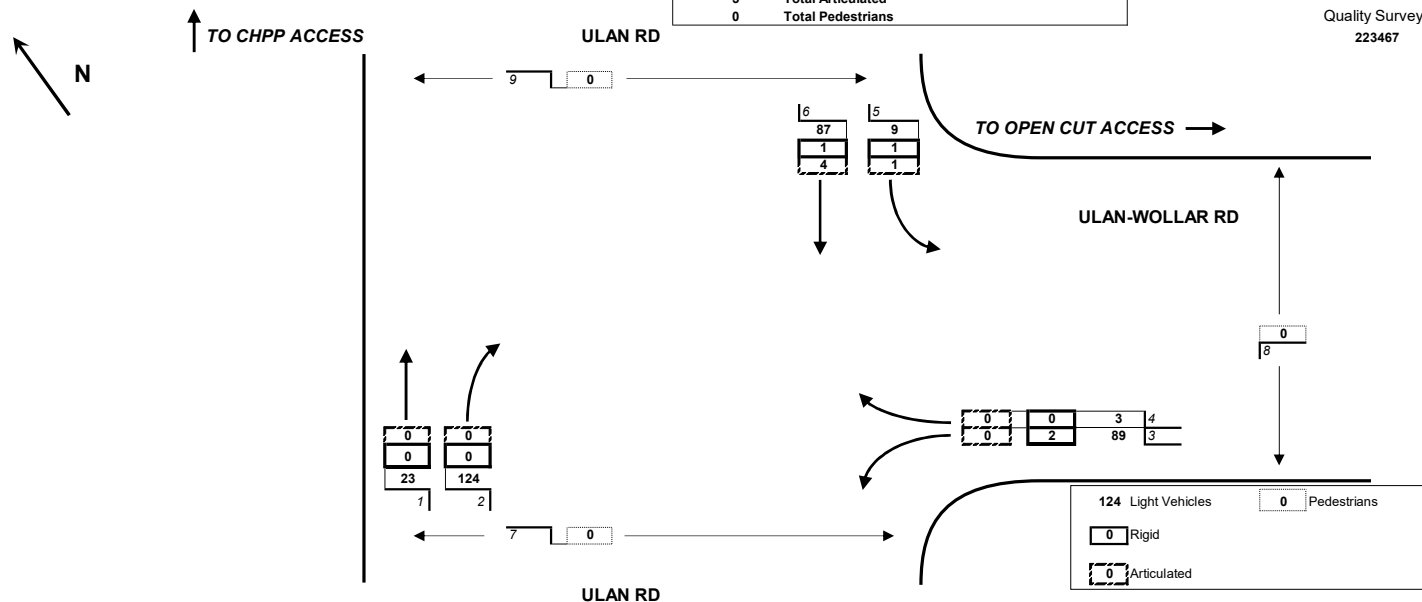


4/5/2022 - ULAN RD / ULAN-WOLLAR RD, MOOLARBEN

Light Vehicles							Total Vehicles		Pedestrians		
	1	2	3	4	5	6	15 MIN	HOURLY	7	8	9
10:15	16	4	1	2	6	13	42		0	0	0
10:30	18	2	1	4	4	12	41		0	0	0
10:45	13	4	5	5	4	7	38		0	0	0
11:00	15	1	5	3	3	< 6	33	154	0	0	0
11:15	8	3	8	3	6	< 6	34	146	0	0	0
11:30	6	5	4	9	< 1	6	31	136	0	0	0
11:45	13	1	6	0	2	6	28	126	0	0	0
12:00	10	6	7	< 5	2	5	35	128	0	0	0
12:15	11	1	4	3	1	15	35	129	0	0	0
12:30	10	4	8	< 3	4	13	42	140	0	0	0
12:45	19	5	1	2	3	12	42	154	0	0	0
13:00	19	8	4	1	4	13	49	168	0	0	0
13:15	21	4	4	5	5	13	52	185	0	0	0
13:30	15	8	3	2	3	13	44	187	0	0	0
13:45	27	< 7	< 4	6	3	18	65	210	< 0	0	0
14:00	9	0	3	1	2	11	26	187	0	0	0
14:15	9	3	7	2	3	10	34	169	0	0	0
14:30	8	4	7	1	2	17	39	164	0	0	0
14:45	5	2	4	2	2	19	34	133	0	0	0
15:00	12	4	2	2	1	43	64	171	0	0	0
							Total Vehicles				
							15 MIN	HOURLY			
Rigid											
	1	2	3	4	5	6					
10:15	1	0	1	1	0	1	4				
10:30	1	1	0	0	0	3	5				
10:45	4	3	4	0	0	1	12				
11:00	0	1	3	1	0	1	6	27			
11:15	0	2	< 0	0	0	1	3	26			
11:30	1	1	< 3	< 1	0	1	7	28	<		
11:45	1	2	3	0	1	2	9	25			
12:00	0	1	1	1	0	0	3	22			
12:15	1	1	1	0	0	2	5	24			
12:30	1	2	1	1	1	1	7	24			
12:45	1	0	1	1	< 0	1	4	19			
13:00	1	1	0	0	0	1	4	20			
13:15	2	0	1	0	0	0	3	18			
13:30	2	1	1	0	2	< 0	6	17			
13:45	3	< 3	1	1	0	< 2	10	23			
14:00	1	< 1	0	1	0	0	3	22			
14:15	2	< 1	0	1	< 0	1	5	24			
14:30	1	0	3	0	< 0	2	6	24			
14:45	0	1	0	0	0	3	4	18			
15:00	0	1	1	0	0	4	6	21			
							Total Vehicles				
							15 MIN	HOURLY			
Articulated											
	1	2	3	4	5	6					
10:15	0	0	0	0	1	1	2				
10:30	0	1	0	0	0	1	2				
10:45	1	1	1	0	0	0	3				
11:00	0	1	1	1	0	2	5	12			
11:15	1	0	1	0	0	0	2	12			
11:30	0	2	< 0	0	0	0	2	12			
11:45	0	1	< 0	2	< 0	1	4	13			
12:00	2	0	0	0	0	1	3	11			
12:15	2	0	0	0	0	0	2	11			
12:30	1	< 3	< 2	0	1	1	8	17			
12:45	0	< 0	2	1	1	< 0	4	17			
13:00	0	0	1	< 0	0	< 0	1	15			
13:15	1	0	0	< 0	0	< 0	1	14			
13:30	0	0	0	0	0	1	1	7			
13:45	1	0	0	0	0	4	5	8			
14:00	1	0	2	0	1	0	4	11			
14:15	0	3	0	0	1	< 1	5	15			
14:30	0	0	1	0	0	< 2	3	17			
14:45	0	0	1	0	0	< 0	1	13			
15:00	0	0	2	0	0	2	4	13			
							Total Vehicles				
							15 MIN	HOURLY			
Light + Heavy Vehicles											
	1	2	3	4	5	6					
10:15	17	4	2	3	6	14	46				
10:30	19	3	1	4	4	15	46				
10:45	17	7	9	5	4	8	50				
11:00	15	2	8	4	3	7	39	181			
11:15	8	5	8	3	6	7	37	172			
11:30	7	6	7	< 10	< 1	7	38	164			
11:45	14	3	9	< 0	3	8	37	151			
12:00	10	7	8	< 6	2	5	38	150			
12:15	12	2	5	3	1	17	40	153			
12:30	11	6	9	4	5	14	49	164			
12:45	20	5	2	3	3	13	46	173			
13:00	20	9	4	1	5	14	53	188			
13:15	23	4	5	5	5	< 13	55	203			
13:30	17	9	4	2	5	< 13	50	204			
13:45	30	< 10	< 5	7	3	< 20	75	233	<		
14:00	10	1	3	2	2	11	29	209			
14:15	11	4	7	3	3	11	39	193			
14:30	9	4	10	1	2	19	45	188			
14:45	5	3	4	2	2	22	38	151			
15:00	12	5	3	2	1	47	70	192			

Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

Summary: ULAN RD / ULAN-WOLLAR RD	
335	Total Light Vehicles
4	Total Rigid
5	Total Articulated
0	Total Pedestrians



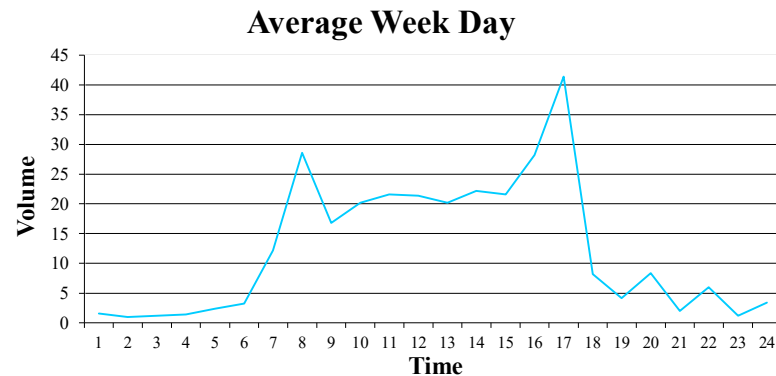
4/5/2022 - ULAN RD / ULAN-WOLLAR RD, MOOLARBEN

Light Vehicles							Total Vehicles		Pedestrians		
	1	2	3	4	5	6	15 MIN	HOURLY	7	8	9
15:15	6	2	7	2	7	55	79		0	0	0
15:30	8	1	14	1	0	35	59		0	0	0
15:45	6	6	18	5	0	32	67		0	0	0
16:00	10	3	15	3	1	32	64	269	0	0	0
16:15	5	0	37	1	1	47	91	281	0	0	0
16:30	5	2	38	4	1	40	90	312	0	0	0
16:45	16	1	24	2	2	36	81	326	0	0	0
17:00	9	4	21	0	0	25	59	321	0	0	0
17:15	11	5	19	1	1	25	62	292	0	0	0
17:30	10	7	30	2	2	21	72	274	0	0	0
17:45	13	18	20	2	1	9	63	256	0	0	0
18:00	7	35	14	1	3	18	78	275	0	0	0
18:15	6	31	36	1	0	23	97	310	0	0	0
18:30	6	33	20	0	5	26	90	328	0	0	0
18:45	4	25	19	1	1	20	70	335	0	0	0
19:00	2	0	27	2	0	3	34	291	0	0	0
Rigid							Total Vehicles				
	1	2	3	4	5	6	15 MIN	HOURLY			
15:15	3	0	1	1	0	0	5				
15:30	2	0	0	0	0	2	4				
15:45	0	0	0	0	0	1	3				
16:00	0	0	1	1	0	2	4	16			
16:15	1	0	1	0	0	0	2	13			
16:30	0	0	1	0	0	0	1	10			
16:45	0	0	0	0	0	0	0	7			
17:00	1	0	0	0	0	2	3	6			
17:15	0	0	0	0	0	0	0	4			
17:30	0	0	0	1	1	3	5	8			
17:45	0	0	0	0	0	0	0	8			
18:00	0	0	1	0	1	0	2	7			
18:15	0	0	0	0	0	0	0	7			
18:30	0	0	1	0	0	1	2	4			
18:45	0	0	0	0	0	0	0	4			
19:00	0	0	0	0	0	0	0	2			
Articulated							Total Vehicles				
	1	2	3	4	5	6	15 MIN	HOURLY			
15:15	1	0	1	1	0	0	3				
15:30	0	1	0	1	0	3	5				
15:45	2	1	0	0	0	0	3				
16:00	0	0	1	0	0	2	3	14			
16:15	0	0	1	0	0	0	1	12			
16:30	0	0	1	0	0	0	1	8			
16:45	0	0	0	0	0	2	2	7			
17:00	0	0	0	0	0	1	1	5			
17:15	0	0	0	0	0	0	0	4			
17:30	0	0	0	0	0	0	0	3			
17:45	0	0	0	0	0	2	2	3			
18:00	0	0	0	0	0	2	2	4			
18:15	0	0	0	0	0	1	1	5			
18:30	0	0	0	0	1	0	1	6			
18:45	0	0	0	0	0	1	1	5			
19:00	0	0	0	0	0	1	1	4			
Light + Heavy Vehicles							Total Vehicles				
	1	2	3	4	5	6	15 MIN	HOURLY			
15:15	9	2	8	3	7	55	84				
15:30	10	1	14	1	0	37	63				
15:45	6	6	18	5	2	33	70				
16:00	10	3	16	4	1	34	68	285			
16:15	6	0	38	1	1	47	93	294			
16:30	5	2	39	4	1	40	91	322			
16:45	16	1	24	2	2	36	81	333			
17:00	10	4	21	0	0	27	62	327			
17:15	11	5	19	1	1	25	62	296			
17:30	10	7	30	3	3	24	77	282			
17:45	13	18	20	2	1	9	63	264			
18:00	7	35	15	1	4	18	80	282			
18:15	6	31	36	1	0	23	97	317			
18:30	6	33	21	0	5	27	92	332			
18:45	4	25	19	1	1	20	70	339			
19:00	2	0	27	2	0	3	34	293			

Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

Site 1 Moolarben CCHP Access Rd [40]
Northbound

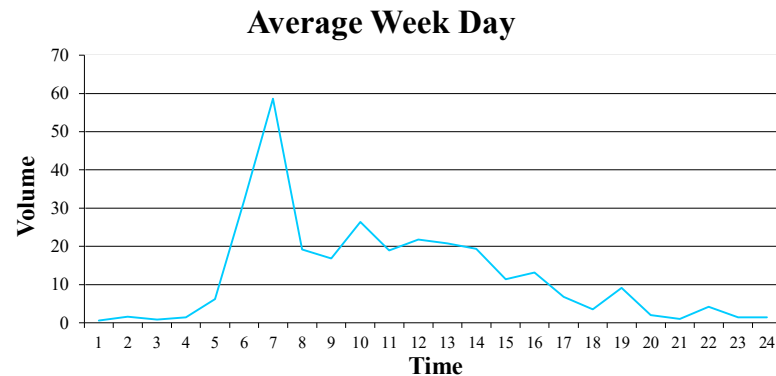
Day Time	Thu 05/05/22	Fri 06/05/2022	Sat 07/05/2022	Sun 08/05/2022	Mon 09/05/2022	Tue 10/05/2022	Wed 11/05/2022	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	1	4	1	1	1	1	1	2	1	1
1:00	1	2	1	1	0	0	2	1	1	1
2:00	2	1	1	2	0	3	0	1	2	1
3:00	4	2	0	1	0	0	1	1	1	1
4:00	0	5	1	0	6	0	1	2	1	2
5:00	1	6	0	0	6	2	1	3	0	2
6:00	6	9	1	5	13	16	17	12	3	10
7:00	32	17	10	8	41	23	30	29	9	23
8:00	25	6	5	2	15	20	18	17	4	13
9:00	20	20	1	2	20	25	16	20	2	15
10:00	18	20	8	3	21	23	26	22	6	17
11:00	32	19	4	3	16	17	23	21	4	16
12:00	17	18	3	1	21	20	25	20	2	15
13:00	30	13	0	2	18	32	18	22	1	16
14:00	17	23	4	14	22	22	24	22	9	18
15:00	33	27	12	6	29	24	28	28	9	23
16:00	34	23	4	3	51	57	42	41	4	31
17:00	8	2	0	6	10	13	8	8	3	7
18:00	4	4	2	4	6	3	4	4	3	4
19:00	7	9	8	6	9	9	8	8	7	8
20:00	1	3	1	2	1	2	3	2	2	2
21:00	6	3	2	0	10	5	6	6	1	5
22:00	2	0	1	1	2	1	1	1	1	1
23:00	4	1	0	0	4	4	4	3	0	2
Total	305	237	70	73	322	322	307	299	72	234


Summary

	from	to	
AM Peak	7:00 AM	8:00 AM	41
PM Peak	4:00 PM	5:00 PM	57
Week Day Average			299
Weekend Day Average			72
7 Day Average			234

Site 1 Moolarben CCHP Access Rd [40]
Southbound

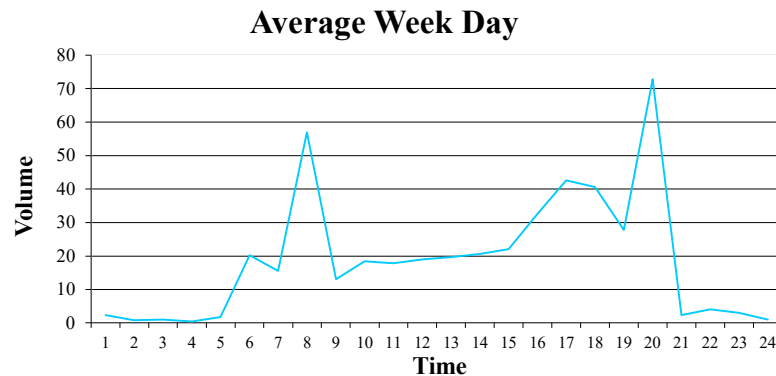
Day Time	Thu 05/05/22	Fri 6/05/2022	Sat 7/05/2022	Sun 8/05/2022	Mon 9/05/2022	Tue 10/05/2022	Wed 11/05/2022	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	1	1	1	0	0	1	0	1	1	1
1:00	2	3	0	1	0	1	2	2	1	1
2:00	0	2	1	2	0	1	1	1	2	1
3:00	2	3	0	0	0	1	1	1	0	1
4:00	8	11	2	0	8	2	2	6	1	5
5:00	31	30	10	11	30	32	37	32	11	26
6:00	53	48	17	14	62	66	64	59	16	46
7:00	25	16	2	1	20	18	17	19	2	14
8:00	19	5	3	2	21	21	18	17	3	13
9:00	26	19	5	4	29	32	26	26	5	20
10:00	22	18	6	4	14	18	23	19	5	15
11:00	29	18	3	2	19	22	21	22	3	16
12:00	22	18	2	0	21	23	20	21	1	15
13:00	16	11	1	2	27	21	22	19	2	14
14:00	13	6	2	4	14	16	8	11	3	9
15:00	10	11	3	4	16	14	15	13	4	10
16:00	7	5	2	3	8	8	6	7	3	6
17:00	1	4	1	4	1	8	4	4	3	3
18:00	11	7	6	10	11	10	7	9	8	9
19:00	2	3	1	1	2	0	3	2	1	2
20:00	1	1	1	1	1	1	1	1	1	1
21:00	4	2	1	0	9	3	3	4	1	3
22:00	0	1	2	1	1	3	2	1	2	1
23:00	3	0	0	1	3	0	1	1	1	1
Total	308	243	72	72	317	322	304	299	72	234


Summary

	from	to	
AM Peak	6:00 AM	7:00 AM	66
PM Peak	1:00 PM	2:00 PM	27
Week Day Average			299
Weekend Day Average			72
7 Day Average			234

Site 2 Moolarben Open Cut Access Rd [60]
Eastbound

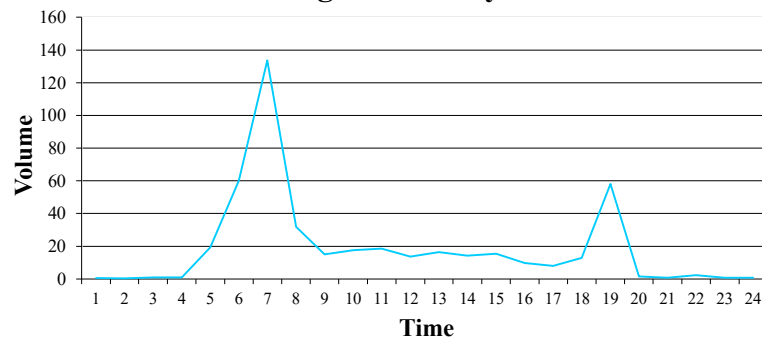
Day Time	Thu 05/05/22	Fri 6/05/2022	Sat 7/05/2022	Sun 8/05/2022	Mon 9/05/2022	Tue 10/05/2022	Wed 11/05/2022	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	3	3	1	0	1	3	2	2	1	2
1:00	0	2	1	0	1	1	0	1	1	1
2:00	1	1	0	1	1	0	2	1	1	1
3:00	0	0	2	1	1	1	0	0	2	1
4:00	1	4	0	0	0	1	3	2	0	1
5:00	14	18	19	20	21	18	30	20	20	20
6:00	10	11	3	3	17	18	22	16	3	12
7:00	66	55	36	36	48	58	58	57	36	51
8:00	14	9	1	0	18	13	11	13	1	9
9:00	13	14	4	3	13	28	24	18	4	14
10:00	26	18	2	2	9	19	17	18	2	13
11:00	20	14	3	0	20	22	19	19	2	14
12:00	16	25	0	4	10	22	25	20	2	15
13:00	19	31	2	4	19	17	17	21	3	16
14:00	26	27	1	3	18	22	17	22	2	16
15:00	40	28	2	4	33	36	26	33	3	24
16:00	39	14	0	5	46	58	56	43	3	31
17:00	30	34	12	25	48	44	47	41	19	34
18:00	30	29	20	8	27	27	26	28	14	24
19:00	81	69	58	58	68	68	78	73	58	69
20:00	4	1	1	1	3	2	2	2	1	2
21:00	3	6	1	1	4	3	4	4	1	3
22:00	4	3	2	2	3	2	3	3	2	3
23:00	2	1	0	1	0	1	1	1	1	1
Total	462	417	171	182	429	484	490	456	177	376


Summary

	from	to	
AM Peak	7:00 AM	8:00 AM	66
PM Peak	7:00 PM	8:00 PM	81
Week Day Average			456
Weekend Day Average			177
7 Day Average			376

Site 2 Moolarben Open Cut Access Rd [60]
Westbound

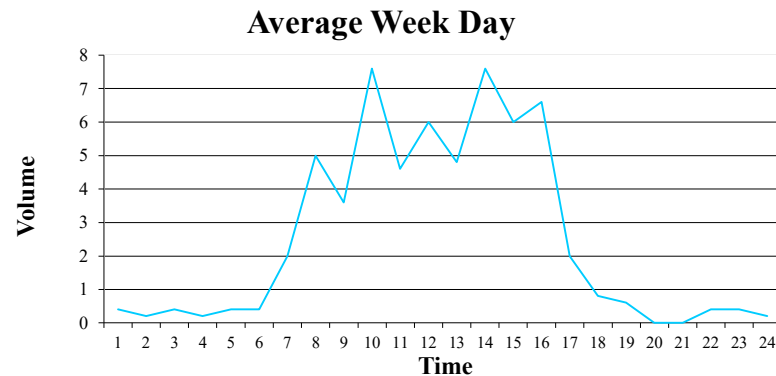
Day Time	Thu 05/05/22	Fri 06/05/2022	Sat 07/05/2022	Sun 08/05/2022	Mon 09/05/2022	Tue 10/05/2022	Wed 11/05/2022	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	1	2	1	0	0	0	0	1	1	1
1:00	0	0	1	0	1	0	1	0	1	0
2:00	0	1	0	2	0	2	2	1	1	1
3:00	1	2	2	1	2	0	0	1	2	1
4:00	19	19	3	5	19	19	21	19	4	15
5:00	60	56	29	30	58	58	69	60	30	51
6:00	131	129	59	63	122	154	132	134	61	113
7:00	36	21	2	0	34	31	38	32	1	23
8:00	16	10	1	1	16	12	22	15	1	11
9:00	17	15	1	2	17	25	14	18	2	13
10:00	18	17	3	2	16	15	27	19	3	14
11:00	14	16	2	1	10	15	13	14	2	10
12:00	17	10	1	4	15	22	18	16	3	12
13:00	13	11	1	1	16	14	18	14	1	11
14:00	12	8	1	5	24	18	15	15	3	12
15:00	7	8	0	2	9	11	14	10	1	7
16:00	8	7	0	1	7	10	8	8	1	6
17:00	13	14	10	9	11	10	16	13	10	12
18:00	65	50	46	48	60	62	53	58	47	55
19:00	3	1	0	1	1	2	1	2	1	1
20:00	1	1	0	1	1	0	1	1	1	1
21:00	1	3	0	0	4	2	2	2	0	2
22:00	2	0	2	2	1	1	0	1	2	1
23:00	1	2	0	1	0	0	1	1	1	1
Total	456	403	165	182	444	483	486	454	174	374

Average Week Day

Summary

	from	to	
AM Peak	6:00 AM	7:00 AM	154
PM Peak	6:00 PM	7:00 PM	65
Week Day Average			454
Weekend Day Average			174
7 Day Average			374

Site 3 Moolarben ROM Facility Access Rd [35]
Northbound

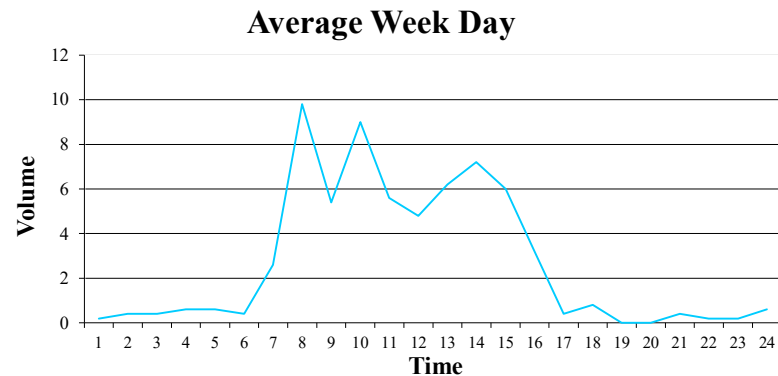
Day Time	Thu 05/05/22	Fri 6/05/2022	Sat 7/05/2022	Sun 8/05/2022	Mon 9/05/2022	Tue 10/05/2022	Wed 11/05/2022	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	1	0	0	0	0	0	1	0	0	0
1:00	0	1	0	1	0	0	0	0	1	0
2:00	0	0	0	0	0	1	1	0	0	0
3:00	0	0	0	0	0	0	1	0	0	0
4:00	0	2	0	0	0	0	0	0	0	0
5:00	0	0	1	0	0	1	1	0	1	0
6:00	2	3	0	1	2	1	2	2	1	2
7:00	5	8	1	1	5	1	6	5	1	4
8:00	3	2	4	1	4	3	6	4	3	3
9:00	8	3	1	0	11	9	7	8	1	6
10:00	4	3	5	0	5	3	8	5	3	4
11:00	9	3	2	1	5	10	3	6	2	5
12:00	3	5	2	0	7	3	6	5	1	4
13:00	1	5	2	2	16	11	5	8	2	6
14:00	3	4	2	1	10	8	5	6	2	5
15:00	6	7	2	0	6	7	7	7	1	5
16:00	5	1	1	0	1	0	3	2	1	2
17:00	0	0	0	1	0	3	1	1	1	1
18:00	0	1	1	0	1	1	0	1	1	1
19:00	0	0	0	1	0	0	0	0	1	0
20:00	0	0	0	1	0	0	0	0	1	0
21:00	0	1	0	0	1	0	0	0	0	0
22:00	0	0	1	1	0	1	1	0	1	1
23:00	0	0	0	0	1	0	0	0	0	0
Total	50	49	25	12	75	63	64	60	19	48


Summary

	from	to	
AM Peak	9:00 AM	10:00 AM	11
PM Peak	1:00 PM	2:00 PM	16
Week Day Average			60
Weekend Day Average			19
7 Day Average			48

Site 3 Moolarben ROM Facility Access Rd [35]
Southbound

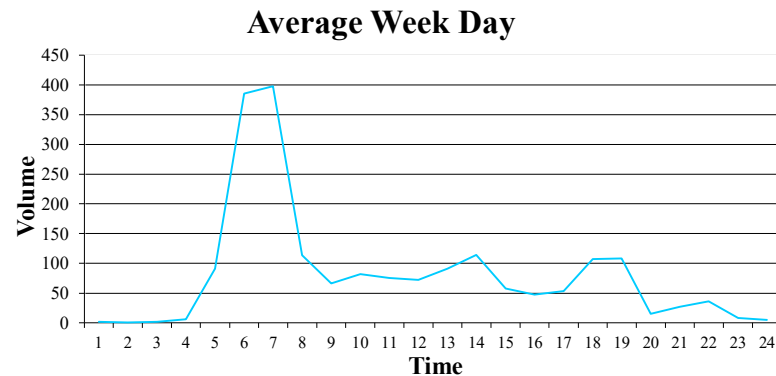
Day Time	Thu 05/05/22	Fri 06/05/2022	Sat 7/05/2022	Sun 8/05/2022	Mon 9/05/2022	Tue 10/05/2022	Wed 11/05/2022	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	0	0	0	1	0	0	1	0	1	0
1:00	0	2	0	0	0	0	0	0	0	0
2:00	1	0	0	0	0	0	1	0	0	0
3:00	0	0	0	1	0	1	2	1	1	1
4:00	0	3	0	0	0	0	0	1	0	0
5:00	0	1	0	0	0	0	1	0	0	0
6:00	2	3	1	0	2	3	3	3	1	2
7:00	7	11	2	2	13	9	9	10	2	8
8:00	3	2	5	0	12	2	8	5	3	5
9:00	8	4	1	1	13	9	11	9	1	7
10:00	5	4	4	0	7	6	6	6	2	5
11:00	8	2	2	1	5	4	5	5	2	4
12:00	1	5	2	1	12	9	4	6	2	5
13:00	2	6	2	1	11	11	6	7	2	6
14:00	4	7	1	1	5	8	6	6	1	5
15:00	4	4	2	0	2	2	4	3	1	3
16:00	0	0	1	0	1	0	1	0	1	0
17:00	0	1	0	0	0	1	2	1	0	1
18:00	0	0	0	1	0	0	0	0	1	0
19:00	0	0	0	0	0	0	0	0	0	0
20:00	0	1	0	1	0	0	1	0	1	0
21:00	0	0	1	0	1	0	0	0	1	0
22:00	0	0	0	1	0	1	0	0	1	0
23:00	0	1	0	0	1	0	1	1	0	0
Total	45	57	24	12	85	66	72	65	18	52


Summary

	from	to	
AM Peak	7:00 AM	8:00 AM	13
PM Peak	12:00 PM	1:00 PM	12
Week Day Average			65
Weekend Day Average			18
7 Day Average			52

Site 4 Ulan Rd S of Ulan-Wollar Rd [100]
Northbound

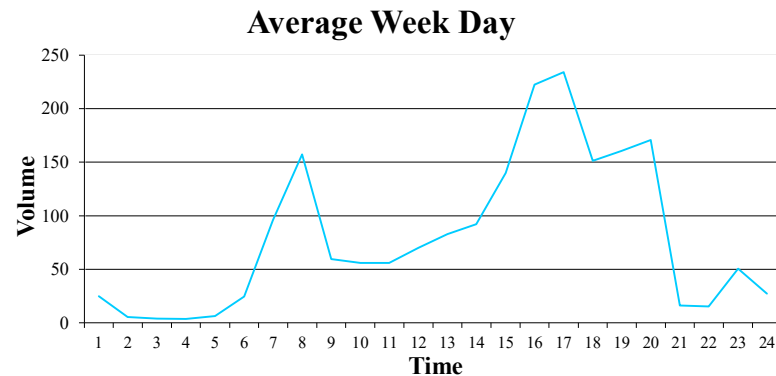
Day Time	Thu 05/05/22	Fri 6/05/2022	Sat 7/05/2022	Sun 8/05/2022	Mon 9/05/2022	Tue 10/05/2022	Wed 11/05/2022	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	5	1	3	2	1	1	0	2	3	2
1:00	0	0	3	1	1	1	1	1	2	1
2:00	3	2	1	4	2	2	1	2	3	2
3:00	5	6	3	0	6	6	7	6	2	5
4:00	97	89	23	22	95	83	90	91	23	71
5:00	375	371	152	151	324	402	456	386	152	319
6:00	439	370	199	165	345	420	416	398	182	336
7:00	147	100	46	18	99	98	124	114	32	90
8:00	60	73	44	33	69	64	65	66	39	58
9:00	89	90	68	47	78	74	80	82	58	75
10:00	71	79	49	53	91	69	68	76	51	69
11:00	77	83	45	75	73	61	69	73	60	69
12:00	88	93	38	54	89	90	94	91	46	78
13:00	124	110	37	38	115	100	122	114	38	92
14:00	64	85	51	55	56	40	45	58	53	57
15:00	44	72	33	60	42	40	38	47	47	47
16:00	50	74	31	53	52	47	45	54	42	50
17:00	128	103	81	107	89	100	116	107	94	103
18:00	119	108	100	105	105	109	100	108	103	107
19:00	11	17	8	11	11	20	16	15	10	13
20:00	34	8	6	27	27	35	32	27	17	24
21:00	46	7	6	24	40	43	46	36	15	30
22:00	15	8	8	2	5	8	6	8	5	7
23:00	5	4	1	3	5	4	6	5	2	4
Total	2096	1953	1036	1110	1820	1917	2043	1966	1073	1711


Summary

	from	to	
AM Peak	5:00 AM	6:00 AM	456
PM Peak	5:00 PM	6:00 PM	128
Week Day Average			1966
Weekend Day Average			1073
7 Day Average			1711

Site 4 Ulan Rd S of Ulan-Wollar Rd [100]
Southbound

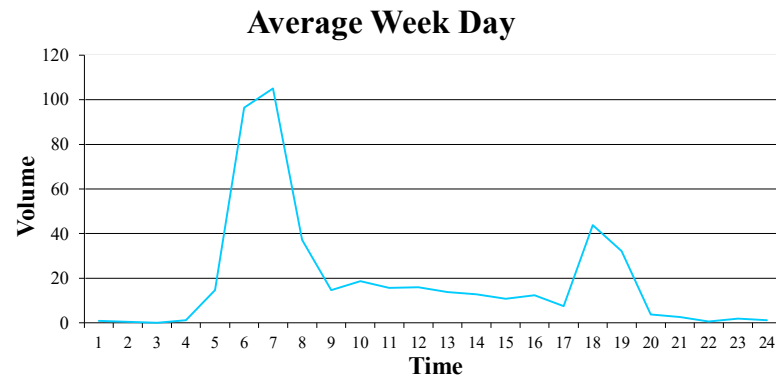
Day Time	Thu 05/05/22	Fri 6/05/2022	Sat 7/05/2022	Sun 8/05/2022	Mon 9/05/2022	Tue 10/05/2022	Wed 11/05/2022	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	30	21	9	6	2	36	35	25	8	20
1:00	2	7	3	4	1	8	10	6	4	5
2:00	5	5	4	4	3	2	5	4	4	4
3:00	4	10	3	3	1	2	2	4	3	4
4:00	5	11	7	6	7	7	2	6	7	6
5:00	20	22	18	11	24	26	31	25	15	22
6:00	109	88	57	51	82	113	88	96	54	84
7:00	168	144	115	107	154	160	160	157	111	144
8:00	65	54	17	8	47	62	70	60	13	46
9:00	55	59	29	20	55	57	55	56	25	47
10:00	71	51	40	43	50	51	57	56	42	52
11:00	68	78	44	60	70	64	70	70	52	65
12:00	108	100	55	50	68	63	76	83	53	74
13:00	95	129	36	71	72	69	95	92	54	81
14:00	136	214	38	73	127	120	103	140	56	116
15:00	240	232	64	71	225	218	198	223	68	178
16:00	227	120	45	67	262	288	273	234	56	183
17:00	127	106	55	94	148	182	194	151	75	129
18:00	150	130	130	95	161	184	178	161	113	147
19:00	161	196	176	177	160	158	179	171	177	172
20:00	21	18	18	21	9	18	15	16	20	17
21:00	17	13	11	13	15	15	17	15	12	14
22:00	49	52	9	5	51	52	50	51	7	38
23:00	31	21	8	4	23	27	34	27	6	21
Total	1964	1881	991	1064	1817	1982	1997	1928	1028	1671


Summary

	from	to	
AM Peak	7:00 AM	8:00 AM	168
PM Peak	4:00 PM	5:00 PM	288
Week Day Average			1928
Weekend Day Average			1028
7 Day Average			1671

Site 5 Ulan-Wollar Rd R E of the ROM Facility Access Rd [80]
Eastbound

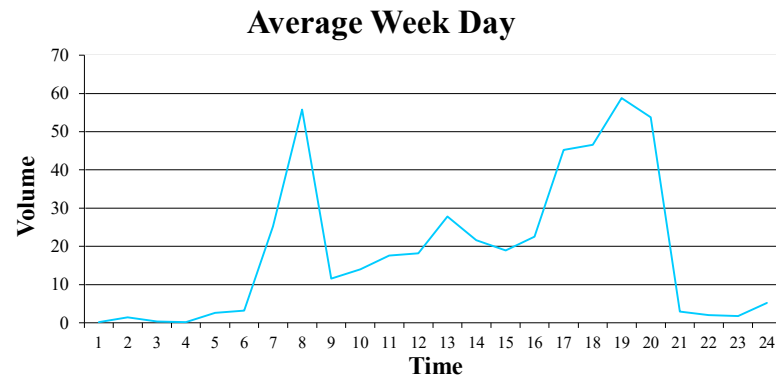
<i>Day Time</i>	<i>Thu 05/05/22</i>	<i>Fri 6/05/2022</i>	<i>Sat 7/05/2022</i>	<i>Sun 8/05/2022</i>	<i>Mon 9/05/2022</i>	<i>Tue 10/05/2022</i>	<i>Wed 11/05/2022</i>	<i>W/Day Ave.</i>	<i>W/End Ave.</i>	<i>7 Day Ave</i>
0:00	2	2	1	0	0	1	0	1	1	1
1:00	0	1	0	1	1	0	0	0	1	0
2:00	0	0	0	2	0	0	0	0	1	0
3:00	1	2	0	0	0	1	2	1	0	1
4:00	14	12	9	9	13	12	22	15	9	13
5:00	86	90	62	59	82	97	127	96	61	86
6:00	133	87	49	54	107	94	104	105	52	90
7:00	82	26	13	3	26	27	25	37	8	29
8:00	21	11	6	1	11	14	16	15	4	11
9:00	13	15	6	1	21	24	21	19	4	14
10:00	15	12	5	2	18	18	16	16	4	12
11:00	14	16	6	6	14	18	18	16	6	13
12:00	13	15	7	2	14	11	16	14	5	11
13:00	11	16	2	4	12	12	13	13	3	10
14:00	7	16	2	3	10	10	11	11	3	8
15:00	11	16	4	5	15	12	8	12	5	10
16:00	5	7	3	8	8	9	9	8	6	7
17:00	49	33	36	32	45	41	51	44	34	41
18:00	30	40	29	38	25	32	34	32	34	33
19:00	4	3	4	3	3	4	5	4	4	4
20:00	4	1	1	1	3	3	2	3	1	2
21:00	0	2	2	0	1	0	0	1	1	1
22:00	3	2	0	0	1	2	2	2	0	1
23:00	2	1	0	0	2	1	0	1	0	1
Total	520	426	247	234	432	443	502	465	241	401


Summary

	from	to	
AM Peak	6:00 AM	7:00 AM	133
PM Peak	5:00 PM	6:00 PM	51
Week Day Average			465
Weekend Day Average			241
7 Day Average			401

Site 5 Ulan-Wollar Rd R E of the ROM Facility Access Rd [80]
Westbound

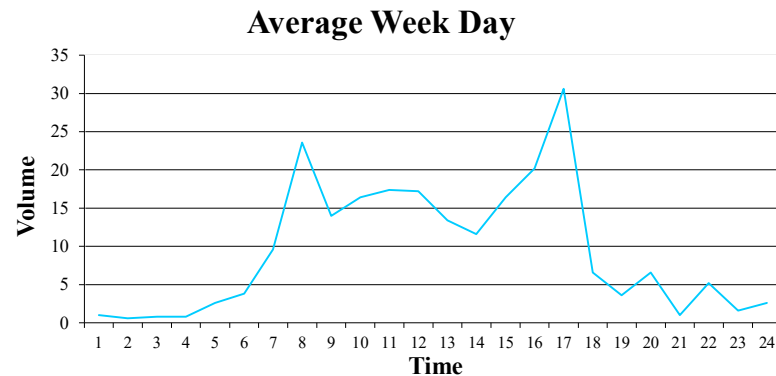
Day Time	Thu 05/05/22	Fri 6/05/2022	Sat 7/05/2022	Sun 8/05/2022	Mon 9/05/2022	Tue 10/05/2022	Wed 11/05/2022	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	0	1	0	0	0	0	0	0	0	0
1:00	2	1	1	0	1	1	2	1	1	1
2:00	0	2	0	3	0	0	0	0	2	1
3:00	0	0	0	1	1	0	0	0	1	0
4:00	3	5	2	3	3	1	1	3	3	3
5:00	1	1	2	4	5	6	3	3	3	3
6:00	29	28	24	23	21	24	24	25	24	25
7:00	58	56	45	41	51	56	58	56	43	52
8:00	13	5	3	0	9	15	16	12	2	9
9:00	12	16	4	0	21	8	13	14	2	11
10:00	21	17	5	6	18	17	15	18	6	14
11:00	13	16	6	4	22	19	21	18	5	14
12:00	68	17	7	7	19	13	22	28	7	22
13:00	24	24	8	8	24	15	21	22	8	18
14:00	23	30	3	3	22	11	9	19	3	14
15:00	22	19	13	5	21	29	22	23	9	19
16:00	43	27	9	13	48	61	47	45	11	35
17:00	38	30	27	23	41	49	75	47	25	40
18:00	48	55	45	46	59	64	68	59	46	55
19:00	59	54	47	47	49	45	62	54	47	52
20:00	2	2	0	0	0	7	4	3	0	2
21:00	4	0	1	1	0	2	4	2	1	2
22:00	0	0	0	0	6	1	2	2	0	1
23:00	6	6	3	2	4	4	6	5	3	4
Total	489	412	255	240	445	448	495	458	248	398


Summary

	from	to	
AM Peak	7:00 AM	8:00 AM	58
PM Peak	5:00 PM	6:00 PM	75
Week Day Average			458
Weekend Day Average			248
7 Day Average			398

Site 1 Moolarben CCHP Access Rd [40]
Northbound

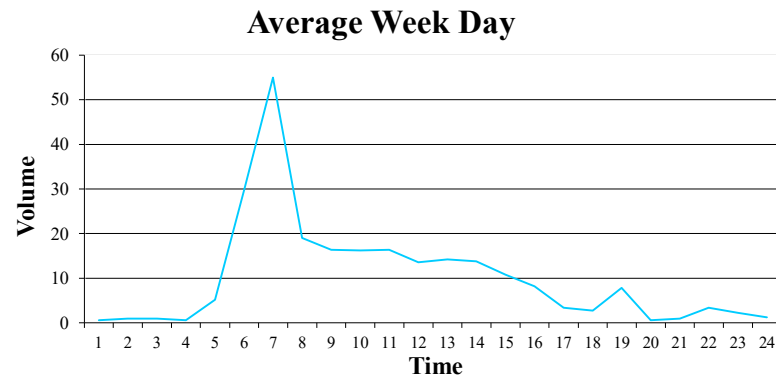
Day Time	Thu 12/05/22	Fri 13/05/2022	Sat 14/05/2022	Sun 15/05/2022	Mon 16/05/2022	Tue 17/05/2022	Wed 18/05/2022	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	0	0	1	1	1	3	1	1	1	1
1:00	1	1	1	2	1	0	0	1	2	1
2:00	2	1	1	0	0	0	1	1	1	1
3:00	0	2	1	1	2	0	0	1	1	1
4:00	3	1	0	1	7	1	1	3	1	2
5:00	3	5	0	0	4	6	1	4	0	3
6:00	7	6	1	2	16	10	9	10	2	7
7:00	24	21	12	9	18	27	28	24	11	20
8:00	10	24	0	2	14	6	16	14	1	10
9:00	23	15	2	2	13	16	15	16	2	12
10:00	11	19	1	2	16	25	16	17	2	13
11:00	25	23	2	2	14	15	9	17	2	13
12:00	19	11	0	1	21	16	0	13	1	10
13:00	9	18	1	4	12	19	0	12	3	9
14:00	20	16	2	12	28	18	0	16	7	14
15:00	28	22	8	3	23	28	0	20	6	16
16:00	37	15	5	2	49	52	0	31	4	23
17:00	3	1	3	2	14	15	0	7	3	5
18:00	4	4	1	1	4	6	0	4	1	3
19:00	9	11	7	9	7	6	0	7	8	7
20:00	2	0	0	1	1	2	0	1	1	1
21:00	5	3	2	2	11	7	0	5	2	4
22:00	1	1	0	1	6	0	0	2	1	1
23:00	3	4	2	1	3	3	0	3	2	2
Total	249	224	53	63	285	281	97	227	58	179


Summary

	from	to	
AM Peak	7:00 AM	8:00 AM	28
PM Peak	4:00 PM	5:00 PM	52
Week Day Average			227
Weekend Day Average			58
7 Day Average			179

Site 1 Moolarben CCHP Access Rd [40]
Southbound

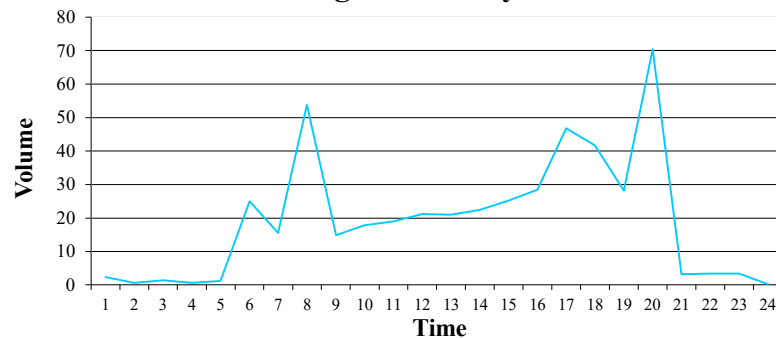
<i>Day Time</i>	<i>Thu 12/05/22</i>	<i>Fri 13/05/2022</i>	<i>Sat 14/05/2022</i>	<i>Sun 15/05/2022</i>	<i>Mon 16/05/2022</i>	<i>Tue 17/05/2022</i>	<i>Wed 18/05/2022</i>	<i>W/Day Ave.</i>	<i>W/End Ave.</i>	<i>7 Day Ave</i>
0:00	0	0	0	4	0	3	0	1	2	1
1:00	1	1	1	0	1	2	0	1	1	1
2:00	2	1	2	0	0	0	2	1	1	1
3:00	1	2	1	1	0	0	0	1	1	1
4:00	3	4	1	1	12	4	3	5	1	4
5:00	36	23	5	8	29	33	28	30	7	23
6:00	56	52	11	12	47	56	64	55	12	43
7:00	20	16	1	0	18	14	27	19	1	14
8:00	16	23	5	1	17	12	14	16	3	13
9:00	13	14	1	2	16	23	15	16	2	12
10:00	10	16	1	5	16	21	19	16	3	13
11:00	14	15	1	3	16	17	6	14	2	10
12:00	18	12	2	2	19	22	0	14	2	11
13:00	14	11	0	2	25	19	0	14	1	10
14:00	9	5	2	0	21	19	0	11	1	8
15:00	13	10	3	5	6	12	0	8	4	7
16:00	3	1	3	2	7	6	0	3	3	3
17:00	3	1	2	3	3	6	1	3	3	3
18:00	10	11	10	9	10	8	0	8	10	8
19:00	0	1	0	2	1	1	0	1	1	1
20:00	2	0	0	0	2	1	0	1	0	1
21:00	2	0	0	3	9	6	0	3	2	3
22:00	2	4	0	1	4	1	0	2	1	2
23:00	1	2	1	1	3	0	0	1	1	1
Total	249	225	53	67	282	286	179	244	60	192


Summary

	from	to	
AM Peak	6:00 AM	7:00 AM	64
PM Peak	1:00 PM	2:00 PM	25
Week Day Average			244
Weekend Day Average			60
7 Day Average			192

Site 2 Moolarben Open Cut Access Rd [60]
Eastbound

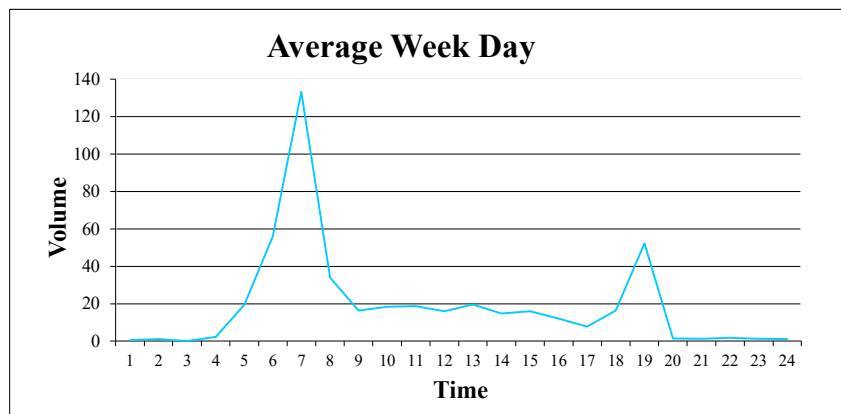
Day Time	Thu 12/05/22	Fri 13/05/2022	Sat 14/05/2022	Sun 15/05/2022	Mon 16/05/2022	Tue 17/05/2022	Wed 18/05/2022	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	2	3	2	2	1	4	2	2	2	2
1:00	1	0	1	0	0	2	0	1	1	1
2:00	1	2	2	2	1	1	2	1	2	2
3:00	1	1	0	1	0	0	1	1	1	1
4:00	0	2	0	1	1	3	0	1	1	1
5:00	26	33	20	15	18	28	20	25	18	23
6:00	13	11	6	4	14	20	20	16	5	13
7:00	51	43	48	45	56	62	57	54	47	52
8:00	8	13	5	0	18	17	18	15	3	11
9:00	19	11	2	0	18	25	16	18	1	13
10:00	16	23	2	0	18	19	19	19	1	14
11:00	25	22	4	6	21	23	15	21	5	17
12:00	26	25	1	5	10	19	25	21	3	16
13:00	28	21	2	2	21	25	17	22	2	17
14:00	16	38	2	1	28	27	17	25	2	18
15:00	35	17	2	3	29	35	26	28	3	21
16:00	53	14	4	2	52	59	56	47	3	34
17:00	39	31	6	8	39	52	47	42	7	32
18:00	17	29	23	16	42	27	26	28	20	26
19:00	73	69	68	67	66	66	78	70	68	70
20:00	2	4	1	3	2	6	2	3	2	3
21:00	3	2	2	0	5	3	4	3	1	3
22:00	3	5	0	0	3	3	3	3	0	2
23:00	0	0	1	0	0	0	1	0	1	0
Total	458	419	204	183	463	526	472	468	194	389

Average Week Day

Summary

	from	to	
AM Peak	7:00 AM	8:00 AM	62
PM Peak	7:00 PM	8:00 PM	78
Week Day Average			468
Weekend Day Average			194
7 Day Average			389

Site 2 Moolarben Open Cut Access Rd [60]
Westbound

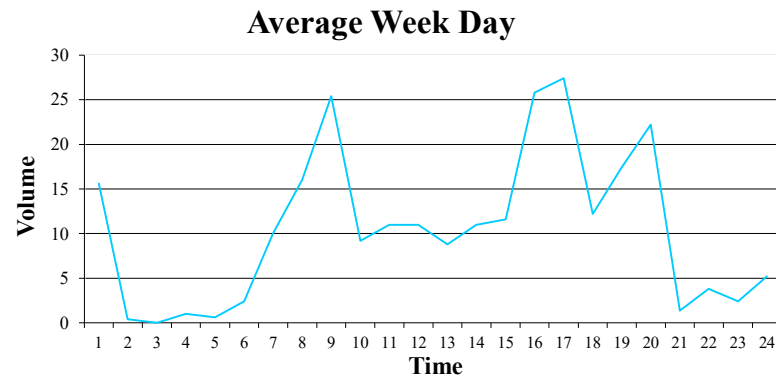
Day Time	Thu 12/05/22	Fri 13/05/2022	Sat 14/05/2022	Sun 15/05/2022	Mon 16/05/2022	Tue 17/05/2022	Wed 18/05/2022	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	1	0	0	1	0	1	0	0	1	0
1:00	1	0	2	0	1	2	1	1	1	1
2:00	0	0	1	2	0	0	0	0	2	0
3:00	2	5	1	1	3	0	1	2	1	2
4:00	17	22	3	3	20	21	17	19	3	15
5:00	62	51	34	29	51	64	52	56	32	49
6:00	128	124	68	65	125	150	139	133	67	114
7:00	32	27	3	0	38	39	34	34	2	25
8:00	14	13	4	0	18	23	14	16	2	12
9:00	16	21	2	0	14	22	19	18	1	13
10:00	24	10	1	0	19	19	21	19	1	13
11:00	18	16	4	2	22	14	10	16	3	12
12:00	19	25	2	5	21	15	18	20	4	15
13:00	16	4	1	3	11	25	18	15	2	11
14:00	13	9	4	0	24	19	15	16	2	12
15:00	18	6	0	4	8	14	14	12	2	9
16:00	4	5	1	0	8	14	8	8	1	6
17:00	13	15	15	17	22	16	16	16	16	16
18:00	52	52	49	41	53	51	53	52	45	50
19:00	2	2	0	2	0	2	1	1	1	1
20:00	0	3	0	0	1	1	1	1	0	1
21:00	1	3	1	1	2	0	2	2	1	1
22:00	2	2	2	0	2	0	0	1	1	1
23:00	2	0	0	0	1	1	1	1	0	1
Total	457	415	198	176	464	513	455	461	187	383



Summary			
	from	to	
AM Peak	6:00 AM	7:00 AM	150
PM Peak	6:00 PM	7:00 PM	53
Week Day Average			461
Weekend Day Average			187
7 Day Average			383

Site 3 Ulan Coal Mines Access [40]
Eastbound

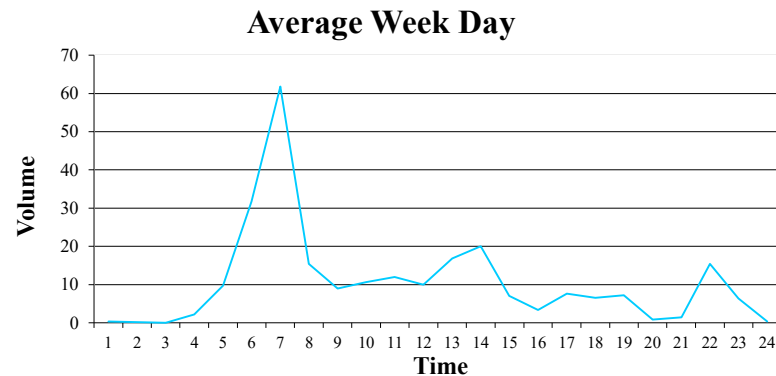
Day Time	Thu 12/05/22	Fri 13/05/2022	Sat 14/05/2022	Sun 15/05/2022	Mon 16/05/2022	Tue 17/05/2022	Wed 18/05/2022	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	25	15	0	1	0	19	19	16	1	11
1:00	0	1	1	0	0	0	1	0	1	0
2:00	0	0	0	0	0	0	0	0	0	0
3:00	0	1	1	0	2	1	1	1	1	1
4:00	1	1	1	2	1	0	0	1	2	1
5:00	3	4	0	2	2	2	1	2	1	2
6:00	6	7	24	21	18	8	11	10	23	14
7:00	23	13	6	1	13	15	16	16	4	12
8:00	29	30	0	0	8	27	33	25	0	18
9:00	8	9	1	1	3	15	11	9	1	7
10:00	11	12	3	0	10	11	11	11	2	8
11:00	14	12	0	1	11	10	8	11	1	8
12:00	6	12	0	1	9	10	7	9	1	6
13:00	9	11	3	0	9	12	14	11	2	8
14:00	7	24	5	2	13	10	4	12	4	9
15:00	29	11	1	3	26	35	28	26	2	19
16:00	37	11	1	0	22	34	33	27	1	20
17:00	12	5	4	5	16	10	18	12	5	10
18:00	12	11	8	7	18	27	19	17	8	15
19:00	18	34	28	29	16	20	23	22	29	24
20:00	1	3	2	2	0	2	1	1	2	2
21:00	4	3	1	1	2	7	3	4	1	3
22:00	2	3	1	0	3	2	2	2	1	2
23:00	12	0	0	0	7	7	0	5	0	4
Total	269	233	91	79	209	284	264	252	85	204


Summary

	from	to	
AM Peak	8:00 AM	9:00 AM	33
PM Peak	4:00 PM	5:00 PM	37
Week Day Average			252
Weekend Day Average			85
7 Day Average			204

Site 3 Ulan Coal Mines Access [40]
Westbound

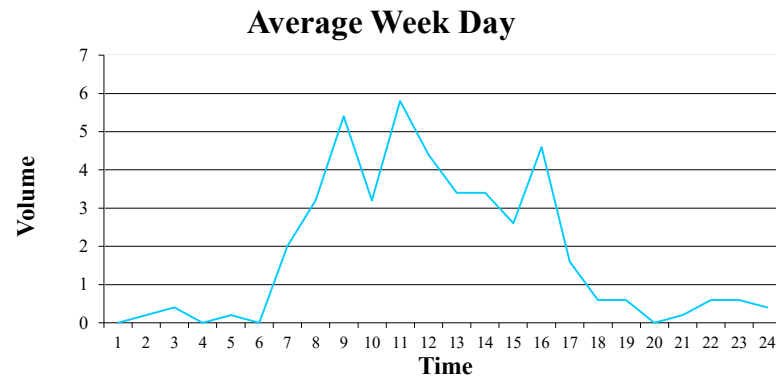
<i>Day Time</i>	<i>Thu 12/05/22</i>	<i>Fri 13/05/2022</i>	<i>Sat 14/05/2022</i>	<i>Sun 15/05/2022</i>	<i>Mon 16/05/2022</i>	<i>Tue 17/05/2022</i>	<i>Wed 18/05/2022</i>	<i>W/Day Ave.</i>	<i>W/End Ave.</i>	<i>7 Day Ave</i>
0:00	0	0	0	0	1	0	1	0	0	0
1:00	0	1	1	2	0	0	0	0	2	1
2:00	0	0	0	0	0	0	0	0	0	0
3:00	1	4	0	0	4	1	1	2	0	2
4:00	8	9	2	3	21	5	6	10	3	8
5:00	32	31	13	12	21	41	34	32	13	26
6:00	66	58	32	23	41	66	78	62	28	52
7:00	20	10	3	0	16	13	18	15	2	11
8:00	4	10	2	0	8	6	17	9	1	7
9:00	11	8	1	1	11	12	11	11	1	8
10:00	10	8	2	0	14	17	11	12	1	9
11:00	11	11	0	1	9	11	8	10	1	7
12:00	17	8	3	1	16	23	20	17	2	13
13:00	21	4	0	2	25	24	26	20	1	15
14:00	5	3	1	2	12	9	6	7	2	5
15:00	4	6	2	3	1	4	2	3	3	3
16:00	7	12	10	10	4	7	8	8	10	8
17:00	1	18	16	12	4	7	3	7	14	9
18:00	8	2	0	0	7	7	12	7	0	5
19:00	1	0	0	1	1	2	0	1	1	1
20:00	1	0	0	2	2	2	2	1	1	1
21:00	22	2	1	0	15	18	20	15	1	11
22:00	5	1	0	0	12	9	5	6	0	5
23:00	0	1	0	0	0	0	1	0	0	0
Total	255	207	89	75	245	284	290	256	82	206


Summary

	from	to	
AM Peak	6:00 AM	7:00 AM	78
PM Peak	1:00 PM	2:00 PM	26
Week Day Average			256
Weekend Day Average			82
7 Day Average			206

Site 4 Moolarben ROM Facility Access Rd [35]
Northbound

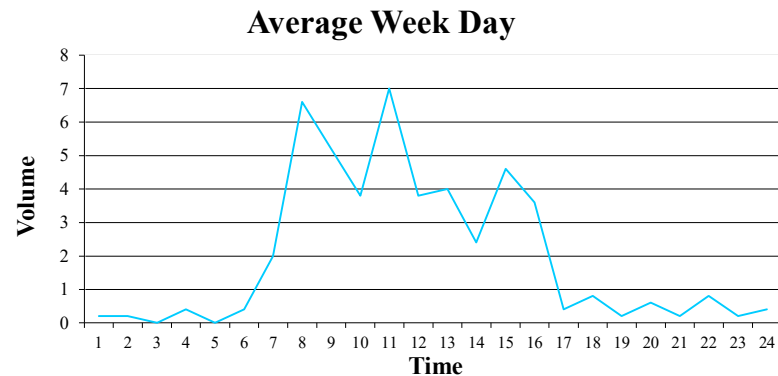
Day Time	Thu 12/05/22	Fri 13/05/2022	Sat 14/05/2022	Sun 15/05/2022	Mon 16/05/2022	Tue 17/05/2022	Wed 18/05/2022	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	0	0	0	1	0	0	0	0	1	0
1:00	0	0	0	0	0	1	0	0	0	0
2:00	0	1	2	0	0	0	1	0	1	1
3:00	0	0	1	0	0	0	0	0	1	0
4:00	0	1	0	0	0	0	0	0	0	0
5:00	0	0	0	0	0	0	0	0	0	0
6:00	2	3	1	1	2	2	1	2	1	2
7:00	3	6	0	0	0	3	4	3	0	2
8:00	7	6	5	0	5	4	5	5	3	5
9:00	2	5	1	3	1	4	4	3	2	3
10:00	7	4	1	0	7	3	8	6	1	4
11:00	4	5	1	0	3	7	3	4	1	3
12:00	3	2	3	3	1	5	6	3	3	3
13:00	2	4	0	0	2	4	5	3	0	2
14:00	1	1	2	0	3	3	5	3	1	2
15:00	2	6	3	1	3	5	7	5	2	4
16:00	0	1	3	1	2	2	3	2	2	2
17:00	0	0	1	0	0	2	1	1	1	1
18:00	1	2	0	0	0	0	0	1	0	0
19:00	0	0	0	0	0	0	0	0	0	0
20:00	1	0	0	0	0	0	0	0	0	0
21:00	1	1	0	0	0	1	0	1	0	0
22:00	0	2	0	1	0	0	1	1	1	1
23:00	0	2	0	0	0	0	0	0	0	0
Total	36	52	24	11	29	46	54	43	18	36


Summary

	from	to	
AM Peak	10:00 AM	11:00 AM	8
PM Peak	3:00 PM	4:00 PM	7
Week Day Average			43
Weekend Day Average			18
7 Day Average			36

Site 4 Moolarben ROM Facility Access Rd [35]
Southbound

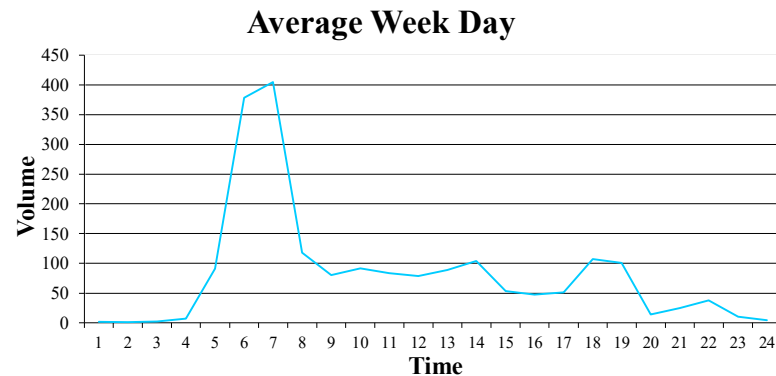
Day Time	Thu 12/05/22	Fri 13/05/2022	Sat 14/05/2022	Sun 15/05/2022	Mon 16/05/2022	Tue 17/05/2022	Wed 18/05/2022	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	0	0	1	0	0	1	0	0	1	0
1:00	0	0	0	0	0	0	1	0	0	0
2:00	0	0	1	0	0	0	0	0	1	0
3:00	0	1	0	0	1	0	0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0
5:00	1	1	0	1	0	0	0	0	1	0
6:00	2	2	1	0	1	3	2	2	1	2
7:00	5	9	5	1	2	8	9	7	3	6
8:00	7	5	3	2	3	1	10	5	3	4
9:00	3	4	2	0	2	4	6	4	1	3
10:00	8	6	1	0	8	5	8	7	1	5
11:00	4	3	1	2	1	8	3	4	2	3
12:00	7	2	1	1	2	5	4	4	1	3
13:00	0	4	2	1	1	1	6	2	2	2
14:00	4	3	4	0	4	6	6	5	2	4
15:00	1	3	1	2	4	6	4	4	2	3
16:00	0	1	1	0	0	0	1	0	1	0
17:00	0	1	1	0	0	1	2	1	1	1
18:00	0	1	0	0	0	0	0	0	0	0
19:00	1	2	0	0	0	0	0	1	0	0
20:00	0	0	0	0	0	0	1	0	0	0
21:00	2	1	1	0	0	1	0	1	1	1
22:00	0	1	0	1	0	0	0	0	1	0
23:00	0	1	1	0	0	0	1	0	1	0
Total	45	51	27	11	29	50	64	48	19	40


Summary

	from	to	
AM Peak	8:00 AM	9:00 AM	10
PM Peak	12:00 PM	1:00 PM	7
Week Day Average			48
Weekend Day Average			19
7 Day Average			40

Site 5 Ulan Rd S of Ulan-Wollar Rd [100]
Northbound

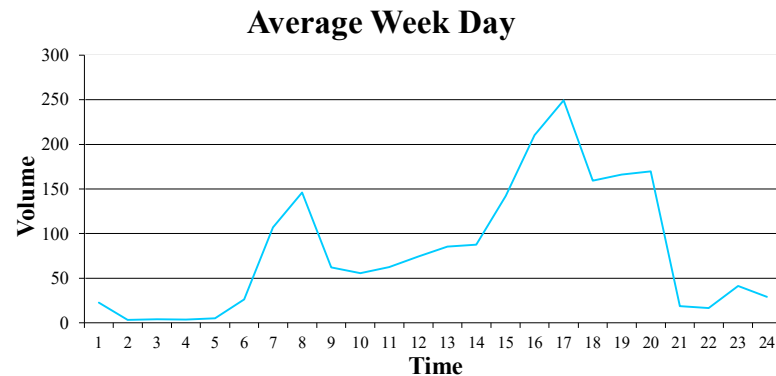
<i>Day Time</i>	<i>Thu 12/05/22</i>	<i>Fri 13/05/2022</i>	<i>Sat 14/05/2022</i>	<i>Sun 15/05/2022</i>	<i>Mon 16/05/2022</i>	<i>Tue 17/05/2022</i>	<i>Wed 18/05/2022</i>	<i>W/Day Ave.</i>	<i>W/End Ave.</i>	<i>7 Day Ave</i>
0:00	2	1	1	2	1	2	2	2	2	2
1:00	0	1	2	4	4	0	1	1	3	2
2:00	4	3	0	2	2	1	1	2	1	2
3:00	6	11	3	3	7	6	5	7	3	6
4:00	101	84	19	19	94	88	90	91	19	71
5:00	418	344	147	148	335	403	392	378	148	312
6:00	409	388	176	163	349	426	452	405	170	338
7:00	132	101	28	13	127	115	117	118	21	90
8:00	82	104	37	36	80	69	67	80	37	68
9:00	91	128	43	46	80	73	86	92	45	78
10:00	80	90	40	57	92	74	80	83	49	73
11:00	78	96	46	50	100	58	62	79	48	70
12:00	94	76	45	52	90	90	94	89	49	77
13:00	123	52	36	57	114	108	122	104	47	87
14:00	58	58	30	48	54	53	45	54	39	49
15:00	50	53	38	47	45	50	38	47	43	46
16:00	66	57	35	37	37	53	45	52	36	47
17:00	109	114	93	105	93	104	116	107	99	105
18:00	100	112	100	96	95	95	100	100	98	100
19:00	12	16	9	11	9	18	16	14	10	13
20:00	28	9	8	27	33	24	32	25	18	23
21:00	52	8	6	30	38	44	46	38	18	32
22:00	7	8	4	2	13	17	6	10	3	8
23:00	5	3	4	1	2	6	6	4	3	4
Total	2107	1917	950	1056	1894	1977	2021	1983	1003	1703


Summary

	from	to	
AM Peak	6:00 AM	7:00 AM	452
PM Peak	1:00 PM	2:00 PM	123
Week Day Average			1983
Weekend Day Average			1003
7 Day Average			1703

Site 5 Ulan Rd S of Ulan-Wollar Rd [100]
Southbound

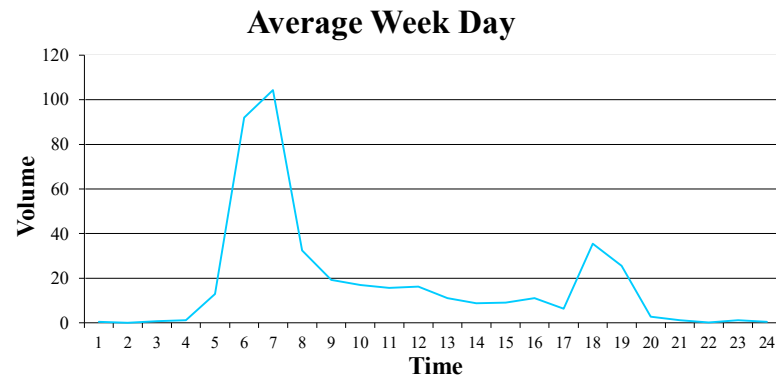
Day Time	Thu 12/05/22	Fri 13/05/2022	Sat 14/05/2022	Sun 15/05/2022	Mon 16/05/2022	Tue 17/05/2022	Wed 18/05/2022	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	35	22	6	7	4	28	24	23	7	18
1:00	2	0	4	3	2	7	5	3	4	3
2:00	6	3	2	2	1	4	7	4	2	4
3:00	2	5	2	4	5	2	4	4	3	3
4:00	5	7	5	4	3	5	6	5	5	5
5:00	30	32	14	13	17	29	23	26	14	23
6:00	95	83	59	58	112	114	132	107	59	93
7:00	150	131	121	119	148	165	137	146	120	139
8:00	58	71	22	11	61	54	66	62	17	49
9:00	63	57	30	14	55	55	49	56	22	46
10:00	64	69	50	34	77	52	51	63	42	57
11:00	86	71	37	36	80	63	72	74	37	64
12:00	141	85	39	48	57	69	76	86	44	74
13:00	91	108	48	55	63	81	95	88	52	77
14:00	136	211	38	86	157	105	103	142	62	119
15:00	191	200	41	55	216	246	198	210	48	164
16:00	287	145	42	62	261	281	273	249	52	193
17:00	145	125	59	61	159	174	194	159	60	131
18:00	149	136	107	113	183	185	178	166	110	150
19:00	160	196	178	198	162	152	179	170	188	175
20:00	21	16	10	31	22	19	15	19	21	19
21:00	18	21	6	11	11	17	17	17	9	14
22:00	58	19	5	4	33	47	50	41	5	31
23:00	36	5	8	6	38	34	34	29	7	23
Total	2029	1818	933	1035	1927	1988	1988	1950	984	1674


Summary

	from	to	
AM Peak	7:00 AM	8:00 AM	165
PM Peak	4:00 PM	5:00 PM	287
Week Day Average			1950
Weekend Day Average			984
7 Day Average			1674

Site 6 Ulan-Wollar Rd R E of the ROM Facility Access Rd [80]
Eastbound

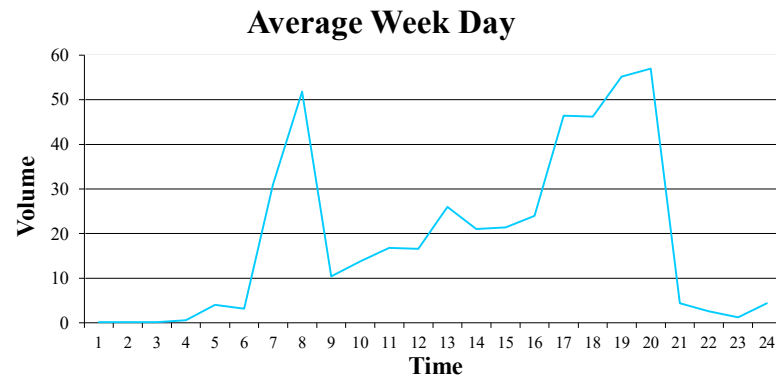
<i>Day Time</i>	<i>Thu 12/05/22</i>	<i>Fri 13/05/2022</i>	<i>Sat 14/05/2022</i>	<i>Sun 15/05/2022</i>	<i>Mon 16/05/2022</i>	<i>Tue 17/05/2022</i>	<i>Wed 18/05/2022</i>	<i>W/Day Ave.</i>	<i>W/End Ave.</i>	<i>7 Day Ave</i>
0:00	0	0	1	1	0	1	1	0	1	1
1:00	0	0	0	2	0	0	0	0	1	0
2:00	0	3	0	0	0	1	0	1	0	1
3:00	1	1	0	0	1	2	1	1	0	1
4:00	12	13	9	7	12	13	15	13	8	12
5:00	89	85	58	62	80	107	99	92	60	83
6:00	131	89	39	42	99	102	101	104	41	86
7:00	59	15	11	13	38	25	25	32	12	27
8:00	18	12	7	1	31	21	14	19	4	15
9:00	24	18	2	7	12	10	21	17	5	13
10:00	12	11	3	4	14	21	21	16	4	12
11:00	18	17	4	5	12	14	20	16	5	13
12:00	16	12	3	1	6	22	0	11	2	9
13:00	8	9	2	3	15	12	0	9	3	7
14:00	9	14	3	2	12	11	0	9	3	7
15:00	15	14	5	8	15	11	0	11	7	10
16:00	9	8	7	3	6	9	0	6	5	6
17:00	50	46	41	39	42	40	0	36	40	37
18:00	24	32	27	34	36	36	0	26	31	27
19:00	1	3	5	5	5	5	0	3	5	3
20:00	1	3	1	1	2	0	0	1	1	1
21:00	1	0	1	0	0	0	0	0	1	0
22:00	2	0	0	0	1	3	0	1	0	1
23:00	1	0	0	1	1	0	0	0	1	0
Total	501	405	229	241	440	466	318	426	235	371


Summary

	from	to	
AM Peak	6:00 AM	7:00 AM	131
PM Peak	5:00 PM	6:00 PM	50
Week Day Average			426
Weekend Day Average			235
7 Day Average			371

Site 6 Ulan-Wollar Rd R E of the ROM Facility Access Rd [80]
Westbound

Day Time	Thu 12/05/22	Fri 13/05/2022	Sat 14/05/2022	Sun 15/05/2022	Mon 16/05/2022	Tue 17/05/2022	Wed 18/05/2022	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	0	1	1	1	0	0	0	0	1	0
1:00	0	0	0	2	0	1	0	0	1	0
2:00	0	0	0	1	0	0	1	0	1	0
3:00	0	0	0	1	0	1	2	1	1	1
4:00	4	8	2	3	2	4	2	4	3	4
5:00	3	3	6	4	1	7	2	3	5	4
6:00	31	29	26	21	27	30	38	31	24	29
7:00	56	48	44	43	52	52	51	52	44	49
8:00	12	12	2	1	13	12	3	10	2	8
9:00	13	13	4	4	12	15	16	14	4	11
10:00	19	13	1	7	23	18	11	17	4	13
11:00	18	10	4	3	15	18	22	17	4	13
12:00	73	12	5	1	10	13	22	26	3	19
13:00	27	19	1	5	18	20	21	21	3	16
14:00	21	28	6	6	26	23	9	21	6	17
15:00	26	30	1	3	20	22	22	24	2	18
16:00	54	29	6	9	54	48	47	46	8	35
17:00	33	25	24	24	45	53	75	46	24	40
18:00	63	44	32	37	47	54	68	55	35	49
19:00	53	49	49	50	64	57	62	57	50	55
20:00	5	2	1	0	10	1	4	4	1	3
21:00	0	3	0	1	2	4	4	3	1	2
22:00	1	2	0	1	0	1	2	1	1	1
23:00	5	3	5	2	4	4	6	4	4	4
Total	517	383	220	230	445	458	490	459	225	392


Summary

	from	to	
AM Peak	7:00 AM	8:00 AM	56
PM Peak	5:00 PM	6:00 PM	75
Week Day Average			459
Weekend Day Average			225
7 Day Average			392

Appendix B

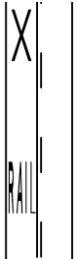
Railway Level Crossings

Locations of Railway Level Crossings

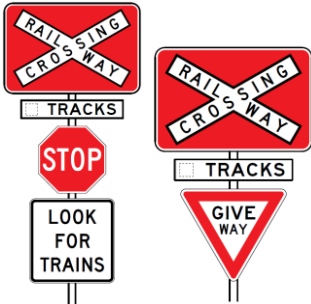
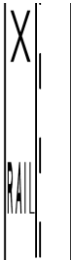


The existing signage and linemarking at the level crossings have been observed on-site in July 2022, and their compliance with the requirements of AS 1742.7 (2016) reviewed. The general signage and linemarking requirements are tabulated below for active and passive controls respectively, noting that local conditions can vary the specific requirements.

Active Level Crossing Signage and Linemarking General Requirements

	Image	Notes
Advance warning		Sign W7-4 on left side of the road, at a distance based on the speed limit. The sign may be repeated on the right side for emphasis on high volume roads, and repeated at long distance (e.g. 500 m) on high volume roads.
		Assembly RX-7 on the main road if the level crossing is located on a side road.
Crossing signage		Assembly RX-5 located minimum 3.5 m from nearest rail. The W7-2-2 TRACKS sign is not required where there is only one track. The RX-5 assembly may be supplemented by boom barriers.
Pavement markings		RAIL X pavement marking on all high-speed approaches of adequate seal width, located 15-20 m beyond the first warning sign
	Centre barrier line	On sealed roads 5.5 m or more wide, no-overtaking lines should extend from the crossing to the advance warning sign W7-4.
	Stop line	On all approaches, located minimum 3 m from signal pedestal.

Passive Level Crossing Signage and Linemarking General Requirements

	Image	Notes
Advance warning		Sign W7-7(R) on left side of the road, at a distance from the crossing which is based on the speed limit. The optional W7-7(L) sign may be used on the right side of the road on busy roads.
		Assembly RX-4 is used on the main road if the level crossing is located on a side road.
		W7-12 if the intersection itself requires an intersection warning sign, used in conjunction with and in advance of the RX-4 assembly.
Intermediate warning signage		W3-1 stop sign ahead used on left side of the road, at a distance based on the speed limit. RX-2-1 assembly used ahead of give way controls, on the left side of the road, with variations where the railway crosses the road at other than at right angles.
Crossing signage		Assembly RX-2 (stop) or RX-1 (give way), located minimum 3.5 m from nearest rail. The W7-2-2 TRACKS sign is not required where there is only one track.
Pavement markings		RAIL X pavement marking on all high-speed approaches of adequate seal width, located 15-20 m beyond the first warning sign
	Centre barrier line	No-overtaking lines should extend from the crossing to the advance warning sign W7-7
	Stop line	On all approaches, located minimum 3.5 m from nearest rail.

LXM 1304 Cope Road, Ulan

The level crossing is located on Cope Road approximately 40 m north-west of Ulan Road. The railway is single track, and Cope Road is a two-lane, two-way rural road, which provides access between Ulan and Gulgong. Cope Road nominally has a speed limit of 100 km/h at the level crossing, however operational speeds in both directions are curtailed by the proximity to Ulan Road, and the 50 km/h speed limit that applies on Cope Road to the north-west of the crossing. The level crossing is actively controlled with flashing signal assemblies.



LXM 1304 Cope Road Ulan

	Eastbound	Westbound
Advance warning	W7-4 on Cope Road 160 m ahead of crossing.	RX-7 assembly for southbound traffic on Ulan Road 350 m north of Cope Road. RX-7 assembly for northbound traffic on Ulan Road 300 m south of Cope Road.
Crossing signage	RX-5 assembly with R6-24 (rather than R6-25 which has red backboard) RAILWAY CROSSING sign.	RX-5 assembly with R6-24 (rather than R6-25 which has red backboard) RAILWAY CROSSING sign.
	Pedestrian warning sign "1 TRACK DO NOT CROSS WHILE LIGHTS ARE FLASHING OR ALARM SOUNDING" (W7-14-3).	Pedestrian warning sign "1 TRACK DO NOT CROSS WHILE LIGHTS ARE FLASHING OR ALARM SOUNDING" (W7-14-3).
Pavement markings	RAIL X beyond the W7-4.	None (not required).
	Edge lines and single dividing centreline then double two-way barrier line for 100 m approaching crossing (should extend to the W7-4 sign).	Double two-way barrier line and edge lines between Ulan Road and level crossing.
	STOP line (worn/faded).	STOP line (worn/faded).
Other	100km/h speed limit sign for eastbound traffic approximately 175 m ahead of level crossing. T-intersection warning signs both sides of Cope Road 150 m ahead of level crossing.	50km/h speed limit sign for westbound traffic approximately 175 m beyond level crossing.

Due to its proximity to Ulan Road, there is a risk that queueing of westbound traffic from the level crossing could extend to Ulan Road, and impede the flow of through traffic on Ulan Road. While this is a possibility, the design of the intersection of Ulan Road and Cope Road assists to mitigate the potential impacts of queueing, as the auxiliary lanes for vehicles turning left and right into Cope Road provide additional queueing capabilities while maintaining through access for traffic along Ulan Road.

LXM 1304 East along Cope Road to the Ulan Road Intersection



LXM 1304 West along Cope Road



LXM 1815 Ulan Colliery Road, Ulan

The level crossing is located on the road which provides vehicular access to and from the Ulan Mine Complex. The access road extends westwards from Ulan Road approximately 900 m north of its intersection with Cope Road. The crossing is approximately 36 m from the edgeline of Ulan Road. The railway is single track, and the access road is a sealed two-lane road. The level crossing is actively controlled with flashing signal assemblies.

The proximity of the level crossing to Ulan Road presents the possibility that queueing of westbound traffic from the level crossing could extend to Ulan Road, and impede the flow of through traffic on Ulan Road. While this is a possibility, the design of the intersection assists to mitigate the potential impacts of queueing, as the widening of Ulan Road provides additional queuing capabilities while maintaining through access for traffic along Ulan Road.



LXM 1815 Ulan Coal Mine Road

	Eastbound	Westbound
Advance warning	W7-4 on left side of Mine Road 250 m ahead of the level crossing. W7-4 on left side of Mine Road 180 m ahead of level crossing.	RX-7 assembly for northbound traffic on Ulan Road 300 m south of Mine Road. RX-7 assembly for southbound traffic on Ulan Road 180 m north of Mine Road.
Crossing signage	RX-5 assembly with R6-24 (rather than R6-25 which has red backboard) RAILWAY CROSSING sign.	RX-5 assembly with R6-24 (rather than R6-25 which has red backboard) RAILWAY CROSSING sign.
	Pedestrian warning sign "1 TRACK DO NOT CROSS WHILE LIGHTS ARE FLASHING OR ALARM SOUNDING" (W7-14-3).	Pedestrian warning sign "1 TRACK DO NOT CROSS WHILE LIGHTS ARE FLASHING OR ALARM SOUNDING" (W7-14-3).
Pavement markings	RAIL X beyond the second W7-4 sign.	RAIL X between Ulan Road and level crossing.
	Edgelines and double two-way barrier lines for 500 m.	Edgelines and double two-way barrier line between Ulan Road and level crossing.
	Stop line.	Stop line.
Other	T-intersection warning sign 120 m ahead of level crossing (rotated on post, not facing road traffic). Guideposts on curve approaching level crossing. Give way sign at Ulan Road intersection.	50 km/h speed limit sign and pavement marking 20 m beyond level crossing.

LXM 1815 Eastbound on Ulan Coal Mine Road to Ulan Road



LXM 1815 Westbound on Ulan Coal Mine Road



LXM 1302 Local Road, Ulan

While still identified as a public level crossing (TfNSW, 2022), this crossing is no longer accessible for general traffic. This crossing lies approximately 10.5 km east of Ulan Road, adjacent to a section of Ulan-Wollar Road which has been realigned closer to the railway. Following the realignment, the level crossing is located approximately 20 m from Ulan Road, while it was previously approximately 150 m from Ulan-Wollar Road. Access to the crossing is controlled by gates on each side, similar to the several non-public level crossings elsewhere in the vicinity. The railway is single track, and the access road is an unsealed single lane road. The level crossing is passively controlled with "STOP" sign control.



Map shows former alignment of Ulan-Wollar Road, which now runs approximately parallel to and closer to the railway line.

LXM 1302 Local Road, Ulan

	Northbound	Southbound
Advance warning	None.	None.
Intermediate warning signage	None.	None.
Crossing signage	RX-2 assembly with R6-24 (rather than R6-25 which has red backboard) RAILWAY CROSSING sign.	RX-2 assembly with R6-24 (rather than R6-25 which has red backboard) RAILWAY CROSSING sign.
Pavement markings	Unsealed road, no pavement markings.	Unsealed road, no pavement markings.
Other	Gates each side.	Gates each side.

LXM 1302 Northbound along Local Road



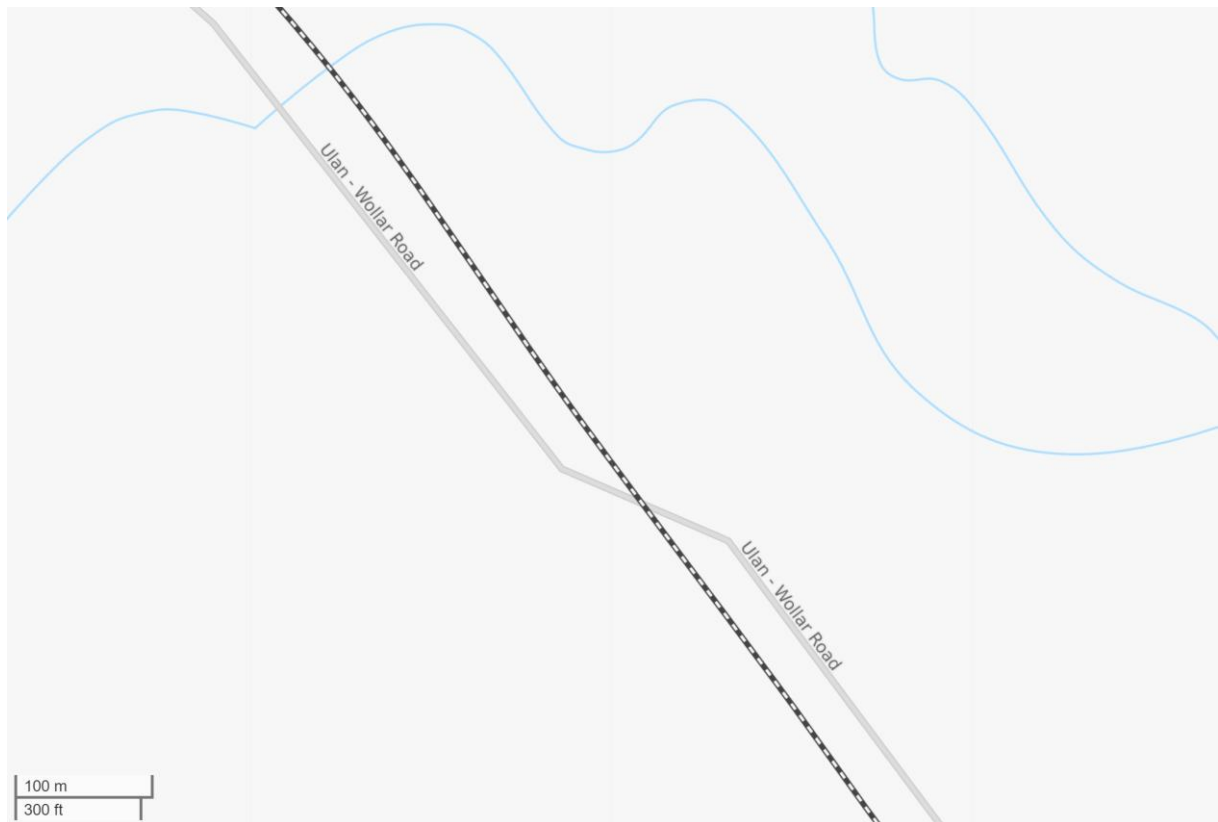
LXM 1302 Southbound along Local Road to Ulan-Wollar Road



Photograph taken 2015, prior to realignment of Ulan-Wollar Road on south side of this level crossing, when access across the level crossing was available.

LXM 1301 Ulan-Wollar Road, Wollar (West of Wilpinjong Coal Mine Main Access)

The level crossing is located on Ulan-Wollar Road approximately 250m east of the Wilpinjong Coal Mine Access Road. The railway is single track, and Ulan-Wollar Road is a sealed two-way two-lane rural road, with a speed limit of 100 km/h. The crossing is actively controlled with flashing lights and boom barriers. Ulan-Wollar Road follows a curved alignment on the two approaches to the level crossing.



LXM 1301 Ulan-Wollar Road (West of Wilpinjong Coal Mine Main Access)

	Northbound	Southbound
Advance warning	W7-4 sign on left side of Ulan-Wollar Road 180 m ahead of the crossing.	W7-4 sign on left side of Ulan-Wollar Road 180 m ahead of the crossing.
Intermediate warning	Non-standard diagrammatic warning sign of the approaching crossing on a left-right S-bend 110 m ahead of the level crossing.	Non-standard diagrammatic warning sign of the approaching crossing on a left-right S-bend 130 m ahead of the level crossing.
Crossing signage	RX-5 assembly with boom barrier and additional pair of flashing lights above, angled to face approaching vehicles on Ulan-Wollar Road.	RX-5 assembly with boom barrier and additional pair of flashing lights above, angled to face approaching vehicles on Ulan-Wollar Road.
Pavement markings	RAIL X pavement marking ahead of advance warning sign W7-4.	RAIL X pavement marking ahead of advance warning sign W7-4.
	Edgelines, single one-way barrier lines start 250 m ahead of level crossing and double two-way barrier lines start 60 m ahead of level crossing.	Edgelines, double two-way barrier lines start 330 m ahead of level crossing.
	Stop line.	Stop line.
Other	REDUCE SPEED sign on left side of Ulan-Wollar Road 250 m ahead of the crossing. Chevron alignment markers (D4-6) and guideposts with reflectors guide traffic at the bends in Ulan-Wollar Road approaching and beyond the crossing.	REDUCE SPEED sign on left side of Ulan-Wollar Road 200 m ahead of the crossing. Chevron alignment markers (D4-6) and guideposts with reflectors guide traffic at the bends in Ulan-Wollar Road approaching and beyond the crossing.

LXM 1301 Eastbound along Ulan-Wollar Road



LXM 1301 Westbound along Ulan-Wollar Road



LXM 1300 Ulan-Wollar Road, Wollar

The level crossing is located on Ulan-Wollar Road approximately 15.5 km east of Ulan Road. The railway is single track, and the level crossing is actively controlled with flashing signal and boom barrier assemblies. Ulan-Wollar Road is a sealed two-way road with a default rural speed limit of 100 km/h.



LXM 1300 Ulan-Wollar Road

	Eastbound	Westbound
Advance warning	W7-4 signs on both sides of Ulan-Wollar Road 240 m from crossing (sign on the right side of road rotated, not facing traffic).	W7-4 sign with 500 m distance plate (W8-5) 500 m ahead of the crossing. W7-4 sign 140m ahead of the crossing.
Crossing signage	RX-5 assembly with boom barrier.	RX-5 assembly with boom barrier.
Pavement markings	RAIL X adjacent to W7-4 sign.	RAIL X 140 m ahead of the level crossing, immediately after causeway (faded/worn).
	Double two-way barrier lines start 140 m ahead of the crossing (faded/worn on the bend immediately before the crossing).	Double two-way barrier lines start 250 m ahead of the level crossing (faded/worn).
	STOP line (faded/worn).	STOP line (faded/worn).
Other	REDUCE SPEED sign 330 m ahead of the level crossing. LEFT CURVE warning sign 280 m ahead of the level crossing. Chevron alignment markers (D4-6) guide traffic at the right hand bend in Ulan-Wollar Road approaching the crossing. LEFT CURVE warning sign 40 m beyond the level crossing. CAUSEWAY warning sign 60 m beyond the level crossing.	REDUCE SPEED sign approximately 450 m ahead of the crossing. CAUSEWAY warning sign 350 m ahead of the crossing. RIGHT CURVE symbolic sign 250 m ahead of the crossing. Chevron alignment markers (D4-6) guide traffic at the right hand bend in Ulan-Wollar Road approaching the crossing.

LXM 1300 Eastbound along Ulan-Wollar Road



LXM 1300 Westbound along Ulan-Wollar Road



LXM 1298 Local Road, Wollar

The passive control level crossing is located on an unnamed local access road which extends northwards from Ulan-Wollar Road approximately 19 km east of Ulan Road. The crossing is approximately 80 m from Ulan-Wollar Road. The railway is single track, and the access road is an unsealed single lane road which is effectively a private road, leading to a gated control point less than 50 m north of the level crossing.



LXM 1298 Local Road, Wollar

	Northbound	Southbound
Advance warning	None.	None.
Intermediate warning signage	W3-1 sign 10 m from Ulan-Wollar Road.	None.
Crossing signage	RX-2 assembly.	RX-2 assembly.
Pavement markings	Unsealed road, no pavement markings.	Unsealed road, no pavement markings.

LXM 1298 Northbound along Local Road



LXM 1298 Southbound along Local Road



LXM 1297 Mogo Road, Wollar

The level crossing is located on Mogo Road approximately 120 m north of its intersection with Ulan-Wollar Road. The railway is single track, and Mogo Road is a sealed two-lane, two-way road in the immediate vicinity of the crossing. On the northern side of the crossing, there is a T-intersection, from which Araluen Road extends eastwards to provide access to and from a number of properties. Mogo Road extends to the north, is unsealed from about 50 m north of the crossing, and forms the minor approach to the T-intersection. From about 50 m north of the crossing, Mogo Road is unsealed. The level crossing is actively controlled with flashing light and boom barrier assemblies. At the time of the inspection, it appeared that Mogo Road was recently resurfaced, and was awaiting replacement of pavement markings.



LXM 1297 Mogo Road

	Northbound Mogo Road	Southbound Mogo Road	Westbound Araluen Road
Advance warning	None. Note - a post without any sign located on left side of Mogo Road 60 m ahead of the level crossing.	RX-7 assembly on left side of Mogo Road 180 m ahead of the level crossing.	W7-4 signs on both sides of Araluen Road 220 m ahead of level crossing
Pavement markings	Road recently resurfaced, with no replacement of pavement markings. Note - markers in place for remarking RAIL X immediately past the empty post.	Road recently resurfaced, with no replacement of pavement markings.	Unsealed road, no pavement markings
Crossing signage	RX-5 assembly and boom.	RX-5 assembly and boom.	-
Other	Unidirectional hazard marker on bend in Mogo Road immediately north of the level crossing.	T-INTERSECTION warning sign on left side of Mogo Road 130 m ahead of the crossing. GIVE WAY sign in Mogo Road at Araluen Road/Mogo Road. Bidirectional hazard marker opposite Mogo Road southbound.	T-INTERSECTION warning sign 180 m ahead of level crossing

LXM 1297 Northbound along Mogo Road



LXM 1297 Southbound along Mogo Road



LXM 1297 Approaching Southbound along Mogo Road



LXM 1297 Approaching Westbound along Araluen Road



LXM 1297 Approaching Westbound along Araluen Road



LXM 1296 Ringwood Road, Coggan Creek

The level crossing is located on Ringwood Road, which extends northwards from Wollar Road approximately 11 km east of Wollar, and provides a route to Merriwa. The crossing is approximately 170 m from Wollar Road. The railway is single track, and Ringwood Road is an unsealed single lane road which provides local property access as well as access through to Golden Highway and Merriwa. The level crossing is passively controlled with STOP sign control. At the time of the inspection, the northbound sign assembly at the crossing was rotated on its post, so not all signs were clearly visible to northbound drivers. The unsealed road was observed to be in poor condition which limits comfortable travel speeds approaching the level crossing in both directions.



LXM 1296 Ringwood Road, Coggan Creek

	Northbound	Southbound
Advance warning	W7-7 on left side of road 200 m ahead of the level crossing.	W7-7 on left side of road 230 m ahead of the level crossing.
Intermediate warning signage	W3-1 sign on left side of road 140 m ahead of the level crossing.	W3-1 sign on left side of road 160 m ahead of the level crossing.
Pavement markings	Unsealed road, no pavement markings.	Unsealed road, no pavement markings.
Crossing signage	RX-2 assembly with R6-24 rather than R6-25 RAILWAY CROSSING sign.	RX-2 assembly with R6-24 rather than R6-25 RAILWAY CROSSING sign.

LXM 1296 Northbound along Ringwood Road

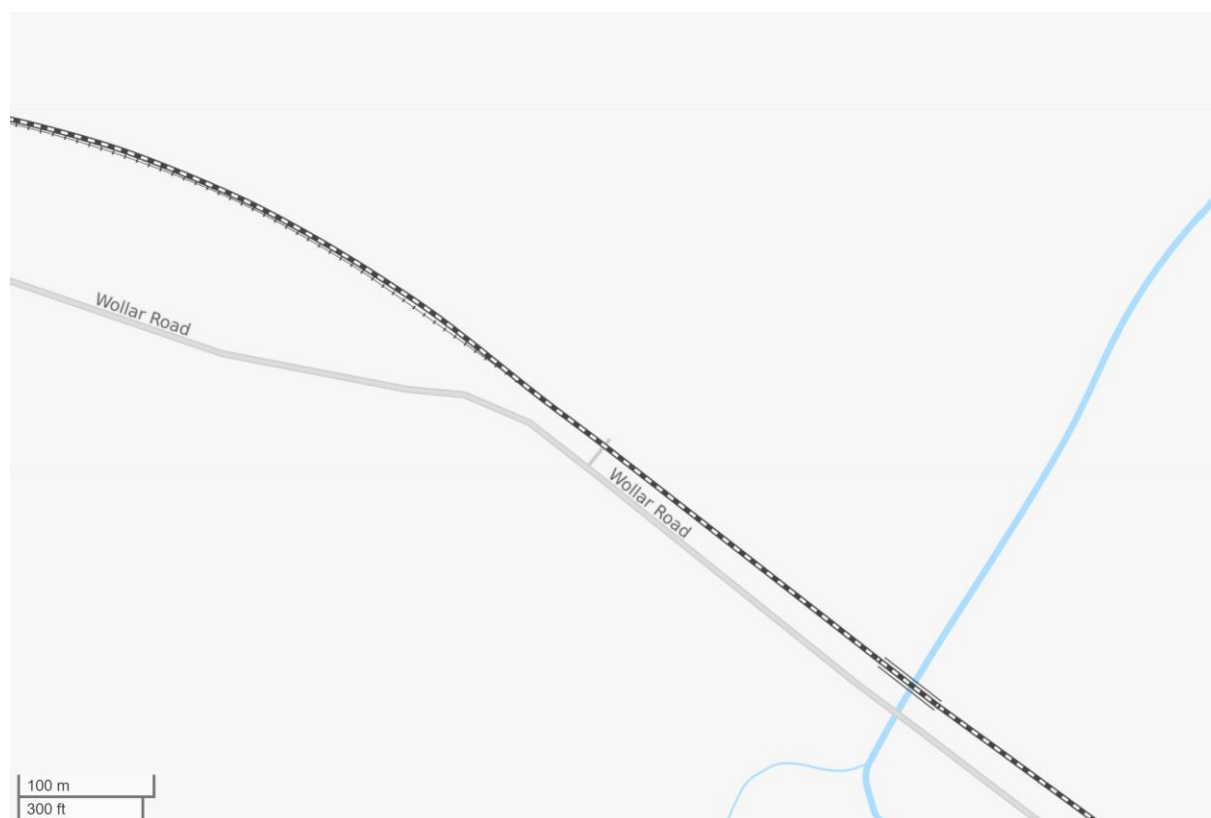


LXM 1296 Southbound along Ringwood Road



LXM 1813 Local Road, Coggan Creek

The level crossing is located on a local road which extends approximately northwards from Wollar Road, about 17 km east from Wollar. The railway is single track, and in the vicinity of the level crossing, Wollar Road is sealed, and the local road is unsealed. The crossing is located immediately north of Wollar Road, and the road continues east and west on the northern side of the crossing. While this crossing remains listed as a “public level crossing” (TfNSW, 2022), it effectively provides only private access to the northern side of the Ulan line from Wollar Road and so is not used by general traffic. The signage on the equipment hut at the crossing indicates the road is a private road. The level crossing is actively controlled with flashing signal controls.



LXM 1813 Local Road, Coggan Creek

	Northbound	Southbound
Advance warning	None.	None.
Crossing signage	RX-5 assembly.	RX-5 assembly.
Pavement markings	Unsealed road, no pavement markings.	Unsealed road, no pavement markings.
Other	Cattle grid.	Cattle grid.

LXM 1813 Northbound on Local Road from Wollar Road

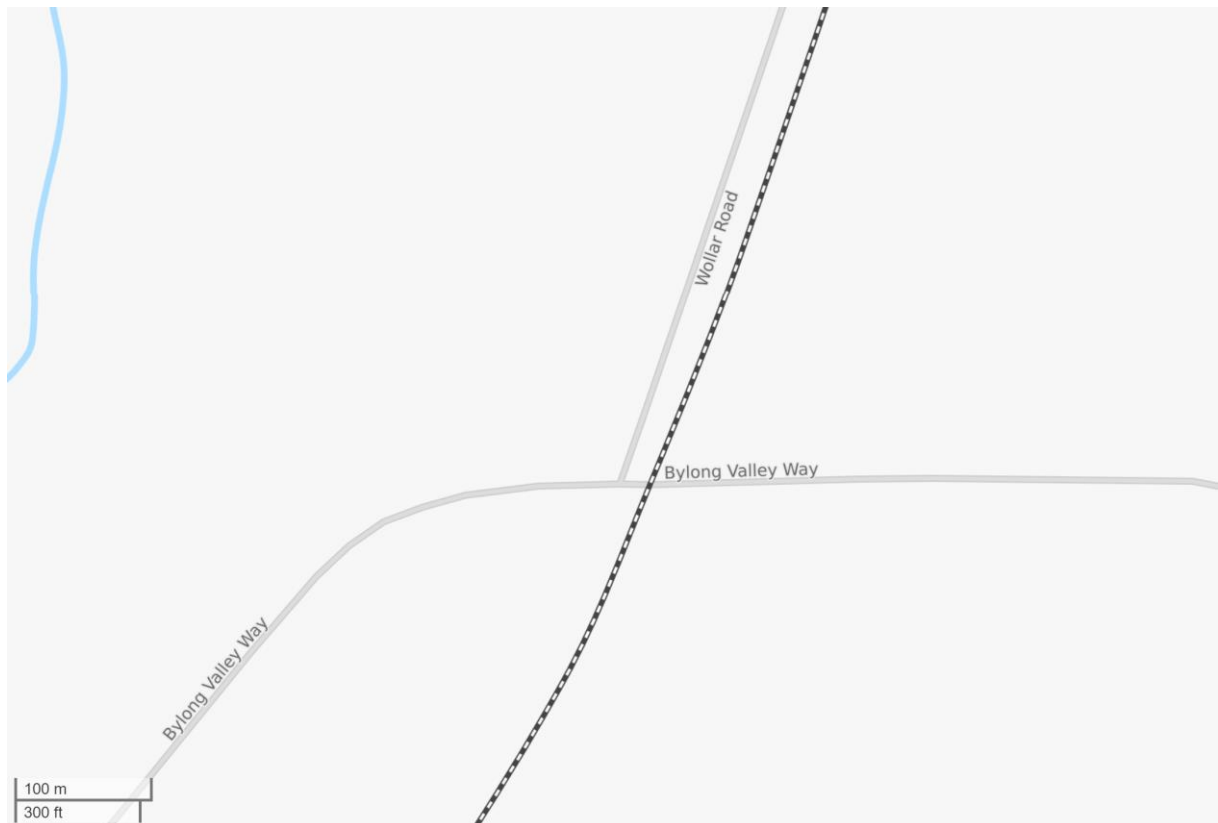


LXM 1813 Southbound on Local Road to Wollar Road



LXM 1295 Bylong Valley Way, Bylong

The level crossing is located on Bylong Valley Way immediately west of the intersection with Wollar Road. Bylong Valley Way provides access through the Bylong Valley between Golden Highway (near Sandy Hollow) and Castlereagh Highway (near Ilford), via Kandos and Rylestone. The railway is single track, and Bylong Valley Way and Wollar Road are sealed two-lane rural roads. Wollar Road is the minor road at the T-intersection immediately to the west of the level crossing. The level crossing is actively controlled with flashing signal controls.



LXM 1295 Bylong Valley Way, Bylong

	Eastbound Bylong Valley Way	Westbound Bylong Valley Way	Southbound Wollar Road
Advance warning	W7-4 sign on left side of Bylong Valley Way 190 m ahead of level crossing.	W7-4 sign on left side of Bylong Valley Way 280 m from crossing.	W7-17(L) on Wollar Road 440 m ahead of Bylong Valley Way (denotes level crossing to left of approaching T-intersection).
Crossing signage	RX-5 assembly with R6-24 (rather than R6-25 which has red backboard) RAILWAY CROSSING sign.	RX-5 assembly.	RX-5 assembly facing Wollar Road traffic.
Pavement markings	RAIL X beyond W7-4 sign.	RAIL X beyond W7-4 sign.	None.
	Double one-way barrier lines start 400 m ahead of the level crossing. Double two-way barrier lines start at W7-4 sign 210 m ahead of the level crossing. No edgelines.	Edgelines, double one-way barrier lines start at W7-4 sign, then double two-way barrier lines start 60 m ahead of the crossing.	Edgelines. Double one-way barrier lines start 400 m ahead of Bylong Valley Way intersection. Double two-way barrier lines start 180 m ahead of Bylong Valley Way intersection.
	No STOP line visible.	STOP line (faded/worn).	No line.
Other	-	LEFT CURVE warning sign 100 m ahead of the level crossing. LEFT CURVE warning sign 70 m beyond the level crossing.	REDUCE SPEED sign 280 m ahead of Bylong Valley Way intersection. W3-2 GIVE WAY AHEAD sign 230 m ahead of Bylong Valley Way intersection. GIVE WAY sign at Bylong Valley Way.

LXM 1295 Westbound on Bylong Valley Way



LXM 1295 Eastbound on Bylong Valley Way



LXM 1295 Southbound on Wollar Road



LXM 1295 Approaching Southbound on Wollar Road



Appendix C

SIDRA Outputs

MOVEMENT SUMMARY

Site: 1 [Ulan and Ulan-Wollar AM 2022 (Site Folder: Surveyed 2022)]

Ulan Rd and Ulan-Wollar Rd
AM Peak 6-7am
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Ulan Road South														
2	T1	134	9	149	6.7	0.230	0.1	LOS A	1.2	9.0	0.03	0.06	0.03	97.6
3	R2	316	8	351	2.5	0.230	8.2	LOS A	1.2	9.0	0.27	0.59	0.27	61.8
Approach		450	17	500	3.8	0.230	5.8	NA	1.2	9.0	0.20	0.44	0.20	69.4
East: Ulan-Wollar Road														
4	L2	27	0	30	0.0	0.020	5.8	LOS A	0.1	0.6	0.19	0.54	0.19	61.5
6	R2	9	0	10	0.0	0.014	8.2	LOS A	0.0	0.3	0.47	0.67	0.47	59.5
Approach		36	0	40	0.0	0.020	6.4	LOS A	0.1	0.6	0.26	0.57	0.26	61.0
North: Ulan Road North														
7	L2	23	4	26	17.4	0.018	8.4	LOS A	0.0	0.0	0.00	0.66	0.00	67.5
8	T1	83	0	92	0.0	0.047	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		106	4	118	3.8	0.047	1.8	NA	0.0	0.0	0.00	0.14	0.00	90.5
All Vehicles		592	21	658	3.5	0.230	5.1	NA	1.2	9.0	0.17	0.39	0.17	71.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 1 [Ulan and Ulan-Wollar PM 2022 (Site Folder: Surveyed 2022)]

Ulan Rd and Ulan-Wollar Rd
PM Peak 4-5pm
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Ulan Road South														
2	T1	37	2	45	5.4	0.022	0.1	LOS A	0.1	0.4	0.10	0.10	0.10	95.6
3	R2	7	0	8	0.0	0.022	8.2	LOS A	0.1	0.4	0.14	0.14	0.14	69.0
Approach		44	2	53	4.5	0.022	1.4	NA	0.1	0.4	0.10	0.10	0.10	90.1
East: Ulan-Wollar Road														
4	L2	124	4	149	3.2	0.112	6.3	LOS A	0.5	3.5	0.30	0.57	0.30	59.7
6	R2	7	0	8	0.0	0.008	6.3	LOS A	0.0	0.2	0.29	0.57	0.29	61.1
Approach		131	4	158	3.1	0.112	6.3	LOS A	0.5	3.5	0.30	0.57	0.30	59.8
North: Ulan Road North														
7	L2	4	0	5	0.0	0.003	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	75.3
8	T1	153	5	184	3.3	0.098	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		157	5	189	3.2	0.098	0.2	NA	0.0	0.0	0.00	0.02	0.00	99.1
All Vehicles		332	11	400	3.3	0.112	2.8	NA	0.5	3.5	0.13	0.25	0.13	77.8

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

MOVEMENT SUMMARY

Site: 1 [Ulan-Wollar and OC Access AM 2022 (Site Folder: Surveyed 2022)]

Ulan-Wollar Rd and OC Access
AM Peak 6-7am
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Open Cut Access														
4	L2	11	0	12	0.0	0.012	3.5	LOS A	0.0	0.3	0.07	0.46	0.07	50.5
6	R2	6	0	7	0.0	0.012	4.8	LOS A	0.0	0.3	0.07	0.46	0.07	50.2
Approach		17	0	19	0.0	0.012	3.9	LOS A	0.0	0.3	0.07	0.46	0.07	50.4
East: Ulan-Wollar Road East														
7	L2	4	0	4	0.0	0.018	7.8	LOS A	0.0	0.0	0.00	0.09	0.00	87.6
8	T1	27	0	30	0.0	0.018	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	97.3
Approach		31	0	34	0.0	0.018	1.0	NA	0.0	0.0	0.00	0.09	0.00	95.9
West: Ulan-Wollar Rd West														
2	T1	142	6	158	4.2	0.085	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	199	5	221	2.5	0.097	7.6	LOS A	0.6	4.2	0.12	0.62	0.12	50.7
Approach		341	11	379	3.2	0.097	4.4	NA	0.6	4.2	0.07	0.36	0.07	63.8
All Vehicles		389	11	432	2.8	0.097	4.1	NA	0.6	4.2	0.06	0.35	0.06	64.8

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

MOVEMENT SUMMARY

Site: 1 [Ulan-Wollar and OC Access PM 2022 (Site Folder: Surveyed 2022)]

Ulan-Wollar Rd and OC Access
PM Peak 4-5pm
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Open Cut Access														
4	L2	58	0	85	0.0	0.045	3.6	LOS A	0.2	1.5	0.17	0.44	0.17	50.3
6	R2	2	0	3	0.0	0.045	3.8	LOS A	0.2	1.5	0.17	0.44	0.17	50.1
Approach		60	0	88	0.0	0.045	3.6	LOS A	0.2	1.5	0.17	0.44	0.17	50.3
East: Ulan-Wollar Road East														
7	L2	6	0	9	0.0	0.046	7.8	LOS A	0.0	0.0	0.00	0.07	0.00	86.9
8	T1	53	2	78	3.8	0.046	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	97.8
Approach		59	2	87	3.4	0.046	0.8	NA	0.0	0.0	0.00	0.07	0.00	96.5
West: Ulan-Wollar Rd West														
2	T1	5	0	7	0.0	0.004	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	11	0	16	0.0	0.007	7.6	LOS A	0.0	0.3	0.19	0.60	0.19	50.6
Approach		16	0	24	0.0	0.007	5.2	NA	0.0	0.3	0.13	0.41	0.13	59.8
All Vehicles		135	2	199	1.5	0.046	2.6	NA	0.2	1.5	0.09	0.27	0.09	65.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

▼ Site: 1 [Ulan and CHPP Access AM 2022 (Site Folder: Surveyed 2022)]

Ulan Rd and Moolarben CHPP Access
AM Peak 6-7am
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Ulan Road South														
2	T1	80	5	87	6.3	0.047	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	51	5	55	9.8	0.036	8.0	LOS A	0.2	1.2	0.23	0.61	0.23	50.4
Approach		131	10	142	7.6	0.047	3.1	NA	0.2	1.2	0.09	0.24	0.09	72.3
East: CHPP Access Rd														
4	L2	7	0	8	0.0	0.006	3.7	LOS A	0.0	0.2	0.20	0.44	0.20	50.2
6	R2	1	0	1	0.0	0.006	4.3	LOS A	0.0	0.2	0.20	0.44	0.20	50.1
Approach		8	0	9	0.0	0.006	3.8	LOS A	0.0	0.2	0.20	0.44	0.20	50.2
North: Ulan Road North														
7	L2	3	0	3	0.0	0.002	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	75.3
8	T1	97	4	105	4.1	0.057	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		100	4	109	4.0	0.057	0.2	NA	0.0	0.0	0.00	0.02	0.00	99.0
All Vehicles		239	14	260	5.9	0.057	1.9	NA	0.2	1.2	0.05	0.15	0.05	80.2

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

MOVEMENT SUMMARY

▼ Site: 1 [Ulan and CHPP Access PM 2022 (Site Folder: Surveyed 2022)]

Ulan Rd and Moolarben CHPP Access

AM Peak 4-5pm

Site Category: (None)

Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Ulan Road South														
2	T1	41	5	48	12.2	0.027	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	6	0	7	0.0	0.004	7.8	LOS A	0.0	0.1	0.23	0.60	0.23	50.5
Approach		47	5	55	10.6	0.027	1.0	NA	0.0	0.1	0.03	0.08	0.03	88.9
East: CHPP Access Rd														
4	L2	47	1	55	2.1	0.041	3.8	LOS A	0.2	1.2	0.23	0.45	0.23	49.4
6	R2	2	1	2	50.0	0.041	4.8	LOS A	0.2	1.2	0.23	0.45	0.23	42.3
Approach		49	2	58	4.1	0.041	3.9	LOS A	0.2	1.2	0.23	0.45	0.23	49.1
North: Ulan Road North														
7	L2	1	0	1	0.0	0.001	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	75.3
8	T1	108	4	127	3.7	0.068	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		109	4	128	3.7	0.068	0.1	NA	0.0	0.0	0.00	0.01	0.00	99.7
All Vehicles		205	11	241	5.4	0.068	1.2	NA	0.2	1.2	0.06	0.13	0.06	78.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 1 [Ulan-Wollar and ROM Access AM 2022 (Site Folder: Surveyed 2022)]

Ulan-Wollar Rd and ROM Access
AM Peak 6-7am
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: ROM Access														
4	L2	2	0	2	0.0	0.002	3.5	LOS A	0.0	0.0	0.07	0.45	0.07	50.6
6	R2	1	0	1	0.0	0.002	3.8	LOS A	0.0	0.0	0.07	0.45	0.07	50.4
Approach		3	0	3	0.0	0.002	3.6	LOS A	0.0	0.0	0.07	0.45	0.07	50.5
East: Ulan-Wollar Road East														
7	L2	1	1	1	100.0	0.016	10.4	LOS A	0.0	0.0	0.00	0.02	0.00	61.0
8	T1	27	0	29	0.0	0.016	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	99.0
Approach		28	1	30	3.6	0.016	0.4	NA	0.0	0.0	0.00	0.02	0.00	96.8
West: Ulan-Wollar Rd West														
2	T1	141	5	153	3.5	0.082	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.8
3	R2	1	0	1	0.0	0.082	7.5	LOS A	0.0	0.0	0.00	0.00	0.00	56.9
Approach		142	5	154	3.5	0.082	0.1	NA	0.0	0.0	0.00	0.00	0.00	99.3
All Vehicles		173	6	188	3.5	0.082	0.2	NA	0.0	0.0	0.00	0.02	0.00	97.3

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

MOVEMENT SUMMARY

Site: 1 [Ulan-Wollar and ROM Access PM 2022 (Site Folder: Surveyed 2022)]

Ulan-Wollar Rd and ROM Access
PM Peak 4-5pm
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: ROM Access														
4	L2	1	0	1	0.0	0.002	3.6	LOS A	0.0	0.0	0.13	0.45	0.13	50.5
6	R2	1	0	1	0.0	0.002	3.6	LOS A	0.0	0.0	0.13	0.45	0.13	50.2
Approach		2	0	3	0.0	0.002	3.6	LOS A	0.0	0.0	0.13	0.45	0.13	50.3
East: Ulan-Wollar Road East														
7	L2	1	0	1	0.0	0.040	7.8	LOS A	0.0	0.0	0.00	0.01	0.00	88.3
8	T1	50	1	75	2.0	0.040	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	99.6
Approach		51	1	76	2.0	0.040	0.2	NA	0.0	0.0	0.00	0.01	0.00	99.3
West: Ulan-Wollar Rd West														
2	T1	6	1	9	16.7	0.006	0.0	LOS A	0.0	0.1	0.05	0.10	0.05	96.0
3	R2	1	0	1	0.0	0.006	7.6	LOS A	0.0	0.1	0.05	0.10	0.05	55.7
Approach		7	1	10	14.3	0.006	1.1	NA	0.0	0.1	0.05	0.10	0.05	87.0
All Vehicles		60	2	90	3.3	0.040	0.4	NA	0.0	0.1	0.01	0.04	0.01	94.7

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

MOVEMENT SUMMARY

▼ Site: 1 [Ulan and Ulan-Wollar AM 2025 (Site Folder: OC3 Extension 2025)]

Ulan Rd and Ulan-Wollar Rd
AM Peak 6-7am
OC3 Extension 2025
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Ulan Road South														
2	T1	158	13	176	8.2	0.283	0.1	LOS A	1.6	11.5	0.03	0.05	0.03	98.0
3	R2	379	14	421	3.7	0.283	8.4	LOS A	1.6	11.5	0.33	0.61	0.33	61.4
Approach		537	27	597	5.0	0.283	6.0	NA	1.6	11.5	0.24	0.45	0.24	69.0
East: Ulan-Wollar Road														
4	L2	40	1	44	2.5	0.031	6.0	LOS A	0.1	0.9	0.23	0.54	0.23	60.2
6	R2	12	0	13	0.0	0.022	9.2	LOS A	0.1	0.5	0.53	0.73	0.53	58.6
Approach		52	1	58	1.9	0.031	6.7	LOS A	0.1	0.9	0.30	0.59	0.30	59.8
North: Ulan Road North														
7	L2	27	5	30	18.5	0.021	8.4	LOS A	0.0	0.0	0.00	0.66	0.00	67.1
8	T1	108	1	120	0.9	0.062	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		135	6	150	4.4	0.062	1.7	NA	0.0	0.0	0.00	0.13	0.00	91.0
All Vehicles		724	34	804	4.7	0.283	5.2	NA	1.6	11.5	0.20	0.40	0.20	71.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

▼ Site: 1 [Ulan and Ulan-Wollar PM 2025 (Site Folder: OC3 Extension 2025)]

Ulan Rd and Ulan-Wollar Rd
PM Peak 4-5pm
OC3 Extension 2025
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Ulan Road South														
2	T1	45	4	54	8.9	0.031	0.3	LOS A	0.1	0.8	0.13	0.10	0.13	95.8
3	R2	10	4	12	40.0	0.031	9.7	LOS A	0.1	0.8	0.20	0.16	0.20	66.2
Approach		55	8	66	14.5	0.031	2.0	NA	0.1	0.8	0.14	0.11	0.14	88.6
East: Ulan-Wollar Road														
4	L2	169	8	204	4.7	0.158	6.4	LOS A	0.7	5.1	0.33	0.59	0.33	59.2
6	R2	11	1	13	9.1	0.014	6.7	LOS A	0.0	0.3	0.32	0.59	0.32	58.2
Approach		180	9	217	5.0	0.158	6.5	LOS A	0.7	5.1	0.33	0.59	0.33	59.1
North: Ulan Road North														
7	L2	4	0	5	0.0	0.003	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	75.3
8	T1	171	7	206	4.1	0.111	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		175	7	211	4.0	0.111	0.2	NA	0.0	0.0	0.00	0.02	0.00	99.2
All Vehicles		410	24	494	5.9	0.158	3.2	NA	0.7	5.1	0.16	0.28	0.16	75.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 1 [Ulan-Wollar and OC Access AM 2025 (Site Folder: OC3 Extension 2025)]

Ulan-Wollar Rd and OC Access
AM Peak 6-7am
OC3 Extension 2025
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Open Cut Access														
4	L2	20	1	22	5.0	0.023	3.5	LOS A	0.1	0.6	0.08	0.46	0.08	49.2
6	R2	10	0	11	0.0	0.023	5.1	LOS A	0.1	0.6	0.08	0.46	0.08	49.9
Approach		30	1	33	3.3	0.023	4.0	LOS A	0.1	0.6	0.08	0.46	0.08	49.4
East: Ulan-Wollar Road East														
7	L2	5	0	6	0.0	0.022	7.8	LOS A	0.0	0.0	0.00	0.09	0.00	87.5
8	T1	33	0	37	0.0	0.022	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	97.2
Approach		38	0	42	0.0	0.022	1.0	NA	0.0	0.0	0.00	0.09	0.00	95.8
West: Ulan-Wollar Rd West														
2	T1	179	9	199	5.0	0.108	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	229	9	254	3.9	0.113	7.6	LOS A	0.7	4.9	0.13	0.62	0.13	50.7
Approach		408	18	453	4.4	0.113	4.3	NA	0.7	4.9	0.08	0.35	0.08	64.7
All Vehicles		476	19	529	4.0	0.113	4.0	NA	0.7	4.9	0.07	0.33	0.07	65.1

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

MOVEMENT SUMMARY

▼ Site: 1 [Ulan-Wollar and OC Access PM 2025 (Site Folder: OC3 Extension 2025)]

Ulan-Wollar Rd and OC Access
PM Peak 4-5pm
OC3 Extension 2025
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV] veh/h	[Total veh/h]	[HV] %				[Veh. veh]	[Dist] m				
South: Open Cut Access														
4	L2	85	3	125	3.5	0.069	3.7	LOS A	0.3	2.4	0.21	0.44	0.21	49.3
6	R2	3	0	4	0.0	0.069	3.9	LOS A	0.3	2.4	0.21	0.44	0.21	49.7
Approach		88	3	129	3.4	0.069	3.7	LOS A	0.3	2.4	0.21	0.44	0.21	49.3
East: Ulan-Wollar Road East														
7	L2	5	0	7	0.0	0.060	7.8	LOS A	0.0	0.0	0.00	0.05	0.00	87.4
8	T1	70	4	103	5.7	0.060	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	98.5
Approach		75	4	110	5.3	0.060	0.5	NA	0.0	0.0	0.00	0.05	0.00	97.7
West: Ulan-Wollar Rd West														
2	T1	7	0	10	0.0	0.005	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	14	4	21	28.6	0.011	8.5	LOS A	0.1	0.5	0.24	0.60	0.24	50.3
Approach		21	4	31	19.0	0.011	5.7	NA	0.1	0.5	0.16	0.40	0.16	60.2
All Vehicles		184	11	271	6.0	0.069	2.6	NA	0.3	2.4	0.12	0.28	0.12	63.3

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

MOVEMENT SUMMARY

Site: 1 [Ulan and CHPP Access AM 2025 (Site Folder: OC3 Extension 2025)]

Ulan Rd and Moolarben CHPP Access
AM Peak 6-7am
OC3 Extension 2025
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Ulan Road South														
2	T1	100	7	109	7.0	0.060	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	54	7	59	13.0	0.041	8.3	LOS A	0.2	1.5	0.26	0.62	0.26	50.3
Approach		154	14	167	9.1	0.060	2.9	NA	0.2	1.5	0.09	0.22	0.09	74.2
East: CHPP Access Rd														
4	L2	10	1	11	10.0	0.009	3.9	LOS A	0.0	0.3	0.23	0.45	0.23	48.1
6	R2	1	0	1	0.0	0.009	4.6	LOS A	0.0	0.3	0.23	0.45	0.23	49.7
Approach		11	1	12	9.1	0.009	4.0	LOS A	0.0	0.3	0.23	0.45	0.23	48.3
North: Ulan Road North														
7	L2	4	0	4	0.0	0.002	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	75.3
8	T1	122	5	133	4.1	0.072	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		126	5	137	4.0	0.072	0.3	NA	0.0	0.0	0.00	0.02	0.00	98.9
All Vehicles		291	20	316	6.9	0.072	1.8	NA	0.2	1.5	0.06	0.14	0.06	81.4

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

MOVEMENT SUMMARY

Site: 1 [Ulan and CHPP Access PM 2025 (Site Folder: OC3 Extension 2025)]

Ulan Rd and Moolarben CHPP Access
AM Peak 4-5pm
OC3 Extension 2025
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Ulan Road South														
2	T1	53	7	62	13.2	0.035	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	6	1	7	16.7	0.005	8.4	LOS A	0.0	0.2	0.28	0.60	0.28	50.2
Approach		59	8	69	13.6	0.035	0.9	NA	0.0	0.2	0.03	0.06	0.03	90.8
East: CHPP Access Rd														
4	L2	38	1	45	2.6	0.035	3.9	LOS A	0.1	1.0	0.26	0.46	0.26	49.3
6	R2	2	1	2	50.0	0.035	5.1	LOS A	0.1	1.0	0.26	0.46	0.26	42.3
Approach		40	2	47	5.0	0.035	4.0	LOS A	0.1	1.0	0.26	0.46	0.26	48.9
North: Ulan Road North														
7	L2	1	0	1	0.0	0.001	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	75.3
8	T1	135	6	159	4.4	0.085	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		136	6	160	4.4	0.085	0.1	NA	0.0	0.0	0.00	0.00	0.00	99.7
All Vehicles		235	16	276	6.8	0.085	0.9	NA	0.1	1.0	0.05	0.10	0.05	82.9

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

MOVEMENT SUMMARY

Site: 1 [Ulan-Wollar and ROM Access AM 2025 (Site Folder: OC3 Extension 2025)]

Ulan-Wollar Rd and ROM Access
AM Peak 6-7am
OC3 Extension 2025
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: ROM Access														
4	L2	2	0	2	0.0	0.002	3.5	LOS A	0.0	0.0	0.08	0.45	0.08	50.6
6	R2	1	0	1	0.0	0.002	3.9	LOS A	0.0	0.0	0.08	0.45	0.08	50.4
Approach		3	0	3	0.0	0.002	3.6	LOS A	0.0	0.0	0.08	0.45	0.08	50.5
East: Ulan-Wollar Road East														
7	L2	1	0	1	0.0	0.020	7.8	LOS A	0.0	0.0	0.00	0.02	0.00	89.2
8	T1	34	0	37	0.0	0.020	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	99.4
Approach		35	0	38	0.0	0.020	0.2	NA	0.0	0.0	0.00	0.02	0.00	99.1
West: Ulan-Wollar Rd West														
2	T1	179	7	195	3.9	0.106	0.0	LOS A	0.0	0.2	0.01	0.01	0.01	99.7
3	R2	3	1	3	33.3	0.106	8.6	LOS A	0.0	0.2	0.01	0.01	0.01	56.4
Approach		182	8	198	4.4	0.106	0.1	NA	0.0	0.2	0.01	0.01	0.01	98.4
All Vehicles		220	8	239	3.6	0.106	0.2	NA	0.0	0.2	0.01	0.02	0.01	97.3

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

MOVEMENT SUMMARY

▼ Site: 1 [Ulan-Wollar and ROM Access PM 2025 (Site Folder: OC3 Extension 2025)]

Ulan-Wollar Rd and ROM Access
PM Peak 4-5pm
OC3 Extension 2025
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: ROM Access														
4	L2	2	0	3	0.0	0.003	3.6	LOS A	0.0	0.1	0.15	0.44	0.15	50.4
6	R2	1	0	1	0.0	0.003	3.7	LOS A	0.0	0.1	0.15	0.44	0.15	50.1
Approach		3	0	4	0.0	0.003	3.6	LOS A	0.0	0.1	0.15	0.44	0.15	50.3
East: Ulan-Wollar Road East														
7	L2	1	0	1	0.0	0.048	7.8	LOS A	0.0	0.0	0.00	0.01	0.00	88.3
8	T1	61	2	91	3.3	0.048	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	99.6
Approach		62	2	93	3.2	0.048	0.1	NA	0.0	0.0	0.00	0.01	0.00	99.4
West: Ulan-Wollar Rd West														
2	T1	9	2	13	22.2	0.008	0.0	LOS A	0.0	0.1	0.04	0.07	0.04	97.0
3	R2	1	0	1	0.0	0.008	7.6	LOS A	0.0	0.1	0.04	0.07	0.04	56.0
Approach		10	2	15	20.0	0.008	0.8	NA	0.0	0.1	0.04	0.07	0.04	90.4
All Vehicles		75	4	112	5.3	0.048	0.4	NA	0.0	0.1	0.01	0.04	0.01	94.5

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

MOVEMENT SUMMARY

▼ Site: 1 [Ulan and Ulan-Wollar AM 2034 (Site Folder: OC3 Extension 2034)]

Ulan Rd and Ulan-Wollar Rd
AM Peak 6-7am
OC3 Extension 2034
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Ulan Road South														
2	T1	127	11	141	8.7	0.197	0.2	LOS A	1.0	7.6	0.06	0.12	0.06	95.5
3	R2	253	9	281	3.6	0.197	8.3	LOS A	1.0	7.6	0.28	0.57	0.28	62.1
Approach		380	20	422	5.3	0.197	5.6	NA	1.0	7.6	0.21	0.42	0.21	70.3
East: Ulan-Wollar Road														
4	L2	27	0	30	0.0	0.020	5.9	LOS A	0.1	0.6	0.22	0.54	0.22	61.4
6	R2	12	0	13	0.0	0.018	7.9	LOS A	0.1	0.4	0.45	0.66	0.45	59.8
Approach		39	0	43	0.0	0.020	6.5	LOS A	0.1	0.6	0.29	0.58	0.29	60.9
North: Ulan Road North														
7	L2	14	4	16	28.6	0.012	8.8	LOS A	0.0	0.0	0.00	0.66	0.00	63.6
8	T1	105	1	117	1.0	0.060	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		119	5	132	4.2	0.060	1.0	NA	0.0	0.0	0.00	0.08	0.00	93.7
All Vehicles		538	25	598	4.6	0.197	4.6	NA	1.0	7.6	0.17	0.35	0.17	73.5

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

MOVEMENT SUMMARY

▼ Site: 1 [Ulan and Ulan-Wollar PM 2034 (Site Folder: OC3 Extension 2034)]

Ulan Rd and Ulan-Wollar Rd
PM Peak 4-5pm
OC3 Extension 2034
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Ulan Road South														
2	T1	44	4	53	9.1	0.025	0.1	LOS A	0.0	0.3	0.06	0.05	0.06	97.7
3	R2	4	1	5	25.0	0.025	9.1	LOS A	0.0	0.3	0.08	0.07	0.08	68.7
Approach		48	5	58	10.4	0.025	0.9	NA	0.0	0.3	0.06	0.06	0.06	94.4
East: Ulan-Wollar Road														
4	L2	120	7	145	5.8	0.112	6.4	LOS A	0.5	3.6	0.31	0.58	0.31	59.0
6	R2	9	0	11	0.0	0.011	6.4	LOS A	0.0	0.2	0.29	0.57	0.29	61.1
Approach		129	7	155	5.4	0.112	6.4	LOS A	0.5	3.6	0.30	0.58	0.30	59.1
North: Ulan Road North														
7	L2	1	0	1	0.0	0.001	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	75.3
8	T1	156	7	188	4.5	0.101	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		157	7	189	4.5	0.101	0.1	NA	0.0	0.0	0.00	0.00	0.00	99.7
All Vehicles		334	19	402	5.7	0.112	2.6	NA	0.5	3.6	0.13	0.23	0.13	78.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\penny.dalton\OneDrive - THE TRANSPORT PLANNING PARTNERSHIP PTY LTD\21195 Moolarben Stage 3\07 Modelling Files\Model\21195-SID-220907-Moolarben OC3 Extension.sip9

MOVEMENT SUMMARY

▼ Site: 1 [Ulan-Wollar and OC Access AM 2034 (Site Folder: OC3 Extension 2034)]

Ulan-Wollar Rd and OC Access
AM Peak 6-7am
OC3 Extension 2034
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Open Cut Access														
4	L2	7	0	8	0.0	0.008	3.5	LOS A	0.0	0.2	0.08	0.46	0.08	50.5
6	R2	4	0	4	0.0	0.008	4.5	LOS A	0.0	0.2	0.08	0.46	0.08	50.3
Approach		11	0	12	0.0	0.008	3.8	LOS A	0.0	0.2	0.08	0.46	0.08	50.4
East: Ulan-Wollar Road East														
7	L2	2	0	2	0.0	0.020	7.8	LOS A	0.0	0.0	0.00	0.04	0.00	88.8
8	T1	33	0	37	0.0	0.020	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	98.8
Approach		35	0	39	0.0	0.020	0.4	NA	0.0	0.0	0.00	0.04	0.00	98.1
West: Ulan-Wollar Rd West														
2	T1	179	9	199	5.0	0.108	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	90	3	100	3.3	0.044	7.6	LOS A	0.2	1.8	0.12	0.62	0.12	50.7
Approach		269	12	299	4.5	0.108	2.5	NA	0.2	1.8	0.04	0.21	0.04	75.4
All Vehicles		315	12	350	3.8	0.108	2.4	NA	0.2	1.8	0.04	0.20	0.04	76.1

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

MOVEMENT SUMMARY

Site: 1 [Ulan-Wollar and OC Access PM 2034 (Site Folder: OC3 Extension 2034)]

Ulan-Wollar Rd and OC Access
PM Peak 4-5pm
OC3 Extension 2034
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Open Cut Access														
4	L2	34	1	50	2.9	0.027	3.7	LOS A	0.1	0.9	0.20	0.44	0.20	49.4
6	R2	1	0	1	0.0	0.027	3.9	LOS A	0.1	0.9	0.20	0.44	0.20	49.7
Approach		35	1	51	2.9	0.027	3.7	LOS A	0.1	0.9	0.20	0.44	0.20	49.4
East: Ulan-Wollar Road East														
7	L2	2	0	3	0.0	0.058	7.8	LOS A	0.0	0.0	0.00	0.02	0.00	88.1
8	T1	70	4	103	5.7	0.058	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	99.3
Approach		72	4	106	5.6	0.058	0.2	NA	0.0	0.0	0.00	0.02	0.00	99.0
West: Ulan-Wollar Rd West														
2	T1	7	0	10	0.0	0.005	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	5	1	7	20.0	0.004	8.2	LOS A	0.0	0.2	0.23	0.59	0.23	50.3
Approach		12	1	18	8.3	0.005	3.4	NA	0.0	0.2	0.09	0.25	0.09	70.9
All Vehicles		119	6	175	5.0	0.058	1.6	NA	0.1	0.9	0.07	0.16	0.07	74.1

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

MOVEMENT SUMMARY

▼ Site: 1 [Ulan and CHPP Access AM 2034 (Site Folder: OC3 Extension 2034)]

Ulan Rd and Moolarben CHPP Access
AM Peak 6-7am
OC3 Extension 2034
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Ulan Road South														
2	T1	100	7	109	7.0	0.060	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	23	5	25	21.7	0.018	8.5	LOS A	0.1	0.7	0.25	0.61	0.25	50.2
Approach		123	12	134	9.8	0.060	1.6	NA	0.1	0.7	0.05	0.11	0.05	84.4
East: CHPP Access Rd														
4	L2	6	1	7	16.7	0.006	3.9	LOS A	0.0	0.2	0.22	0.44	0.22	47.1
6	R2	1	0	1	0.0	0.006	4.4	LOS A	0.0	0.2	0.22	0.44	0.22	49.7
Approach		7	1	8	14.3	0.006	4.0	LOS A	0.0	0.2	0.22	0.44	0.22	47.5
North: Ulan Road North														
7	L2	2	0	2	0.0	0.001	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	75.3
8	T1	111	4	121	3.6	0.065	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		113	4	123	3.5	0.065	0.1	NA	0.0	0.0	0.00	0.01	0.00	99.4
All Vehicles		243	17	264	7.0	0.065	1.0	NA	0.1	0.7	0.03	0.08	0.03	88.6

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

MOVEMENT SUMMARY

Site: 1 [Ulan and CHPP Access PM 2034 (Site Folder: OC3 Extension 2034)]

Ulan Rd and Moolarben CHPP Access
AM Peak 4-5pm
OC3 Extension 2034
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Ulan Road South														
2	T1	53	7	62	13.2	0.035	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	4	1	5	25.0	0.003	8.7	LOS A	0.0	0.1	0.28	0.60	0.28	50.2
Approach		57	8	67	14.0	0.035	0.6	NA	0.0	0.1	0.02	0.04	0.02	93.5
East: CHPP Access Rd														
4	L2	21	1	25	4.8	0.021	3.9	LOS A	0.1	0.6	0.26	0.46	0.26	48.9
6	R2	2	1	2	50.0	0.021	5.1	LOS A	0.1	0.6	0.26	0.46	0.26	42.3
Approach		23	2	27	8.7	0.021	4.0	LOS A	0.1	0.6	0.26	0.46	0.26	48.3
North: Ulan Road North														
7	L2	1	0	1	0.0	0.001	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	75.3
8	T1	134	6	158	4.5	0.085	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		135	6	159	4.4	0.085	0.1	NA	0.0	0.0	0.00	0.00	0.00	99.7
All Vehicles		215	16	253	7.4	0.085	0.6	NA	0.1	0.6	0.03	0.06	0.03	88.1

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

MOVEMENT SUMMARY

▼ Site: 1 [Ulan-Wollar and ROM Access AM 2034 (Site Folder: OC3 Extension 2034)]

Ulan-Wollar Rd and ROM Access
AM Peak 6-7am
OC3 Extension 2034
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: ROM Access														
4	L2	2	0	2	0.0	0.002	3.5	LOS A	0.0	0.0	0.07	0.45	0.07	50.6
6	R2	1	0	1	0.0	0.002	3.8	LOS A	0.0	0.0	0.07	0.45	0.07	50.4
Approach		3	0	3	0.0	0.002	3.6	LOS A	0.0	0.0	0.07	0.45	0.07	50.5
East: Ulan-Wollar Road East														
7	L2	1	0	1	0.0	0.018	7.8	LOS A	0.0	0.0	0.00	0.02	0.00	89.2
8	T1	31	0	34	0.0	0.018	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	99.3
Approach		32	0	35	0.0	0.018	0.2	NA	0.0	0.0	0.00	0.02	0.00	99.0
West: Ulan-Wollar Rd West														
2	T1	173	7	188	4.0	0.103	0.0	LOS A	0.0	0.2	0.01	0.01	0.01	99.7
3	R2	3	1	3	33.3	0.103	8.5	LOS A	0.0	0.2	0.01	0.01	0.01	56.4
Approach		176	8	191	4.5	0.103	0.1	NA	0.0	0.2	0.01	0.01	0.01	98.4
All Vehicles		211	8	229	3.8	0.103	0.2	NA	0.0	0.2	0.01	0.02	0.01	97.2

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

MOVEMENT SUMMARY

Site: 1 [Ulan-Wollar and ROM Access PM 2034 (Site Folder: OC3 Extension 2034)]

Ulan-Wollar Rd and ROM Access
PM Peak 4-5pm
OC3 Extension 2034
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: ROM Access														
4	L2	2	0	3	0.0	0.003	3.6	LOS A	0.0	0.1	0.15	0.44	0.15	50.4
6	R2	1	0	1	0.0	0.003	3.7	LOS A	0.0	0.1	0.15	0.44	0.15	50.2
Approach		3	0	4	0.0	0.003	3.6	LOS A	0.0	0.1	0.15	0.44	0.15	50.3
East: Ulan-Wollar Road East														
7	L2	1	0	1	0.0	0.046	7.8	LOS A	0.0	0.0	0.00	0.01	0.00	88.3
8	T1	58	2	87	3.4	0.046	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	99.6
Approach		59	2	88	3.4	0.046	0.1	NA	0.0	0.0	0.00	0.01	0.00	99.4
West: Ulan-Wollar Rd West														
2	T1	7	2	10	28.6	0.007	0.0	LOS A	0.0	0.1	0.05	0.08	0.05	96.1
3	R2	1	0	1	0.0	0.007	7.6	LOS A	0.0	0.1	0.05	0.08	0.05	55.7
Approach		8	2	12	25.0	0.007	1.0	NA	0.0	0.1	0.05	0.08	0.05	88.1
All Vehicles		70	4	104	5.7	0.046	0.4	NA	0.0	0.1	0.01	0.04	0.01	94.1

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

MOVEMENT SUMMARY

▼ Site: 1 [Ulan and Ulan-Wollar AM 2025 - UG4 (Site Folder: 2025 Sensitivity)]

Ulan Rd and Ulan-Wollar Rd
AM Peak 6-7am
OC3 Extension 2025 with UG4 redistribution
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Ulan Road South														
2	T1	168	17	187	10.1	0.289	0.2	LOS A	1.6	11.7	0.05	0.09	0.05	96.6
3	R2	369	10	410	2.7	0.289	8.5	LOS A	1.6	11.7	0.36	0.60	0.36	61.6
Approach		537	27	597	5.0	0.289	5.9	NA	1.6	11.7	0.27	0.44	0.27	69.4
East: Ulan-Wollar Road														
4	L2	33	0	37	0.0	0.026	6.0	LOS A	0.1	0.7	0.26	0.55	0.26	61.3
6	R2	22	4	24	18.2	0.067	13.3	LOS A	0.2	2.1	0.65	0.86	0.65	50.6
Approach		55	4	61	7.3	0.067	8.9	LOS A	0.2	2.1	0.42	0.67	0.42	56.5
North: Ulan Road North														
7	L2	32	4	36	12.5	0.023	8.2	LOS A	0.0	0.0	0.00	0.66	0.00	69.3
8	T1	123	10	137	8.1	0.078	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		155	14	172	9.0	0.078	1.7	NA	0.0	0.0	0.00	0.14	0.00	91.6
All Vehicles		747	45	830	6.0	0.289	5.3	NA	1.6	11.7	0.22	0.40	0.22	71.8

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

MOVEMENT SUMMARY

▼ Site: 1 [Ulan and Ulan-Wollar PM 2025 - UG4 (Site Folder: 2025 Sensitivity)]

Ulan Rd and Ulan-Wollar Rd
PM Peak 4-5pm
OC3 Extension 2025 with UG4 redistribution
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV] veh/h	[Total veh/h]	[HV] %				[Veh. veh]	[Dist] m				
South: Ulan Road South														
2	T1	52	8	63	15.4	0.030	0.1	LOS A	0.0	0.2	0.02	0.01	0.02	99.0
3	R2	1	1	1	100.0	0.030	12.3	LOS A	0.0	0.2	0.03	0.02	0.03	62.8
Approach		53	9	64	17.0	0.030	0.3	NA	0.0	0.2	0.02	0.01	0.02	98.0
East: Ulan-Wollar Road														
4	L2	111	4	134	3.6	0.102	6.4	LOS A	0.4	3.0	0.32	0.58	0.32	59.6
6	R2	19	4	23	21.1	0.033	7.8	LOS A	0.1	1.1	0.38	0.63	0.38	54.1
Approach		130	8	157	6.2	0.102	6.6	LOS A	0.4	3.0	0.33	0.59	0.33	58.7
North: Ulan Road North														
7	L2	11	4	13	36.4	0.011	9.0	LOS A	0.0	0.0	0.00	0.66	0.00	61.2
8	T1	166	11	200	6.6	0.111	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.9
Approach		177	15	213	8.5	0.111	0.6	NA	0.0	0.0	0.00	0.04	0.00	96.2
All Vehicles		360	32	434	8.9	0.111	2.7	NA	0.4	3.0	0.12	0.24	0.12	78.3

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

MOVEMENT SUMMARY

▼ Site: 1 [Ulan and Ulan-Wollar AM 2025 - No Covid (Site Folder: 2025 Sensitivity)]

Ulan Rd and Ulan-Wollar Rd
AM Peak 6-7am
OC3 Extension 2025 no UG workforce testing
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Ulan Road South														
2	T1	134	13	149	9.7	0.083	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
3	R2	403	14	448	3.5	0.290	8.4	LOS A	1.6	11.8	0.32	0.63	0.32	61.2
Approach		537	27	597	5.0	0.290	6.3	NA	1.6	11.8	0.24	0.47	0.24	67.8
East: Ulan-Wollar Road														
4	L2	40	1	44	2.5	0.031	6.0	LOS A	0.1	0.9	0.23	0.54	0.23	60.2
6	R2	12	0	13	0.0	0.022	9.2	LOS A	0.1	0.5	0.53	0.73	0.53	58.6
Approach		52	1	58	1.9	0.031	6.7	LOS A	0.1	0.9	0.30	0.59	0.30	59.8
North: Ulan Road North														
7	L2	20	5	22	25.0	0.017	8.6	LOS A	0.0	0.0	0.00	0.66	0.00	64.8
8	T1	108	1	120	0.9	0.062	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		128	6	142	4.7	0.062	1.4	NA	0.0	0.0	0.00	0.10	0.00	92.2
All Vehicles		717	34	797	4.7	0.290	5.4	NA	1.6	11.8	0.20	0.41	0.20	70.4

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

MOVEMENT SUMMARY

▼ Site: 1 [Ulan and Ulan-Wollar PM 2025 - No Covid (Site Folder: 2025 Sensitivity)]

Ulan Rd and Ulan-Wollar Rd
PM Peak 4-5pm
OC3 Extension 2025 no UG workforce testing
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Ulan Road South														
2	T1	43	4	52	9.3	0.031	0.3	LOS A	0.1	0.9	0.14	0.12	0.14	95.0
3	R2	12	4	14	33.3	0.031	9.5	LOS A	0.1	0.9	0.22	0.19	0.22	66.0
Approach		55	8	66	14.5	0.031	2.3	NA	0.1	0.9	0.16	0.14	0.16	86.7
East: Ulan-Wollar Road														
4	L2	169	8	204	4.7	0.158	6.4	LOS A	0.7	5.1	0.33	0.59	0.33	59.2
6	R2	11	1	13	9.1	0.014	6.7	LOS A	0.0	0.3	0.32	0.59	0.32	58.2
Approach		180	9	217	5.0	0.158	6.5	LOS A	0.7	5.1	0.33	0.59	0.33	59.1
North: Ulan Road North														
7	L2	2	0	2	0.0	0.001	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	75.3
8	T1	171	7	206	4.1	0.111	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		173	7	208	4.0	0.111	0.1	NA	0.0	0.0	0.00	0.01	0.00	99.6
All Vehicles		408	24	492	5.9	0.158	3.2	NA	0.7	5.1	0.17	0.28	0.17	75.3

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

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