



Traffic & Transportation Direction

Rothbury BESS

1309 Wine Country Drive, Rothbury, NSW

Traffic Impact Assessment

March 2026

Reference: 1296 rep 260312 final

Rothbury BESS

1309 Wine Country Drive,
Rothbury, NSW

Traffic Impact Assessment

Prepared for: Ausgrid

Status: Final report

Date: 12 March 2026

Reference: 1296 rep 260312 final

Revision	Date	Description	Author	Reviewed	Approved
A	12/01/2026	Draft 01	K. Ballantyne	M. Willson	M. Willson
A	12/02/2026	Draft 02	K. Ballantyne	M. Willson	M. Willson
A	12/03/2026	Final 01	K. Ballantyne	M. Willson	M. Willson

Contact

Website: www.amberorg.com.au

E: info@amberorg.com.au

Phone: 1800 022 363



Executive Summary

Amber Organisation Pty Ltd (Amber) has been engaged by Ausgrid to prepare a Traffic Impact Assessment for the proposed Rothbury Battery Energy Storage System (BESS) (the Project). The Project includes the construction, operation and decommissioning of a BESS and associated infrastructure with a maximum targeted storage capacity of up to 135 MW/540 MWh (4 hours).

The Project is located at 1309 Wine Country Drive in Rothbury within Cessnock City Council Local Government Area (LGA) and is approximately 45 km northwest of Newcastle. The Project is located on the site of the existing Ausgrid Rothbury Zone Substation, with the BESS located on Lot 1 and 2 of DP 1318566. Vehicle access is proposed via Old North Road using the existing crossover to the site.

Traffic generated by the Project can be separated by construction, operation and decommissioning stages. The peak traffic generating potential is during construction which generates trips associated with the workforce accessing the Project and the delivery of materials and plant. During operation, the Project is expected to generate a maximum of four vehicle movements per week associated with 1-2 maintenance personnel. Decommissioning is anticipated to generate a similar level of traffic to the construction stage.

The construction period is expected to commence in mid-2027 and take approximately 22 months, with the peak construction period expected to take 6 months. A construction workforce of up to 100 personnel would be on-site during the peak construction phase. These staff would be primarily located in Newcastle, the Hunter Region and Sydney.

It is anticipated that during peak construction the Project could generate up to 120 light and 70 heavy vehicle trips per day. Construction of the Project is expected to generate approximately 66 total vehicle trips per hour in the morning and evening peak hours during the peak construction period, which would reduce to 33 vehicle trips per peak hour during the average construction periods.

In order to determine the traffic impact generated during the construction of the Project, traffic modelling was completed at the intersection of Old North Road and Wine Country Drive, which is the closest connection to the State road network. The assessment also included a review of the cumulative traffic impact on the road network taking into account other major projects in the surrounding area. Overall, the assessment shows that Old North Road and Wine Country Drive can accommodate the peak construction traffic and the Project will have a minimal impact on the operation of the surrounding road network.

The largest vehicle expected to access the site is the battery container vehicle, which would be generally kept under 3.5 metres width and 26 metres length. These vehicles have similar dimensions and manoeuvrability to a 26 m B-Double, would be classed as Oversize and/or Overmass (OSOM) vehicle (due to mass), and not considered high risk. These vehicles would be permitted to travel on the Class 1 OSOM network.

Port of Newcastle and Port Botany have been identified as the likely ports where BESS plant will be imported, including the batteries. The access routes from these locations to the site primarily utilise roads that are designated for B-Doubles and the Class 1 OSOM network, noting that all heavy vehicles will require Council approval to travel on Old North Road.

Amber has undertaken an assessment of the expected access routes for construction traffic to the site. The assessment found that two 26 m B-Doubles/battery vehicles cannot pass simultaneously at the existing site access to Old North Road. Instead, traffic management measures will be required to control movements by these vehicles and ensure two opposing trucks do not meet at the access point.

In order to mitigate the traffic impacts of the Project a Construction Traffic Management Plan (CTMP) would be prepared. This will outline a range of traffic management measures to manage impacts to the capacity and safety of the surrounding road network, including managing movements by heavy vehicles at the site access. The CTMP would be prepared post-approval and prior to the commencement of construction.

Based on the assessment, it is concluded that the road network is able to accommodate the expected vehicle types and traffic volumes during the construction, operation, and decommissioning phases of the Project.



Table of Contents

1.	Introduction	1
1.1	Background.....	1
1.2	Environmental Assessment Requirements	3
1.3	Road/Rail Authority Consultation.....	4
1.4	Purpose of this Document.....	5
2.	Existing Conditions.....	6
2.1	Site Location.....	6
2.2	Road Network	7
2.3	Traffic Volumes	8
2.4	Public Transport Services	12
2.5	Restricted Vehicle Access.....	13
2.6	Crash History.....	16
3.	Project Description.....	17
3.1	The Project.....	17
3.2	Construction Information.....	17
4.	Traffic Assessment	18
4.1	Pre-Construction Minor Works.....	18
4.2	Construction Phase.....	18
4.3	Operational Phase	31
4.4	Decommissioning Phase.....	31
5.	Route Assessment	32
5.1	Plant Delivery – Heavy Vehicles.....	32
5.2	Plant Delivery – OSOM Vehicles	35
5.3	Local Road Upgrades.....	37
5.4	Mitigation Measures.....	37
6.	Intersection Assessment	38
6.1	Intersection Design	38
6.2	Site Access Design	39
6.3	Sight Distance Assessment	39
7.	Traffic Management Plan.....	42
7.1	Information and Communication	42
7.2	Access Road Management Measures.....	43
7.3	Signage.....	43
7.4	Shuttle Buses	43
7.5	On-Site Mitigation Measures	44
7.6	Driver Protocols	44
8.	Mitigation Measure Summary	45

8.1	Schedule of Road Upgrades	45
9.	Conclusion	46

List of Figures

Figure 1: Site Layout.....	2
Figure 2: Site Location	6
Figure 3: Aerial Photograph of Site and Surrounding Area	7
Figure 4: Traffic Survey Locations	8
Figure 5: Turning Movement Count – Old North Road / Wine Country Drive	9
Figure 6: Turning Movement Count – Blackburn Close / Wine Country Drive.....	10
Figure 7: Wine Country Drive Weekday Traffic Volume Data	11
Figure 8: Old North Road Weekday Traffic Volume Data.....	12
Figure 9: School Bus Routes and Stops.....	13
Figure 10: TfNSW 26m B-Double Network Approved Roads	14
Figure 11: Class 1 Oversize Overmass Load Carrying Vehicles Network Approved Roads.....	15
Figure 12: TfNSW SPV Level 6 Approved Roads.....	16
Figure 13: Peak Hour Construction Traffic – Old North Road / Wine Country Drive Intersection.....	21
Figure 14: Peak Construction Traffic Volumes	23
Figure 15: Turn Treatment Assessment Results – Construction Peak Hours	24
Figure 16: Road Network Peak Hour Traffic Volumes	25
Figure 17: Turn Treatment Assessment Results – Road Network Peak Hours	26
Figure 18: Peak Hour Construction Traffic – Nearby Intersections.....	28
Figure 19: Access Route from Port of Newcastle	32
Figure 20: Access Route from Port Botany – Loads up to 4.3m	33
Figure 21: Alternative Access Route from Port Botany – Loads over 4.3m.....	33
Figure 22: Rural left-right staggered T-Intersection.....	38
Figure 23: SISD Images.....	40

List of Tables

Table 1: Traffic and Transport SEARs and Responses	3
Table 2: Road/Rail Authority Consultation	4
Table 3: Road Network	7
Table 4: Wine Country Drive Traffic Volumes – Adjacent to site	10
Table 5: Old North Road Traffic Volumes – Adjacent to site	11
Table 6: Standard Construction Traffic	18
Table 7: Traffic generation during construction period	19
Table 8: Assessment of Cumulative Impacts of Nearby Developments	22
Table 9: Summary of SIDRA Results – Old North Road / Wine Country Drive	29
Table 10: Summary of SIDRA Results – Blackburn Close / Wine Country Drive	30
Table 11: 26 m B-Double Vehicle Routes - Access Roads	34
Table 12: Roads with Restrictions or Conditions on Class 1 OSOM Vehicle Routes	35
Table 13: Roads with Restrictions or Conditions on Class 1 OSOM Vehicle Routes	36
Table 14: Sight Distance Assessment	40

Appendices

Appendix A

Response to TfNSW Agency Advice

Appendix B

Traffic Survey Data

Appendix C

SIDRA Results

Appendix D

Site Access Design – Swept Path Assessment

Appendix E

Sight Distance Assessment

Definitions

Term	Definition
Project	A Battery Energy Storage System (BESS) as described within the Environmental Impact Statement (EIS) to which this Application applies.
The site	Boundary shown on Figure 1 to which the Application applies (unless otherwise stipulated).
Project Area	Area being impacted by construction and operation of the Project.
Applicant	Ausgrid
Application	Application for Development Consent under Part 4.7 of the <i>Environmental Planning and Assessment Act 1979</i> (EP&A Act); and Determination under Part 9 of the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act).
Terminology specific to this report	
Vehicle Trip	A trip is defined as a one way vehicular movement from one point to another excluding the return journey. Therefore, a return trip to and from the site is counted as two trips.
Vehicles per Day (vpd)	The volume of traffic (number of trips) occurring within a 24-hour period. For traffic volumes associated with the Project, this value is generally an even number to reflect the return trip associated with each vehicle.
Vehicles per Hour (vph)	The volume of traffic (number of trips) occurring within a one hour period.
Heavy Vehicle	A vehicle with a Gross Vehicle Mass (GVM) or Aggregate Trailer Mass (ATM) of more than 4.5 tonnes as defined in the Heavy Vehicle National Law (HVNL).
General Access Vehicle (GAV)	General Access Vehicles (GAV) don't require a permit or notice to access road networks; these vehicles have as-of-right access to the network unless signposted otherwise (e.g. a bridge tonnage restriction).
Restricted Access Vehicle (RAV)	Restricted Access Vehicles (RAV) include Class 1, 2 or 3 vehicles that operate under a notice or permit and vehicles operating under higher mass limits (HML) that have restrictions on the parts of the road network they can access.
Oversize and/or Overmass (OSOM) Vehicle	OSOM vehicles are defined as Class 1 vehicles under the Heavy Vehicle National Law. A vehicle or vehicle combination is considered to be OSOM if it exceeds any general access mass or dimension limits.
High Risk Oversize/Overmass Vehicle (requiring escort)	OSOM vehicles exceeding certain criteria for length, height, rear overhang, forward projection, width or total combination weight. These vehicles are subject to Transport Management Plans (TMPs) which provide a comprehensive planning and execution focus to ensure that these movements are carried out in a safe and responsible manner with reduced impact on other road users and road infrastructure. These vehicles also typically require pilot vehicle escort.

1. Introduction

1.1 Background

Amber has been engaged by Ausgrid to prepare a Traffic Impact Assessment of the proposed Rothbury Battery Energy Storage System (the Project). The Project includes the construction, operation and decommissioning of a Battery Energy Storage System (BESS) and associated infrastructure with a targeted storage capacity of up to 135 MW/540 MWh (4 hours).

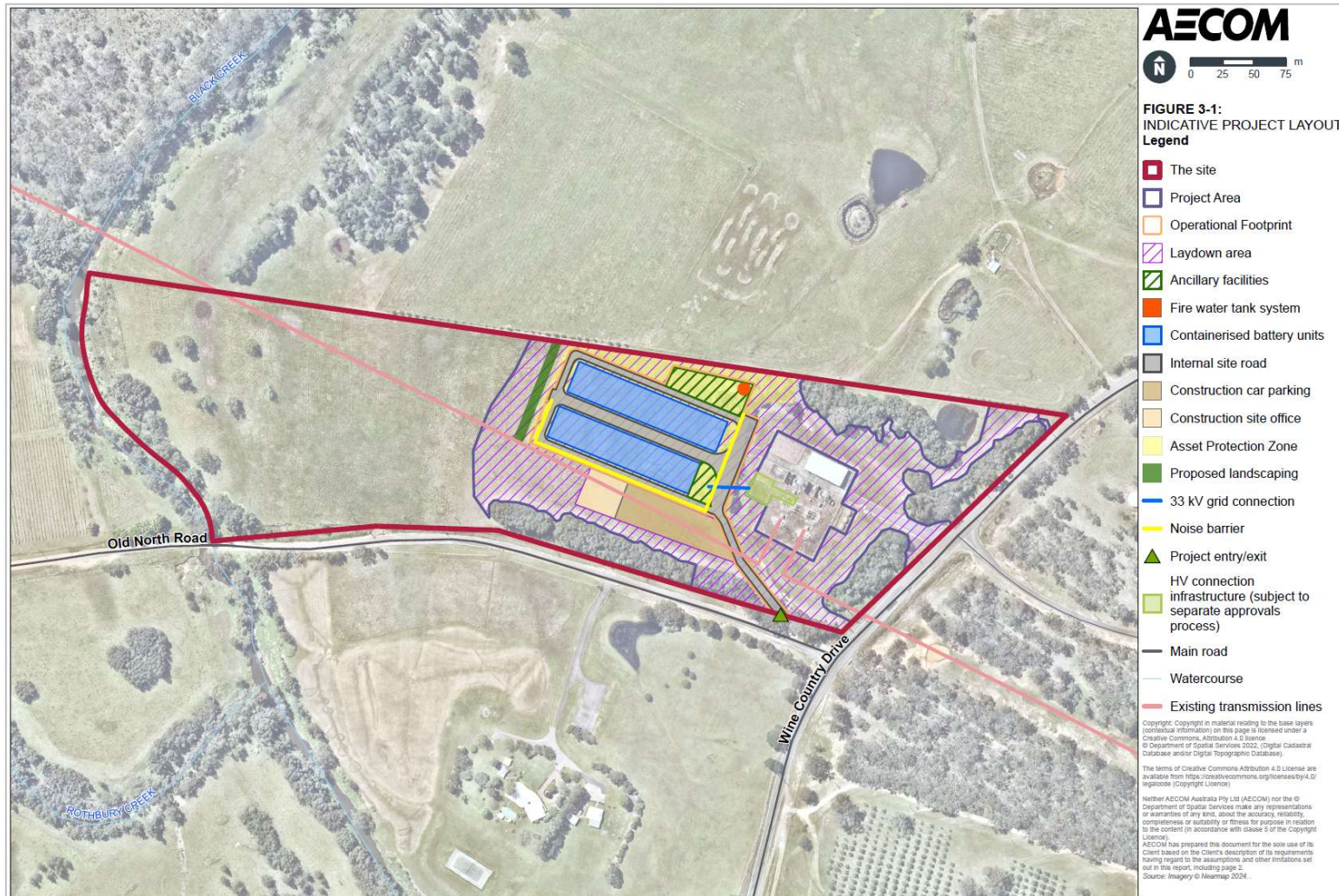
The Project is located at 1309 Wine Country Drive in Rothbury (the site) within Cessnock City Council LGA and is approximately 45 km northwest of Newcastle. The Project is located on the site of the existing Ausgrid Rothbury Zone Substation, with the Project located on Lot 1 and 2 of DP 1318566. Vehicle access to the site is proposed via the existing crossover to Old North Road.

Figure 1 shows the location of the site in relation to the road network, access location, and existing infrastructure.

Construction of the Project is expected to commence in mid-2027 and take approximately 22 months, with the peak construction period expected to last for 6 months. A construction workforce of up to 100 personnel would be on-site during the peak construction phase and these staff would be primarily located in Newcastle, the Hunter Region and Sydney.

Project specific plant such as the battery units are expected to be delivered from the Port of Newcastle or Port Botany. More general construction materials and equipment will be sourced from the surrounding area.

Figure 1: Site Layout



Source: Aecom



1.2 Environmental Assessment Requirements

This report supports a state significant development application under Part 4, Division 4.7 of the *Environmental Planning and Assessment Act 1979* (SSD-85939708). The NSW Department of Planning, Housing and Infrastructure (DPHI) have issued Secretary's Environmental Assessment Requirements (SEARs) for the Project. Traffic and transport matters specified by the SEARs are listed in Table 1 along with the relevant response to each matter.

The Agency Advice provided by Transport for New South Wales (TfNSW) and Cessnock City Council has been reviewed as part of the preparation of this Traffic Impact Assessment. Responses to each of the comments provided within the Agency Advice are outlined within Appendix A.

Table 1: Traffic and Transport SEARs and Responses

SEARs	Response
<i>An assessment of the peak and average traffic generation, including light vehicles (including shuttle buses), heavy vehicles, heavy vehicles requiring escort, high risk heavy vehicles requiring escort and construction worker transportation.</i>	Assessment of the peak and average traffic impacts is provided at Section 4. The assessment includes a breakdown of the traffic volumes based on different vehicle types.
<i>An assessment of the likely transport impacts to site access routes, road capacity, conditions, safety and intersection performance (including consideration of local climatic conditions, driver behaviour and crash data), taking into consideration the above listed vehicles, site access points and any crown land.</i>	The preferred access routes for heavy vehicles and OSOM vehicles are discussed at Section 5. The site is accessed via an existing crossover to Old North Road. The design and impacts of the site access is discussed at Section 6. A review of the existing road safety data and casualty crash history is provided at Section 2.6. An assessment of the site access and capacity of the Old North Road / Wine Country Drive intersection to accommodate the Project traffic is provided at Section 4.
<i>A concept level Route Analysis required for heavy vehicles requiring escort and high risk heavy vehicles requiring escort.</i>	There are no heavy vehicles requiring escort or high risk heavy vehicles requiring escort proposed as part of the scope of this Project.
<i>A cumulative impact assessment of traffic from nearby developments.</i>	The cumulative traffic impacts of nearby developments are discussed at Section 4.1.5.
<i>Provide details of measures to mitigate and / or manage potential impacts (developed in consultation with the relevant road authorities) including:</i> <i>- a schedule of all required road upgrades (including resulting from heavy vehicle and over mass / over dimensional traffic haulage routes),</i> <i>- strategic concept designs of proposed road upgrades (including the site access point); and</i> <i>- road maintenance contributions, and any other traffic control measures.</i>	Road upgrades are discussed at Section 6 and Section 8, with a schedule of road upgrades at Section 8.1. Ausgrid will investigate the intersection of Wine Country Drive/Old North Road upgrade in discussion with Cessnock Council and TfNSW to understand the surrounding developments in the Rothbury area and how this may influence the scope. Once this has been determined, Ausgrid will seek the necessary approvals for the required works from the relevant authorities. Concept design and swept paths of the site access are attached at Appendix D. Mitigation measures are discussed at Section 8.

1.3 Road/Rail Authority Consultation

This Traffic Impact Assessment has been undertaken in consultation with TfNSW and Cessnock City Council, with a summary of consultation provided in Table 2.

Table 2: Road/Rail Authority Consultation

Road Authority	Method	Correspondence
Transport for NSW	Email sent 06/11/2025	Email sent to TfNSW providing an overview of the Project. No response has been received to date.
Cessnock City Council	Email sent 06/11/2025 Reply received 04/12/2025	Email sent to Cessnock City Council providing an overview of the Project. A response was received from Council which is summarised below: - It is noted that currently there is no channelised right turn treatment for vehicles travelling south on Wine Country Drive (MR220) preparing to turn right onto Old North Road. - There is no acceleration lane for vehicles turning left off Old North Road onto Wine Country Drive (MR220). - There is no dedicated left turn lane for vehicles travelling north on Wine Country Drive (MR220) preparing to turn left onto Old North Road. - As this is a State road intersection managed by TfNSW, comments must be sought from TfNSW regarding their requirements for this intersection. - Council would expect upgrades to at least the relevant length of Old North Road in order to cater for construction traffic movements as well as future traffic generation from the project, as follows: - o 3.5m travel lanes in each direction; - o 2 meter sealed shoulders; - o Provision of thermoplastic centre line and edge line pavement markings; - o Appropriate warning signage; and - o Mitigation of roadside hazards, in accordance with the Network Roadside Risk Threshold (NRRT). - It is difficult to provide specific dates for events in the area. Touring concerts vary from year to year, but typically there's one or two each month. Hunter Valley will be celebrating its bicentenary in 2028. - State Significant Development Sunshine Estate BESS adjacent. Future stages of the Huntlee/Aria development may approach the locality. Lovedale Farms development may pick up around that time as well. - Road safety concerns would mainly relate to the potential for intersection collisions, as per the above observations regarding the need for enhanced intersection treatments at the intersection of Wine Country Drive and Old North Road. - Provided information on the local bus operator.

1.4 Purpose of this Document

This Traffic Impact Assessment (TIA) has been prepared to assess the construction, operational and decommissioning traffic impacts, and the access arrangements of the Project. The assessment responds to the SEARs and details how impacts of the Project's traffic, particularly from heavy vehicle use and oversize and overmass vehicles, would be avoided or managed.

More specifically, the TIA addresses the following key matters:

- Details of both light and heavy vehicle traffic volumes and proposed transport routes.
- An assessment of the potential traffic impacts of the Project on road network function and safety.
- An assessment of the capacity of the existing road network to accommodate the type and volume of traffic generated by the Project.
- Details of measures to mitigate and/or manage potential impacts, including construction traffic control and road dilapidation surveys.
- Details of access roads and how these connect to the existing road network and ongoing operational maintenance.

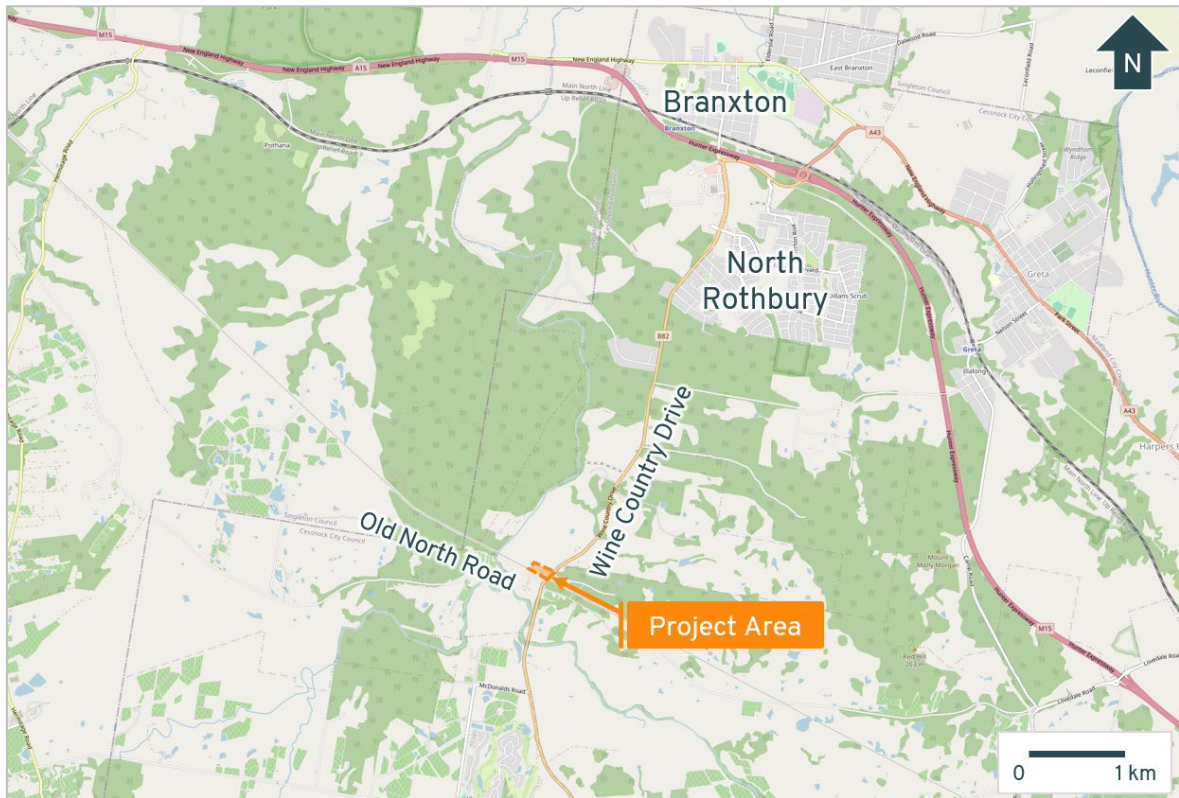
This TIA has been undertaken in accordance with the *TfNSW Guide to Transport Impact Assessment* and relevant Austroads Guidelines.

2. Existing Conditions

2.1 Site Location

The Project is located at 1309 Wine Country Drive in Rothbury within the Cessnock City Council LGA and is approximately 45 km northwest of Newcastle. The Project is located on the site of the existing Ausgrid Rothbury Zone Substation, with the Project proposed on Lot 1 and 2 on DP 1318566. Figure 2 shows the location of the site in relation to the surrounding transport network.

Figure 2: Site Location



Source: OpenStreetMap

The site is well connected with the surrounding State road network, with direct access available to Wine Country Drive, which is a State Road.

The site and surrounding area to the immediate north and east is zoned RU2 – Rural Landscape. Land to the immediate south and west of the site is zoned RU4 – Primary Production Small Lots. Land further to the south is zoned SP3 - Tourist, and land further to the north and east is zoned R5 – Large Lot Residential, C3 – Environmental Management and C1 – National Parks and Nature Reserves. There are a number of wineries within the vicinity of the site which draw tourists to the area.

The site is approximately 11.8 hectares (ha), which includes the disturbance footprint (Project Area) of approximately 4.56 ha for construction and operation of the Project. The operational footprint of the BESS is approximately 1.47 ha. The operational footprint is adjacent to the existing Ausgrid Rothbury Zone Substation and is currently not used but maintained as a grassed area with overhead transmission lines.

Vehicle access to the site is via two existing vehicle crossovers, one to Wine Country Drive and one to Old North Road. The Old North Road access is approximately 60 metres west of Wine Country Drive and the Wine Country Drive access is located opposite Blackburn Close.

Figure 3 provides an aerial photograph of the site and the surrounding area.

Figure 3: Aerial Photograph of Site and Surrounding Area



Source: Metro Map

2.2 Road Network

A summary of the surrounding road network is provided within Table 3.

Table 3: Road Network

Road	Typical Width	Speed Limit	Alignment
State Roads			
Wine Country Drive	Approximately 9 - 10 m wide providing a single lane of traffic in each direction with sealed shoulders.	80 km/hr	General north-south alignment between New England Highway, Branxton and Allandale Road, Cessnock.

Road	Typical Width	Speed Limit	Alignment
Local Roads			
Old North Road	Typically 6 m wide facilitating two-way traffic movement. West of the site Old North Road is unsealed.	80 km/hr	General northwest-southeast alignment between Hermitage Road, Pokolbin and Wine Country Drive, Rothbury.
Blackburn Close	Typically 5.5 m wide facilitating two-way traffic movement.	50 km/hr	General east-west alignment extending for approximately 800 m from Wine Country Drive.

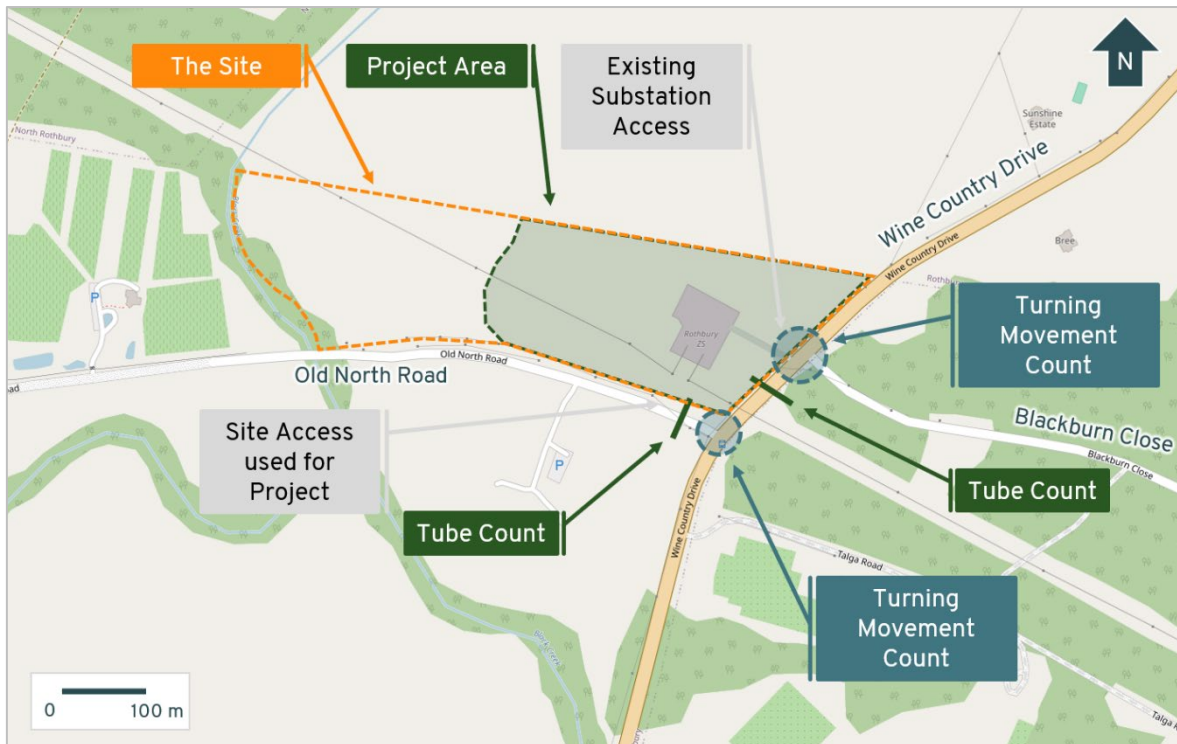
The intersection of **Old North Road / Wine Country Drive** is controlled by Give Way signage and line marking, with priority given to vehicles on Wine Country Drive. Basic Left (BAL) and Basic Right (BAR) turn treatments are provided on Wine Country Drive at the intersection.

The intersection of **Blackburn Close / Wine Country Drive** is controlled by Give Way signage and line marking, with priority given to vehicles on Wine Country Drive. A BAR turn treatment is provided on Wine Country Drive at the intersection.

2.3 Traffic Volumes

Traffic surveys of the road network surrounding the Project were undertaken to establish the existing traffic conditions. The surveys included turning movement counts at the intersections of Old North Road / Wine Country Drive and Blackburn Close / Wine Country Drive (i.e. nearest State road intersections) and a 7-day tube count of Wine Country Drive and Old North Road adjacent to the site. The survey locations can be seen in Figure 4.

Figure 4: Traffic Survey Locations



Source: OpenStreetMap

2.3.1 Turning Movement Counts

Turning movement count surveys were undertaken at the nearest State road intersections of Old North Road / Wine Country Drive and Blackburn Close / Wine Country Drive on Thursday 16 October 2025 between 6:00am-10:00am and 3:00pm-7:00pm. A summary of the survey results is presented below, with the full data provided within Appendix B.

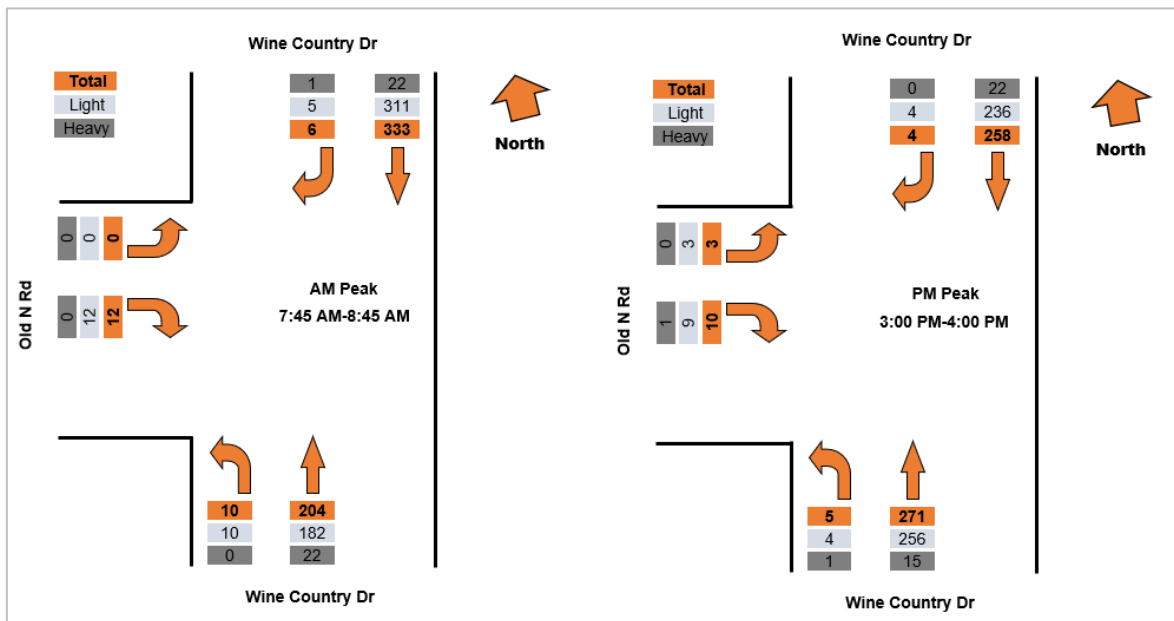
2.3.1.1 Old North Road / Wine Country Drive

The survey results indicate the intersection currently carries a low-moderate level of traffic in the order of 565 vehicles in the morning peak hour and 551 vehicles in the evening peak hour. The morning peak hour was recorded between 7:45am-8:45am and the evening peak hour was recorded between 3:00pm-4:00pm.

The majority of vehicle trips during the morning and evening peak periods are through traffic movements along Wine Country Drive, with a slight bias of movements towards the south during the morning peak hour.

Overall, the results indicate both roads accommodate a level of traffic consistent with their classification.

Figure 5: Turning Movement Count – Old North Road / Wine Country Drive



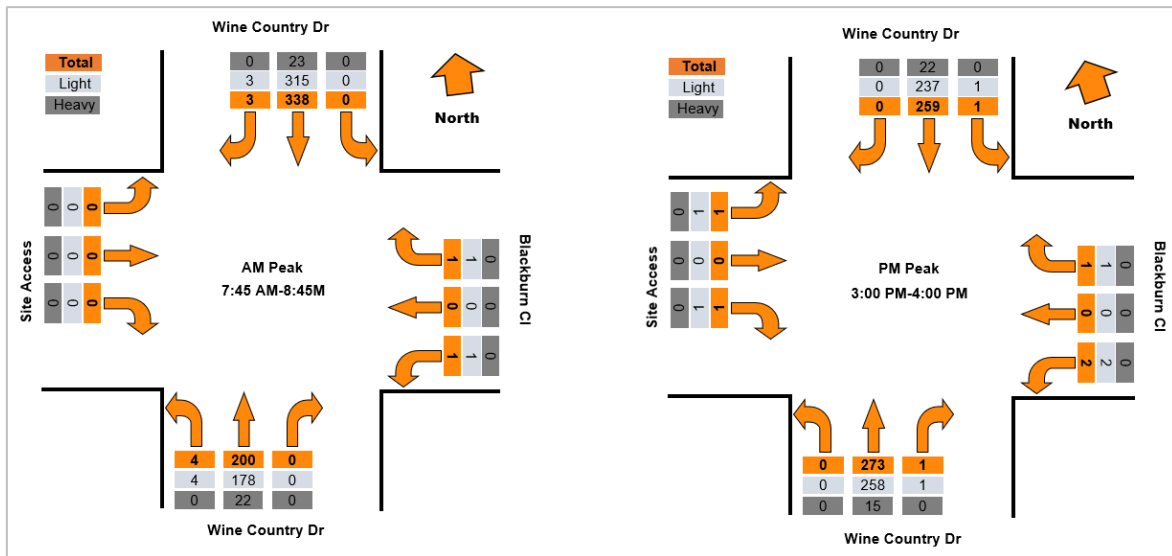
2.3.1.2 Blackburn Close / Wine Country Drive

The survey results indicate the intersection currently carries a low-moderate level of traffic in the order of 548 vehicles in the morning peak hour and 539 vehicles in the evening peak hour. The morning peak hour was recorded between 7:45am-8:45am and the evening peak hour was recorded between 3:00pm-4:00pm.

The majority of vehicle trips during the morning and evening peak periods are through traffic movements along Wine Country Drive, with a slight bias of movements towards the south during the morning peak hour.

Overall, the results indicate both roads accommodate a level of traffic consistent with their classification.

Figure 6: Turning Movement Count – Blackburn Close / Wine Country Drive



2.3.2 Tube Counts

Tube count surveys were completed on Wine Country Drive and Old North Road adjacent to the site to establish the existing traffic volumes and speeds over a typical week. The tube counts were completed between Wednesday 15 October and Wednesday 22 October 2025. A summary of the survey results is presented below, with the full data provided within Appendix B.

2.3.2.1 Wine Country Drive

A summary of the survey results of Wine Country Drive is presented in Table 4.

Table 4: Wine Country Drive Traffic Volumes – Adjacent to site

	Weekday Traffic (vpd)	Weekday AM Peak (vph) 8am-9am	Weekday PM Peak (vph) 3pm-4pm	85 th Percentile Speed	Heavy Vehicle Percentage
Northbound	3,358	198	279	88.3 km/hr	15.3%
Southbound	3,168	291	249	88.9 km/hr	15.6%
Both Directions	6,526	489	528	88.6 km/hr	15.5%

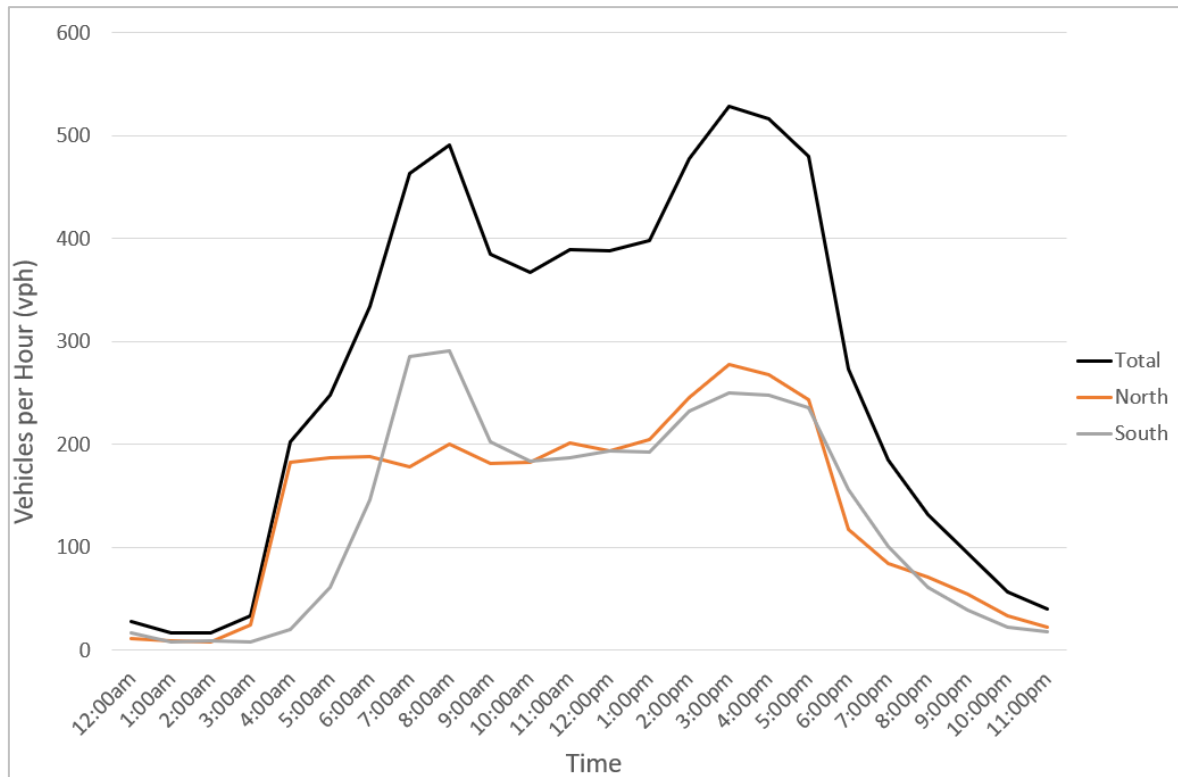
The survey data indicates Wine Country Drive currently carries a moderate level of daily traffic in the order of 6,526 vehicles per weekday, which is split relatively evenly between northbound and southbound trips. The road accommodates approximately 16% heavy vehicle traffic.

The 85th percentile speed was recorded as lower than the applicable speed limit of 90km/hr, which was still in effect at the time of the surveys. It is noted that since the surveys were completed, the speed limit on Wine Country Drive has been reduced to 80km/hr ¹.

¹ <https://www.transport.nsw.gov.au/speed-limits-north-region-2-october-2025>

The weekday hourly traffic volumes have been separated into northbound and southbound trips and are shown in Figure 7.

Figure 7: Wine Country Drive Weekday Traffic Volume Data



The figure shows that the majority of movements along Wine Country Drive occur between 6:00am and 6:00pm with distinct morning and evening peaks. Overall, the data indicates that Wine Country Drive currently accommodates a moderate level of traffic for its classification as a State Road.

2.3.2.2 Old North Road

A summary of the survey results of Old North Road is presented in Table 5.

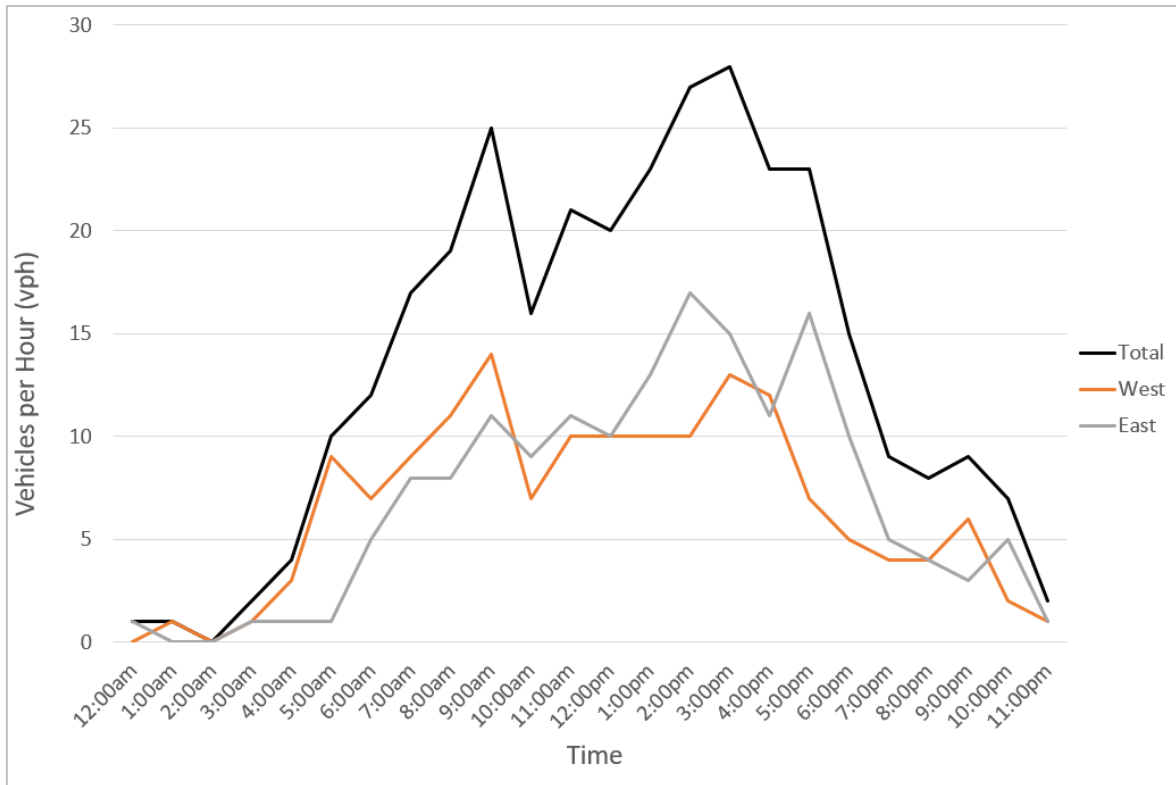
Table 5: Old North Road Traffic Volumes – Adjacent to site

	Weekday Traffic (vpd)	Weekday AM Peak (vph) 9am-10am	Weekday PM Peak (vph) 3pm-4pm	85 th Percentile Speed	Heavy Vehicle Percentage
Westbound	149	14	13	61.0 km/hr	7.1%
Eastbound	162	11	14	67.0 km/hr	8.2%
Both Directions	311	25	27	64.1 km/hr	7.6%

The survey data indicates that Old North Road currently experiences a low level of daily traffic in the order of 311 vehicles per day, which is split relatively evenly between westbound and eastbound vehicles. The 85th percentile speed is lower than the speed limit of 80km/hr and the road accommodates approximately 8% heavy vehicle traffic.

The weekday hourly traffic volumes have been separated into eastbound and westbound trips and are shown in Figure 8.

Figure 8: Old North Road Weekday Traffic Volume Data



The figure shows that the majority of movements along Old North Road occur between 6:00am and 6:00pm with distinct morning and evening peaks. Overall, the data indicates that Old North Road currently accommodates a low level of traffic.

2.4 Public Transport Services

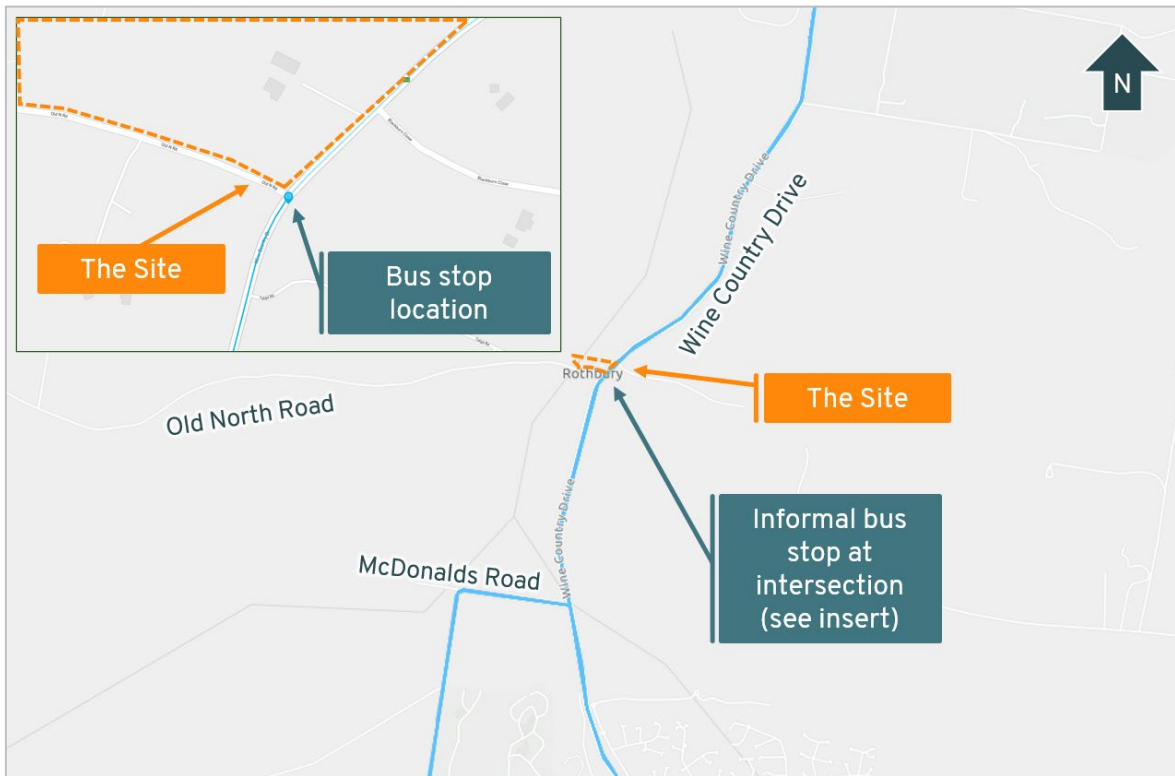
There are no regular public transport services within the vicinity of the site. There are a number of school bus services that operate along Wine Country Drive past the site, with an informal school bus stop at the intersection of Old North Road / Wine Country Drive.

The school buses are typically operated by Rover Coaches and provide access to schools within the region. The following public school bus services travel past the site on Wine Country Drive or stop at the bus stop at the Old North Road / Wine Country Drive intersection:

- Bus route S852 – North Rothbury to St Philips Nulkaba
- Bus route S883 – East Branxton to Cessnock PS via Greta Main
- Bus route S893 – Branxton to Cessnock Public School via North Rothbury & Nulkaba
- Bus route S954 – Huntlee to Cessnock Public School via The Vintage

School buses generally travel past the site on Wine Country Drive between 7:30am–8:00am and 3:40pm–4:40pm on school days, with a total of five school buses passing the site on school days. The school bus routes operating near the site are shown in blue in Figure 9.

Figure 9: School Bus Routes and Stops



Source: TfNSW Bus Routes

The nearby bus stop at the intersection of Old North Road / Wine Country Drive is informal with no signage or linemarking. The TfNSW website states²:

'There are thousands of informal school bus stops across NSW. Unlike public bus stops, there are no signs to indicate informal school bus stops.'

During construction, the informal bus stop would be relocated to a nearby safe location in accordance with the relevant TfNSW Guidelines.

2.5 Restricted Vehicle Access

2.5.1 B-Doubles

The TfNSW Restricted Access Vehicle (RAV) Map for the surrounding area is provided within Figure 10, with the green lines indicating approved B-Double routes. The figure shows that the Project Area can be accessed via the approved 26 m B-Double network via Wine Country Drive using Old North Road.

It is noted that Old North Road is not rated for use by B-Double vehicles and will require approval from Council for Project use. Signage indicates that Old North Road is restricted to a gross load limit of 25 tonnes, which is understood to be related to the creek crossing approximately 500 metres west of Wine Country Drive. It is noted that heavy vehicles associated with the Project are not proposed to travel across this creek crossing.

² transport.nsw.gov.au/roadsafety/community/schools/safety-around-schools

Figure 10: TfNSW 26m B-Double Network Approved Roads



Source: National Heavy Vehicle Register (NHVR) Restricted Access Vehicle Map

2.5.2 Class 1 OSOM Vehicles

The TfNSW Oversize Overmass (OSOM) Load Carrying Vehicles Network map for the surrounding area is provided within Figure 11. The map shows approved routes for eligible vehicles operating under the Multi-State Class 1 Load Carrying Vehicles Mass and Mass Exemption Notices. A summary of the allowances under each exemption within New South Wales (NSW) is provided below:

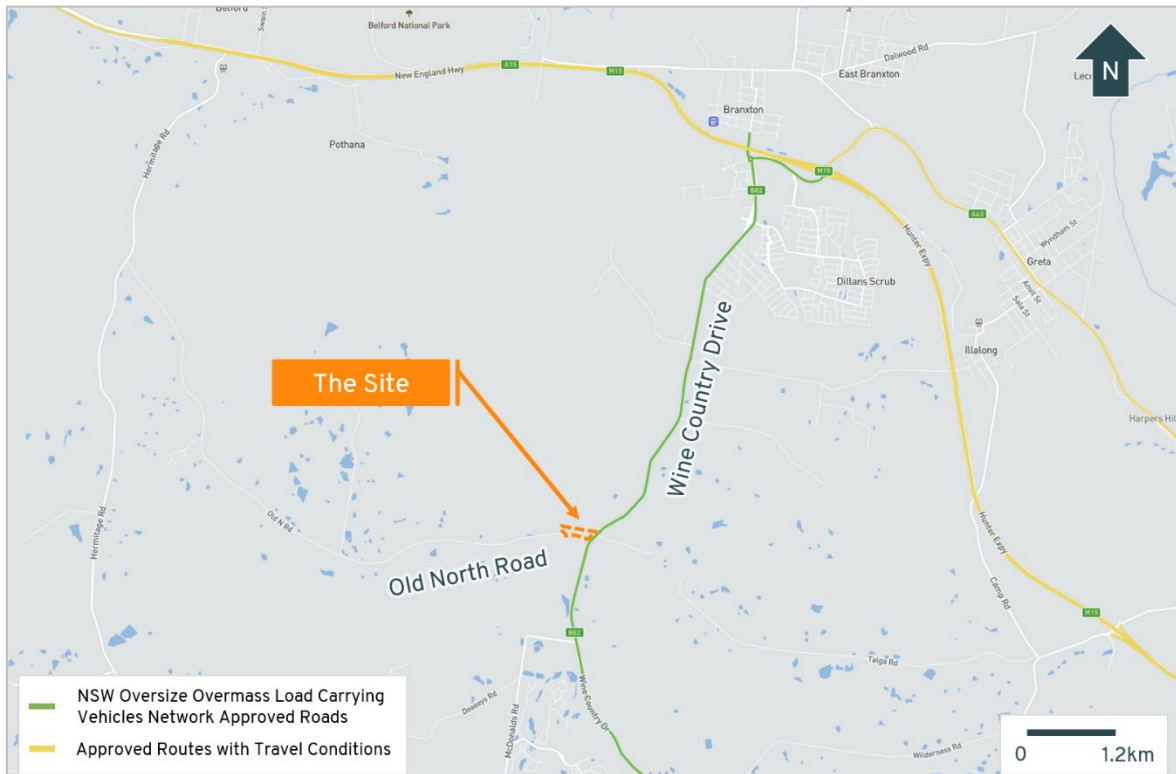
- Dimension: up to 5.0 m wide, 5.0 m high, 30.0 m long and 7.5 m rear overhang on approved (state owned) routes in NSW.
- Mass: up to 115.0 tonnes for rows of 8 tyres low loaders and up to 77.5 tonnes for rows of 4 tyres low loader combinations.

Vehicles operating in the daytime and not exceeding 3.5 m wide or 26 m long generally do not require a pilot vehicle.

The green lines indicate approved Class 1 OSOM Vehicle routes while the yellow lines represent approved routes with conditions. The figure shows that the surrounding State Road network is typically OSOM approved.

The Project Area can be accessed by the Class 1 OSOM approved road network via the Hunter Expressway and Wine Country Drive. It is noted that Old North Road is not rated for use by OSOM vehicles and will require approval from Council for Project use.

Figure 11: Class 1 Oversize Overmass Load Carrying Vehicles Network Approved Roads



Source: NHVR OSOM Network Map

2.5.3 Special Purpose Vehicles (SPVs)

Vehicles built for a purpose other than carrying goods such as a mobile crane, a concrete pump or drill rig are defined as Special Purpose Vehicles (SPVs).

The NSW Special Purpose Vehicle Network map provides details of the approved roads as well as conditions of access and travel restrictions for eligible SPVs operating under the:

- National Class 1 Special Purpose Vehicle Notice, or
- NSW Class 1 4-Axle & 5-Axle All Terrain Mobile Crane Mass and Dimension Exemption Notice, or
- NSW Class 1 All Terrain Mobile Crane and Dolly Combination Mass and Dimension Exemption Notice.

Roads that are not approved on the map require an access permit from the National Heavy Vehicle Regulator or the relevant road manager. There are six SPV access networks for cranes travelling on approved State Roads in NSW:

- SPV Level 1: Cranes and SPVs up to 40 tonnes that comply with the Bridge Formula.
- SPV Level 2: Crane and dolly combinations up to 70 tonnes that comply with the Bridge Formula.
- SPV Level 3: 3-axle All Terrain Cranes up to 36 tonnes and 4-axle All Terrain Cranes up to 43 tonnes.
- SPV Level 4: 4-axle All Terrain Cranes up to 45.8 tonnes and 5-axle All Terrain Cranes up to 50 tonnes.

- SPV Level 4 / 12 tonnes per axle: 4-axle All Terrain Cranes up to 48 tonnes and 5-axle All Terrain Cranes up to 50 tonnes.
- SPV Level 6: 5-axle All Terrain Cranes up to 60 tonnes.

The approved routes for SPV Level 6 vehicles travelling within the surrounding area are identified within Figure 12. The figure shows that SPV Level 6 vehicles are typically approved on the surrounding State Road network.

The Project Area can be accessed by the SPV Level 6 approved road network via Hunter Expressway and Wine Country Drive, subject to conditions. It is noted that Old North Road is not rated for use by SPV Level 6 vehicles and will require approval from Council for Project use.

Figure 12: TfNSW SPV Level 6 Approved Roads



Source: NHVR Special Purpose Vehicle Access Map

2.6 Crash History

Amber has conducted a review of the TfNSW Centre for Road Safety Crash and Casualty Statistics database for all recorded crashes within the surrounding area of the Project. The crash database provides the location and severity of all crashes for the five-year period from 2020 to 2024. The review was completed along Wine Country Drive and Old North Road for 1 km in each direction of the Old North Road / Wine Country Drive intersection.

There were no crashes recorded within the survey area in the time period reviewed. As such, it is concluded that the road network is currently operating in a safe manner.

3. Project Description

3.1 The Project

The Project involves the development, construction, operation and decommissioning of a BESS with a maximum capacity of up to 135 MW/540 MWh (4 hours). The Project would consist of the following components:

- Containerised battery units and associated infrastructure, including inverters and medium voltage transformers
- 33kV underground cable connection from the battery units to the Rothbury Zone Substation
- Combined switch room and control room building
- Ring Main Units
- Warehouse
- Operation and maintenance building
- Auxiliary transformer
- Backup diesel generator
- On-site car parking
- Ancillary infrastructure including internal access roads, laydown areas, stormwater management systems, security fencing, lighting and CCTV
- Vehicle access to the site is via the existing crossover to Old North Road

3.2 Construction Information

Construction of the Project is expected to commence in mid-2027 and take approximately 22 months, with the peak construction period expected to take 6 months. Construction activities would be undertaken during standard daytime construction hours as follows:

- Monday to Friday: 7:00am – 6:00pm
- Saturday: 8:00am – 1:00pm
- No work on Sundays or public holidays.

Some construction activities may require work on Sundays or out of hours periods due to electrical outage constraints. Any construction outside of normal working hours would be undertaken with prior approval from relevant authorities and consultation with impacted stakeholders.

A construction workforce of up to 100 personnel would be on-site during the peak construction phase and these staff would be primarily based in Newcastle, the Hunter Region and Sydney.

A Construction Traffic Management Plan (CTMP) would be prepared by the appointed contractor prior to construction commencing as outlined in Section 7 of this report.

4. Traffic Assessment

Traffic generated by the Project can be separated into three distinct stages: construction, operation and decommissioning. The peak traffic generating potential is during construction, which generates trips associated with the workforce accessing the Project and the delivery of raw materials and plant. During operation the Project is expected to generate a lower amount of traffic associated with up to 1-2 full time maintenance personnel accessing the site per week. Decommissioning is anticipated to generate a similar level of traffic to the construction stage.

The following sections provide an assessment of the potential traffic impacts of the Project on the road network function for each of the three stages.

4.1 Pre-Construction Minor Works

It is anticipated that pre-construction minor works would represent up to two vehicles per day, typically associated with surveyors or consultants visiting the site outside peak hours only using light vehicles or small trucks. The existing access into the site via Old North Road is considered appropriate to accommodate pre-construction minor works. Furthermore, there would be no overlap expected between the pre-construction and main construction works.

4.2 Construction Phase

4.2.1 Standard Construction Traffic Generation

Construction traffic generated by the Project on a day-to-day basis can be broadly separated into the categories outlined in Table 6.

Table 6: Standard Construction Traffic

Terminology	Definition	Example Vehicle Image
Light Vehicles	The use of light vehicles will be associated with transporting the workforce to/from the Project. A conservative vehicle occupancy of approximately 1.7 people per car has been adopted to calculate the light vehicle traffic generation noting the workforce would be encouraged to carpool.	
Heavy Vehicles (up to 26 metres long)		
Rigid Trucks	Rigid Trucks will be used to deliver raw materials and smaller plant and have a typical length between 8 and 13 metres.	
Truck and Dog	Truck and Dog vehicles consist of a rigid truck towing either a dog trailer or a pig trailer and are not more than 19 metres in length. A dog trailer is a trailer with axles at either end of the trailer, a pig trailer has the axles centred on the trailer. These vehicles will be utilised to transport the majority materials to/from the site.	

Terminology	Definition	Example Vehicle Image
Semi-trailers	Semi-trailers will be used to transport larger equipment and materials. These vehicles consist of a truck and a single trailer with a total length of 19 metres.	
B-Doubles	B-Doubles will also be used to transport larger plant. B-Doubles consist of a truck with two trailers and have a maximum length of 26 metres.	
Special Purpose Vehicles	A vehicle where the primary purpose for which it was built was <u>not</u> the carriage of goods or passengers (e.g. mobile cranes, concrete pump trucks, drilling rigs). These vehicles are considered Class 1 OSOM vehicles if exceeding mass or dimensional limits.	
OSOM not requiring pilot/escort	Class 1 OSOM vehicles which can operate on the approved network outlined in Section 2.5.2 subject to travel conditions, as well as vehicles built for a purpose other than carrying goods such as a mobile crane, a concrete pump or drill rig which are defined as SPVs and can also operate on the relevant approved networks subject to travel conditions.	

The construction traffic volumes for the Project have been provided by the Applicant. It is anticipated that during peak construction the Project would generate up to 120 light vehicle trips and 70 heavy vehicle trips per day, noting that a vehicle trip represents a trip to or from the site. Table 7 summarises the forecast traffic volumes expected to be generated during the construction period of the Project.

Table 7: Traffic generation during construction period

Vehicle Type		Average Construction Period		Peak Construction Period	
		Vehicle Trips per Day (vpd)	Peak Hour Trips (vph)	Vehicle Trips per Day (vpd)	Peak Hour Trips (vph)
Light Vehicles (LV)		60	30	120	60
Heavy Vehicles (HV)	Rigid Trucks	10	1	20	2
	Truck and Dog	10	1	20	2
	Semi-trailers	8	1	16	2
	B-Doubles	2	0	4	0
	Non-High Risk OSOM	5	0	10	0
	<i>HV Subtotal</i>	35	3	70	6
Total		95	33	190	66

Overall, the Project is expected to generate up to 66 vehicle trips per hour in the morning and evening peak hours during the peak construction period, which would reduce to 33 vehicle trips per hour during the average construction periods.

4.2.2 Non-High Risk OSOM Vehicles

Specialist construction plant, including mobile cranes, concrete pumps, drill rigs and excavators will be required to access the site for loading/unloading and general construction purposes during both construction and decommissioning of the Project. They are considered Class 1 restricted access vehicles if they exceed one or more of the general mass and dimension limits.

Many of these vehicles would not create daily trips to and from the site. It is expected that there will be influxes of arrivals and departures depending on the phase of construction. Once arrived, they would remain until not required, before being removed from the site. These trips would typically be generated outside of peak hours.

The vehicle combinations to transport the battery units are anticipated to be prime movers with 2 by 4 axle dolly and 4 by 4 axle low loader. These combinations would be kept under 3.5 metres width and less than 26 metres length, would not be classified as High Risk, and would comply with the *National Heavy Vehicle Regulator Multi-State Class 1 Load Carrying Vehicle Mass Exemption Notice 2020 Information Sheet*.

These vehicles would access the Project via the approved road network using Wine Country Drive and Old North Road as outlined at Section 2.5, noting that Old North Road is not rated for use by OSOM vehicles and will require approval from Council for Project use.

Vehicle types and any necessary permits would be confirmed and obtained (as needed) once the construction methodology is determined.

4.2.3 High Risk OSOM Vehicles

OSOM vehicles exceeding the Class 1 criteria for length, height, rear overhang, forward projection, width or total combination weight may be considered high risk. These vehicles are subject to separate permit applications and regulations, including use of a vehicle escort.

There are no High Risk OSOM vehicles anticipated for the construction of the Project within the scope of this TIA. The largest vehicle expected to access the site is the battery container vehicle. As outlined above, these vehicles would be classed as OSOM and are not considered high risk.

4.2.4 Traffic Distribution

Vehicles accessing the site via Old North Road would do so using the intersection with Wine Country Drive, which forms part of the State road network.

It is anticipated that the majority of the workforce for the construction of the Project would be located in Newcastle, the Hunter Region and Sydney. Materials and equipment will generally be sourced from the surrounding area where practicable, with larger plant expected to be delivered from Port of Newcastle or Port Botany.

During the morning peak the majority of vehicle trips would be toward the site and in the evening peak the majority of vehicle trips would be away from the site. Further purpose of the traffic modelling it has been assumed that all light vehicles travel towards the site in the morning peak and away from the site in the evening peak.

Heavy vehicle trips would be distributed throughout the day and would be split evenly between inbound and outbound trips.

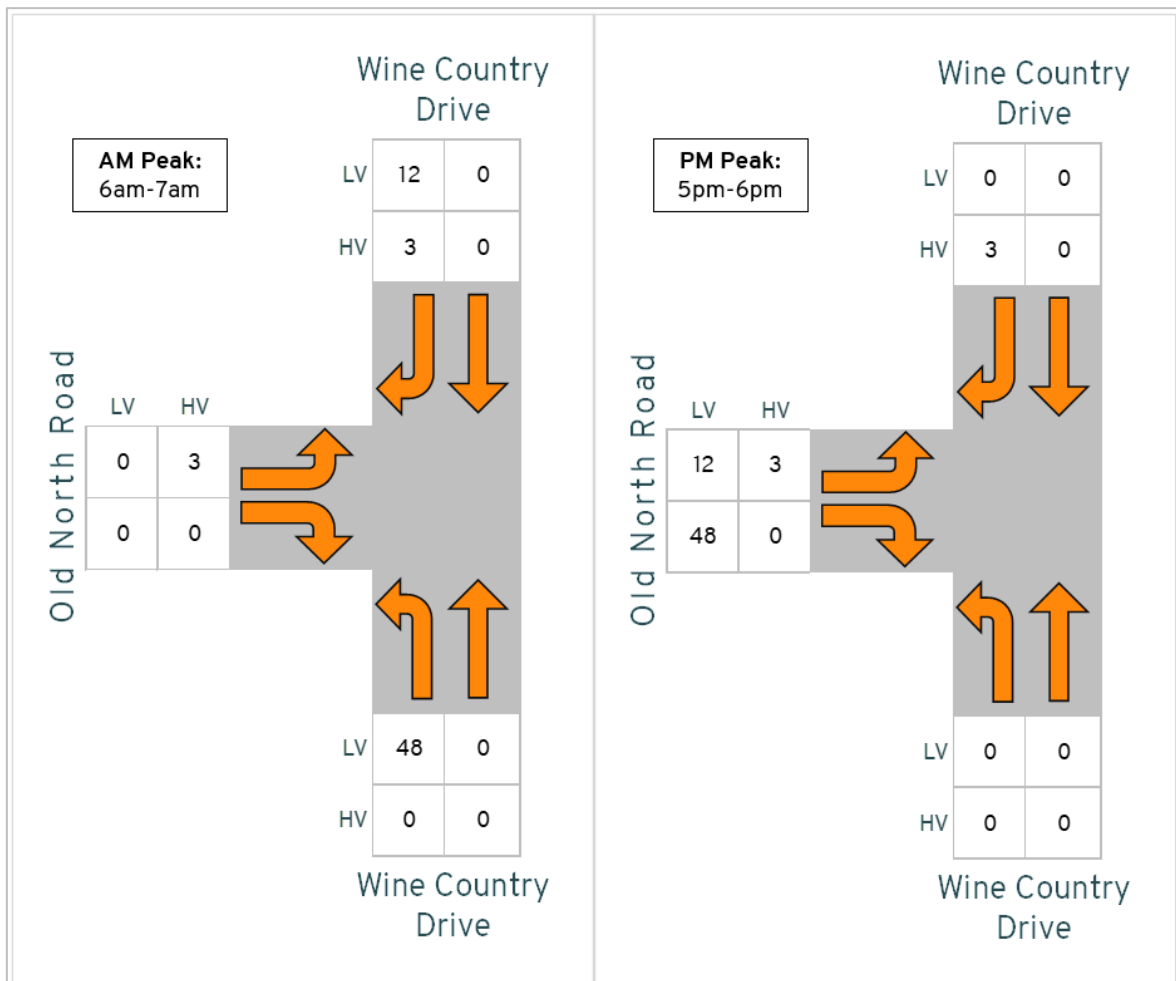
The following provides a breakdown of the anticipated distribution for each of the vehicle classifications outlined within Table 7.

- **Light Vehicles:** 20% via the north and 80% via the south
- **Heavy Vehicles:** 90% via the north and 10% via the south
- **Heavy Vehicles delivering plant/components:** 100% via the north

The peak hour for construction traffic would occur at the start and end of the day when workers travel to/from the site. Most workers would typically arrive on-site between 6:00am and 7:00am and depart between 5:00pm and 7:00pm. Workers generally have staggered finish times which results in the evening peak hour being less pronounced, however, for the purposes of this assessment it is conservatively assumed that the evening peak hour Project traffic is the same as the morning peak, and the evening peak hour occurs between 5:00pm to 6:00pm.

The peak hour construction volumes generated by the Project at the intersection of Old North Road / Wine Country Drive are shown in Figure 13.

Figure 13: Peak Hour Construction Traffic – Old North Road / Wine Country Drive Intersection



4.2.5 Cumulative Traffic Impacts

The primary traffic impact of the Project is generated during construction, which is anticipated to commence in mid-2027 and take approximately 22 months.

To gain an appreciation of other potential traffic generating activities in the locality that may result in cumulative traffic impacts, a review of projects within the Cessnock City Council LGA listed on the DPHI major projects website was undertaken. A search was also completed of the Cessnock City Council Application Tracker for Development Applications within 1 km of the Project on 7 January 2026.

The search identified a number of projects occurring in the locality. A summary of the key major projects that are proposed in the surrounding area are identified in Table 8. The projects highlighted in the table have the potential to generate additional traffic along Wine Country Drive in the vicinity of the Project during the construction period.

Table 8: Assessment of Cumulative Impacts of Nearby Developments

Project	Description	Potential Vehicle Conflict
Sunshine Estate BESS (Prepare EIS)	Construction, operation and decommissioning of a 120 MW / 480 MWh BESS and associated infrastructure	There is no publicly available information in regard to traffic volumes or construction timeframes. There is potential for construction of both projects to overlap. It is expected that the majority of vehicles for the project would travel to/from the north via Hunter Expressway, with minimal traffic travelling through the Old North Road / Wine Country Drive intersection.
Huntlee New Town Stage 1 Mod 25 (Prepare Mod Report)	Expansion and realignment of project boundary and subdivided lots. Construction of Stage 1 currently underway, 4.2 km northeast of the site	There is no publicly available information in regard to traffic volumes or construction timeframes. There is potential for construction of both projects to overlap. The majority of the workforce are anticipated to travel from the north via the Hunter Expressway and therefore it is unlikely that construction vehicles would pass the site on Wine Country Drive.
Huntlee Arcare Seniors Housing (Approved 2025)	Construction of a 1-2 storey residential care facility. Construction anticipated to commence in 2026, 5.0 km northeast of the site	There is potential for construction of both projects to overlap. The majority of the of workforce are anticipated to travel from the north via the Hunter Expressway and therefore it is unlikely that construction vehicles would pass the site on Wine Country Drive.
Huntlee New Town Stage 2 (Assessment)	A Concept Master plan for Stage 2 Development of a subdivision including residential and commercial lots, located approximately 4.8 km north of the site	Development is expected to commence in 2026. There is potential for construction of both projects to overlap. The majority of the of workforce are anticipated to travel from the north via the Hunter Expressway and therefore it is unlikely that construction vehicles would pass the site on Wine Country Drive.
Cedar Mill Hunter Valley (Prepare EIS)	The Cedar Mill proposal comprises of museum, convention and tourism clusters 6.8 km south of the site	Unknown construction timeline. There is potential for construction for both projects to overlap. Both projects are anticipated to have a workforce located in the greater Newcastle region.

Table 8 indicates that a number of projects are expected to generate additional vehicle movements on Wine Country Drive. The majority of these movements would be to the north and are not expected to pass the site.

Overall, the vehicle movements of nearby projects would be distributed on the surrounding road network and are expected to have a minimal cumulative impact on the operation of Wine Country Drive and Old North Road. It should be noted that all approved projects listed above currently do not provide detailed information on construction timelines and as such, there is a risk of conflicting peak construction periods.

4.2.6 Turn Treatment Assessment

Austrroads Guide to Traffic Management Part 6: Intersections, Interchanges, and Crossings specifies the turning treatments required at intersections. An assessment has been undertaken for the intersection of Old North Road / Wine Country Drive in order to ensure vehicles are able to safely leave the State Road network. To confirm that a worst-case scenario is tested, the construction peak hours and road network peak hours have both been assessed.

The assessments have been completed based on a design speed of 90km/hr for Wine Country Drive (i.e. posted speed limit of 80km/hr plus 10km/hr). Figure 3.25 of the guide specifies the required turn treatments on the major road at unsignalised intersections for a design speed of 70-100km/h, which has been adopted for the following assessment.

4.2.6.1 Construction Peak Hour Assessment

The expected traffic volumes at the Old North Road / Wine Country Drive intersection for the morning peak hour (6:00am-7:00am) and evening peak hour (5:00pm-6:00pm) during the peak construction period are provided in Figure 14. These volumes include Project traffic and background traffic growth, noting that there are no cumulative traffic impacts from nearby projects as outlined in Section 4.2.5.

Figure 14: Peak Construction Traffic Volumes

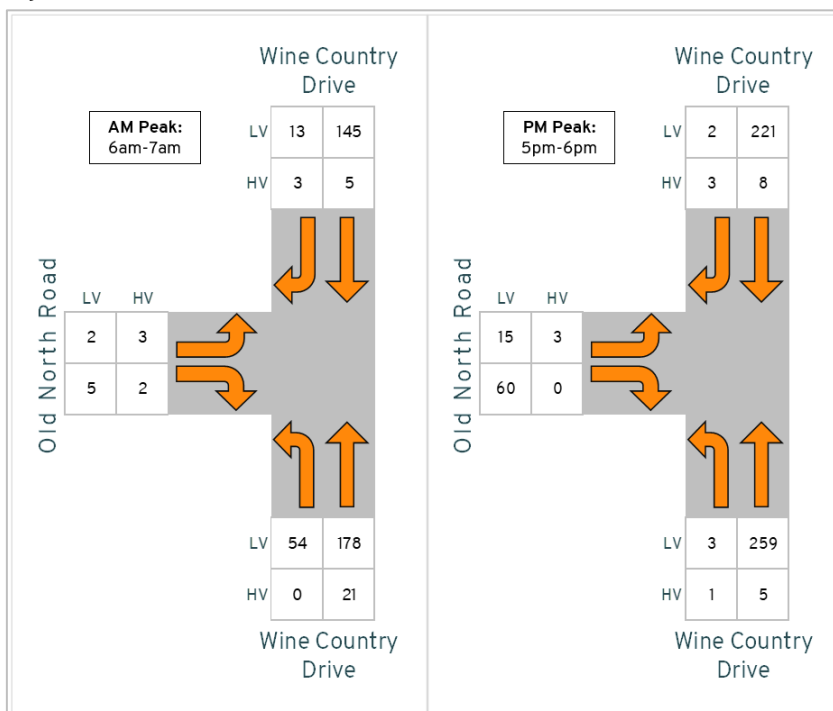
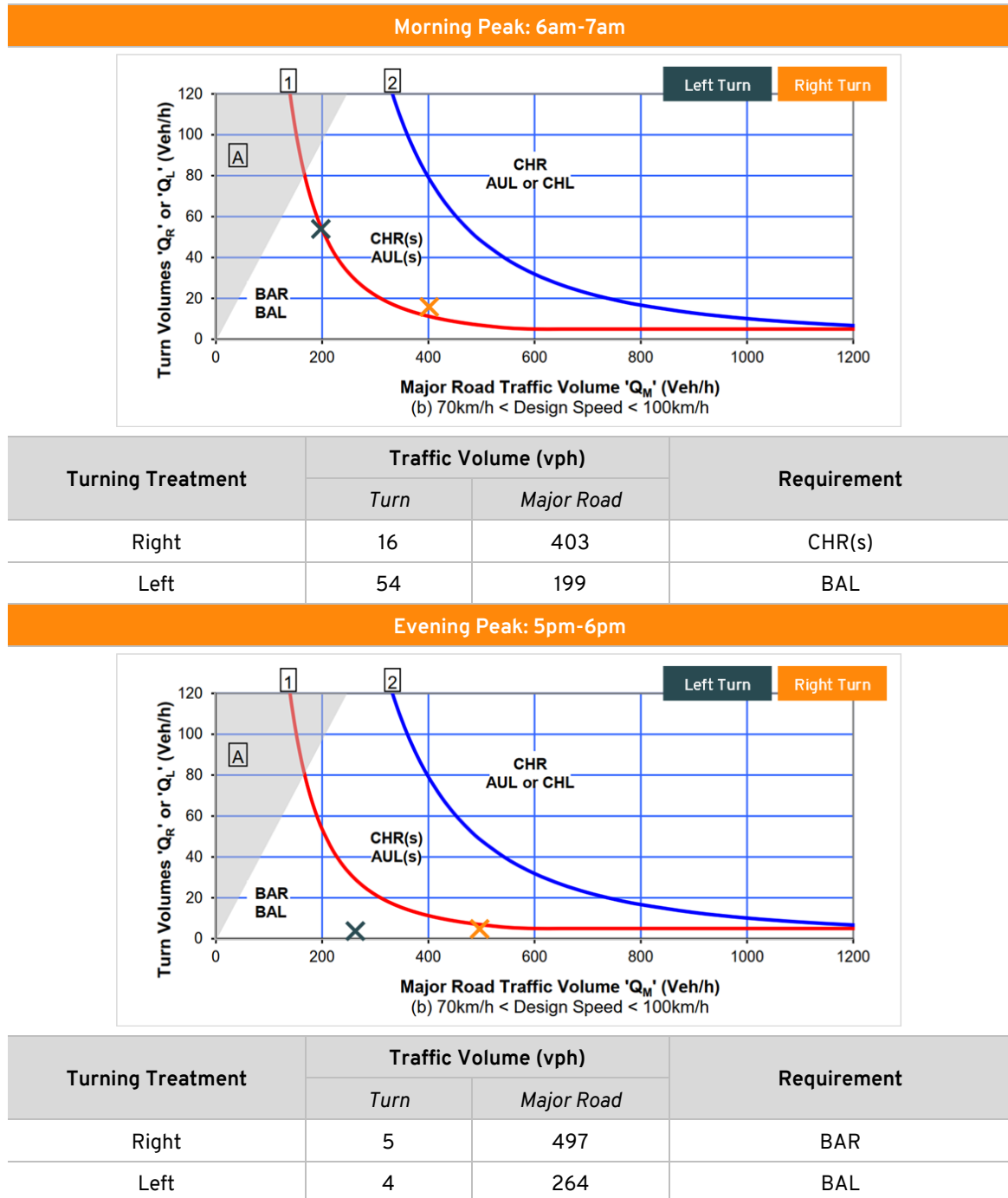


Figure 15 identifies the required turning treatments based on the expected traffic volumes at the intersection as shown at Figure 14.

Figure 15: Turn Treatment Assessment Results – Construction Peak Hours



Based on the above, the intersection would require a Short Channelised Right Turn (CHR(s)) and a Basic Left Turn (BAL) treatment to meet the requirements of the Austroads Guide. It is acknowledged that during the morning peak hour the left turn treatment is on the cusp of a Short Auxiliary Left Turn (AUL(s)) treatment and BAL. It is considered appropriate to provide the lower level treatment (BAL) given that light vehicles may approach the site from both the north and south on Wine Country Drive dependant on the final workforce locations. Additionally, the construction volumes are temporary only and the Project would not create on-going traffic through the intersection during operation.

4.2.6.2 Road Network Peak Hour Assessment

In order to confirm the suitability of the turn treatment, an assessment has also been undertaken for the road network peak hours. During these times the Project traffic would be associated with heavy vehicles only as all staff would be on-site. Heavy vehicles would be up to six vehicle trips per hour and split between entry and exit movements. The traffic volumes during the road network peak hours are provided in Figure 16 which include Project traffic, background traffic growth, and cumulative impacts of nearby projects.

Figure 16: Road Network Peak Hour Traffic Volumes

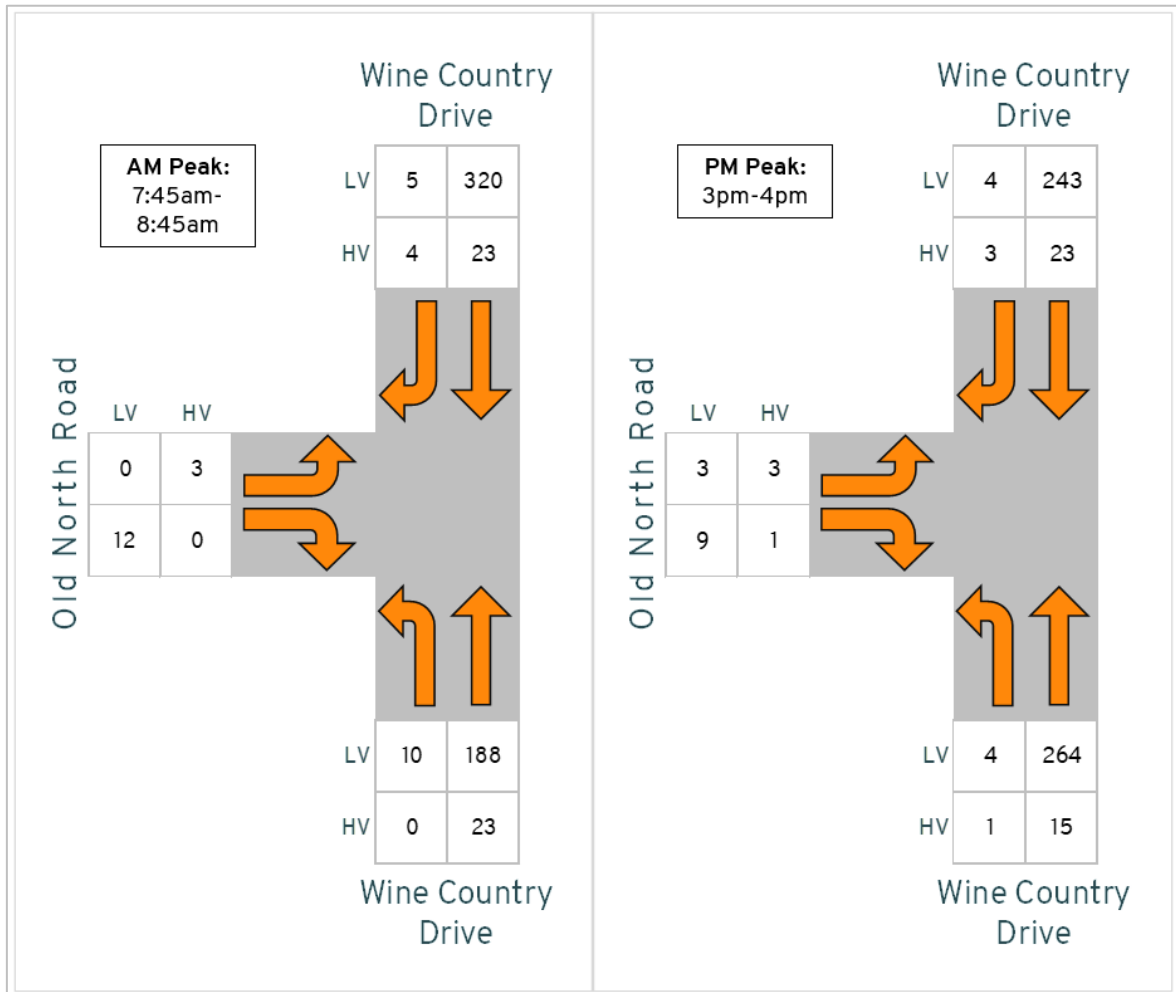
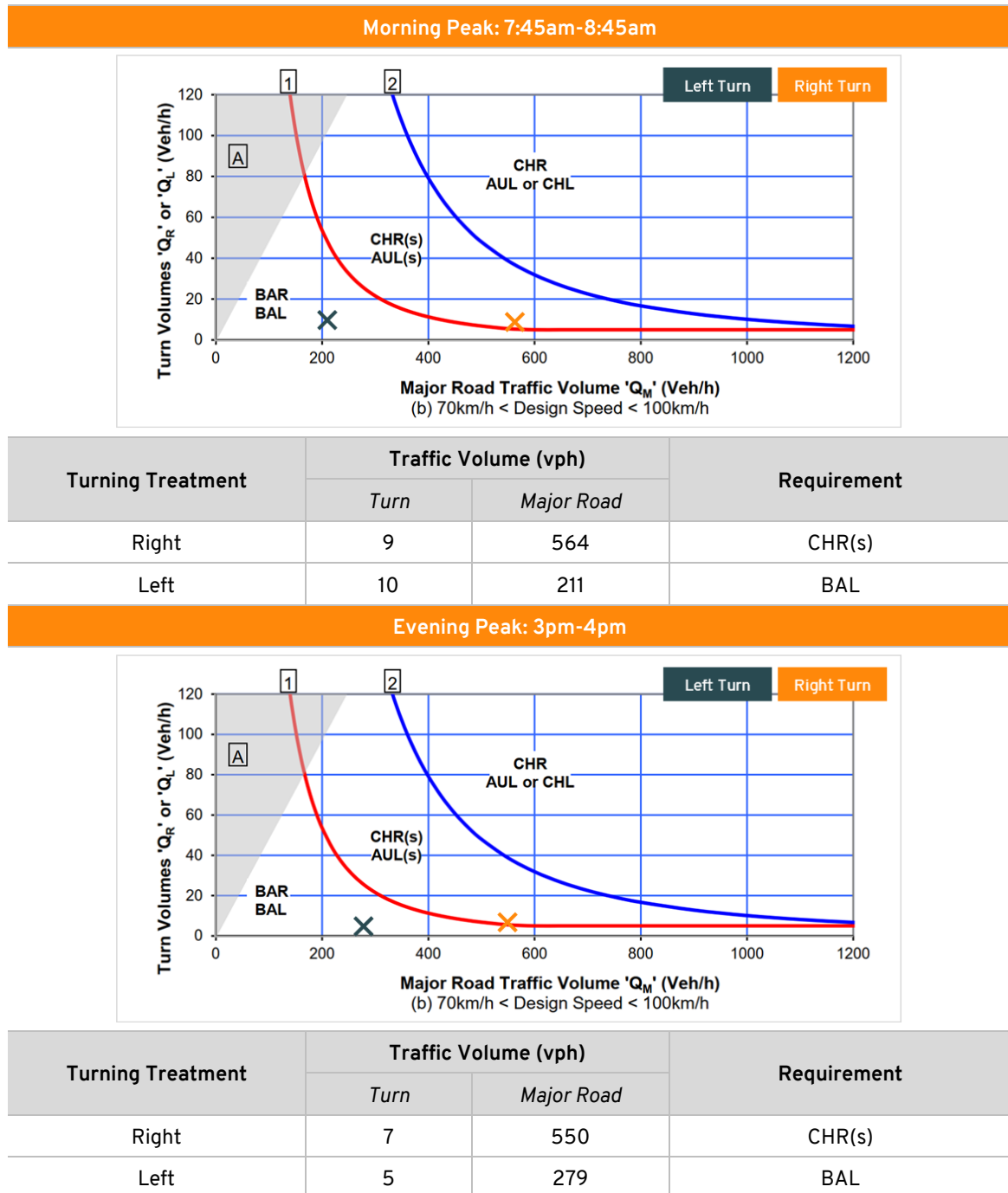


Figure 17 identifies the required turning treatments based on the expected traffic volumes at the intersection as shown at Figure 16.

Based on the turn treatment assessment presented at Figure 17, the provision of a BAL and a CHR(s) treatment at the intersection is considered suitable during the road network peak hours.

Figure 17: Turn Treatment Assessment Results – Road Network Peak Hours



4.2.7 Traffic Assessment

In order to determine the ability of the road network to accommodate the traffic expected to be generated during peak construction periods, a traffic modelling exercise has been undertaken for the intersection of Old North Road / Wine Country Drive using SIDRA intersection modelling software.

Level of Service (LOS) is a qualitative measure used to describe the operating conditions of a section of road or an intersection. LOS are designated from A (free flow conditions) to F (forced flow with stop start operation, long queues and delays) and represent the perception of the road conditions by motorists. This includes factors such as speed and travel time, freedom to manoeuvre, traffic interruptions, comfort and convenience, and safety.

The best indicator of the LOS at an intersection is the average delay experienced by vehicles at that intersection. For priority controlled intersections, the average delay of the critical movement should be taken.

Given the proximity of the intersection with the intersection of Blackburn Close / Wine Country Drive, the intersections have been modelled as a network to determine if there are any queuing impacts between the intersections.

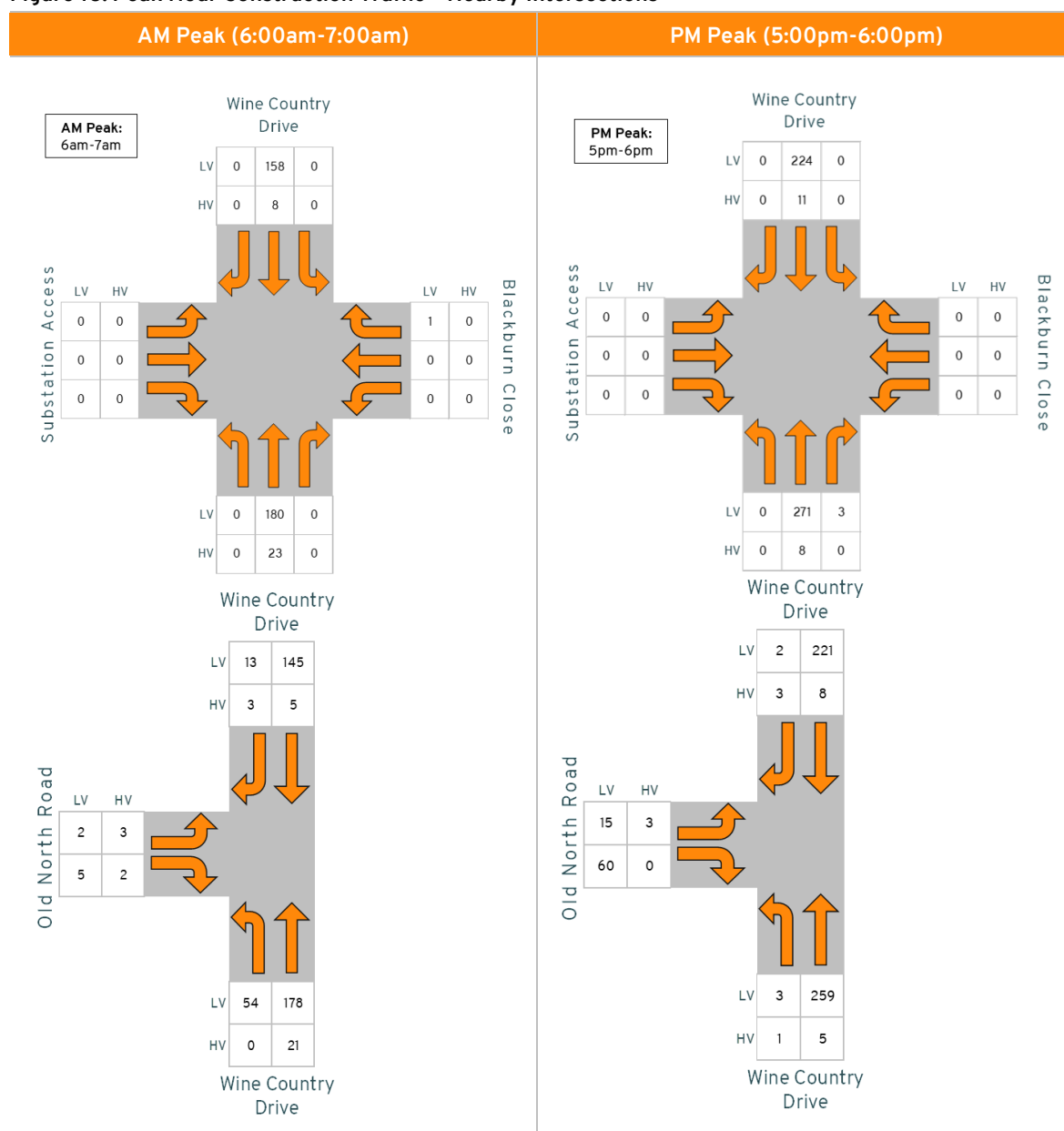
The modelled traffic volumes at the intersections have been based on the morning and evening peak hour of construction (i.e. 6:00am-7:00am and 5:00pm-6:00pm). The traffic volumes utilised for the assessment is the total of the following:

- Existing surveyed traffic volumes presented within Appendix B adjusted by a 1.5% compounded annual growth rate over two years to reflect the peak construction period.
- The peak construction traffic volumes of the Project as presented at Figure 13.

As outlined in Section 4.2.5, there is not anticipated to be any cumulative traffic volumes from nearby projects through this intersection.

The modelled traffic volumes are presented at Figure 18.

Figure 18: Peak Hour Construction Traffic – Nearby Intersections



The results of the SIDRA analysis for the morning and evening peak hours during the peak construction periods are provided within Appendix C and summarised in Table 9 and Table 10.

Table 9: Summary of SIDRA Results – Old North Road / Wine Country Drive

Approach / Movement		Morning Peak Hour				Evening Peak Hour			
		Degree of Saturation	Average Delay (sec)	95% Queue (m)	Level of Service	Degree of Saturation	Average Delay (sec)	95% Queue (m)	Level of Service
Old North Road / Wine Country Drive									
Wine Country Drive (South)	Left	0.145	7.0	0.0	A	0.147	7.4	0.0	A
	Through	0.145	0.0	0.0	A	0.147	0.0	0.0	A
Wine Country Drive (North)	Through	0.083	0.0	0.0	A	0.126	0.0	0.0	A
	Right	0.014	7.1	0.5	A	0.005	7.6	0.2	A
Old North Road (West)	Left	0.018	6.3	0.6	A	0.117	5.9	3.3	A
	Right	0.018	8.6	0.6	A	0.117	8.5	3.3	A
All Vehicles		0.145	1.4	0.6	A	0.147	1.2	3.3	A



Table 10: Summary of SIDRA Results – Blackburn Close / Wine Country Drive

Approach / Movement		Morning Peak Hour				Evening Peak Hour			
		Degree of Saturation	Average Delay (sec)	95% Queue (m)	Level of Service	Degree of Saturation	Average Delay (sec)	95% Queue (m)	Level of Service
Blackburn Close / Wine Country Drive									
Wine Country Drive (South)	Left	0.118	6.4	0.0	A	0.154	6.4	0.0	A
	Through	0.118	0.0	0.0	A	0.154	0.0	0.0	A
	Right	0.001	6.5	0.0	A	0.002	6.7	0.1	A
Blackburn Close (East)	Left	0.004	5.1	0.1	A	0.005	5.3	0.1	A
	Through	0.004	6.9	0.1	A	0.005	8.3	0.1	A
	Right	0.004	7.7	0.1	A	0.005	9.5	0.1	A
Wine Country Drive (North)	Left	0.094	7.0	0.1	A	0.132	7.0	0.1	A
	Through	0.094	0.0	0.1	A	0.132	0.0	0.1	A
	Right	0.094	6.7	0.1	A	0.132	6.8	0.1	A
Substation Access (West)	Left	0.004	0.6	0.1	A	0.005	0.9	0.1	A
	Through	0.004	2.6	0.1	A	0.005	4.0	0.1	A
	Right	0.004	3.4	0.1	A	0.005	5.2	0.1	A
All Vehicles		0.118	0.1	0.1	A	0.154	0.1	0.1	A



The SIDRA analysis indicates the following:

- The intersections of Old North Road / Wine Country Drive and Blackburn Close / Wine Country Drive are expected to operate with negligible queue lengths on all legs.
- The overall average delay is less than two seconds during the peak hours.
- The intersections are expected to operate with a good LOS (LOS A) during the peak construction period during each of the peak hours.

Accordingly, the intersections are expected to operate efficiently with negligible queuing and delays during the peak construction period.

4.2.8 Summary

The SIDRA analysis indicates that the intersections are expected to operate efficiently with negligible queuing and delays during the peak construction period. Accordingly, the road network is expected to readily accommodate the traffic generated by the Project during the peak construction period.

4.3 Operational Phase

During operation, the Project is expected to generate a minimal level of traffic associated with maintenance and operation services. The Project is expected to be operated by up to 1-2 maintenance personnel and occasional deliveries resulting in a traffic generation of up to four vehicle movements per week, which would result in a negligible change to the traffic environment. There would also be occasional heavy vehicles delivering to the site, but only as required for maintenance.

4.4 Decommissioning Phase

At the end of the operational life of the Project all above ground infrastructure would be dismantled and removed from the site. Traffic generation during decommissioning would be similar to traffic generation during the average construction period. A Decommissioning Traffic Management Plan would be prepared prior to the decommissioning phase in conjunction with the relevant road authorities. This would aim to ensure adequate road safety and road network operations are maintained.

5. Route Assessment

5.1 Plant Delivery – Heavy Vehicles

5.1.1 Access Routes

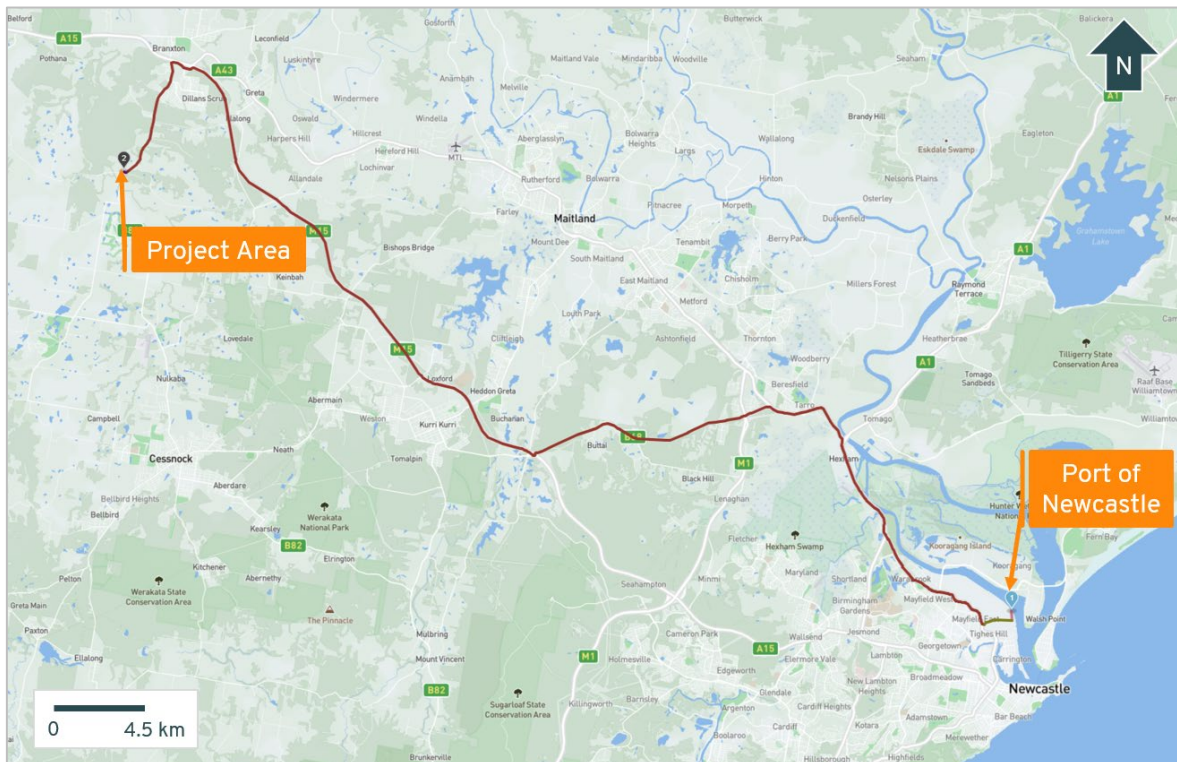
All plant is expected to be delivered from Port of Newcastle or Port Botany. This section provides a review of the proposed access routes for heavy vehicles travelling from the ports. The proposed access routes are outlined in Figure 19 and Figure 20, with a summary of the relevant roads provided in Table 11.

The access routes primarily utilise roads that are designated for B-Double vehicles as outlined within the NHVR RAV Map and subsequently vehicles up to a 26 metre B-Double are able to readily access the site from each port.

It is noted that Old North Road is not rated for use by B-Double vehicles and will require approval from Council for Project use. Signage indicates that Old North Road is restricted to a gross load limit of 25 tonnes, which is understood to be related to the creek crossing approximately 500 metres west of Wine Country Drive. It is noted that heavy vehicles associated with the Project are not proposed to travel across this creek crossing.

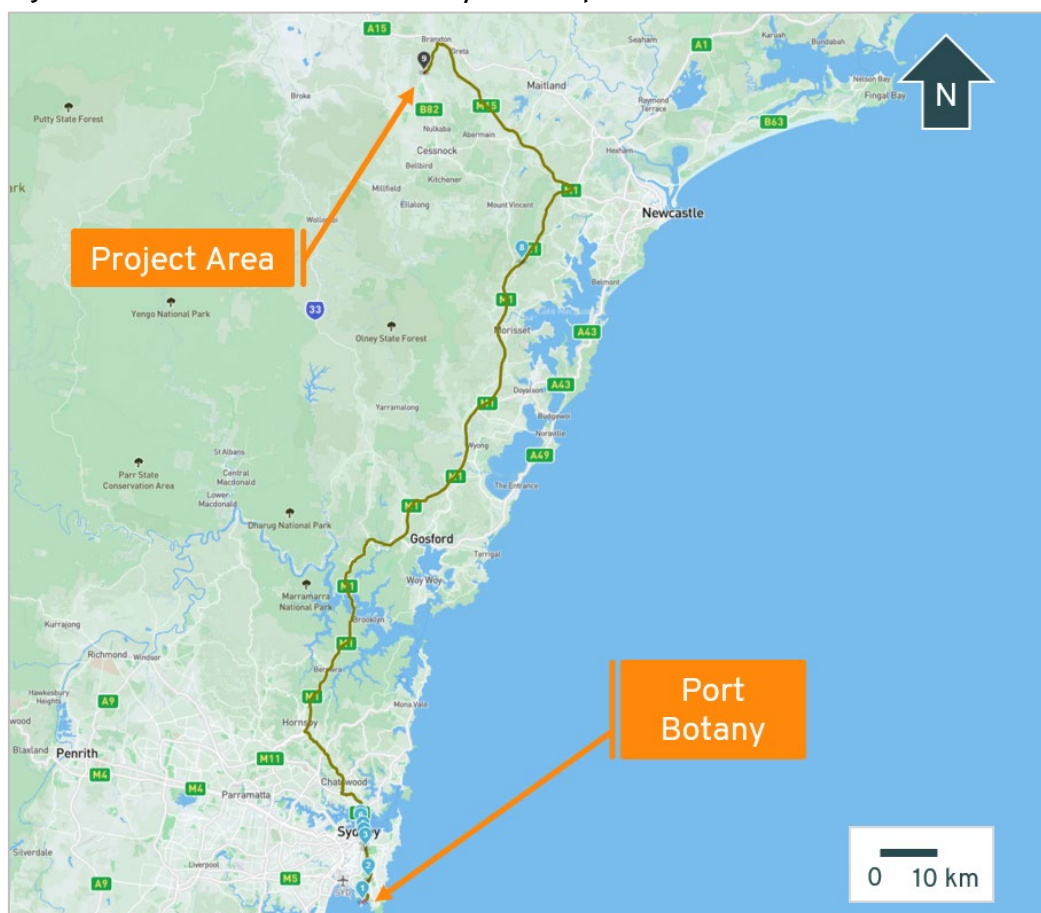
There are conditions on the Eastern Distributor and Sydney Harbour Tunnel for the Port Botany route that has a height restriction of 4.3 metres and that dangerous goods are not permitted. Accordingly, heavy vehicles with loads higher than 4.3 metres would be required to take an alternative route out of Port Botany to the west as shown in Figure 21. This route is the same as the route shown in Figure 20 once accessing the Pacific Motorway in Wahroonga.

Figure 19: Access Route from Port of Newcastle



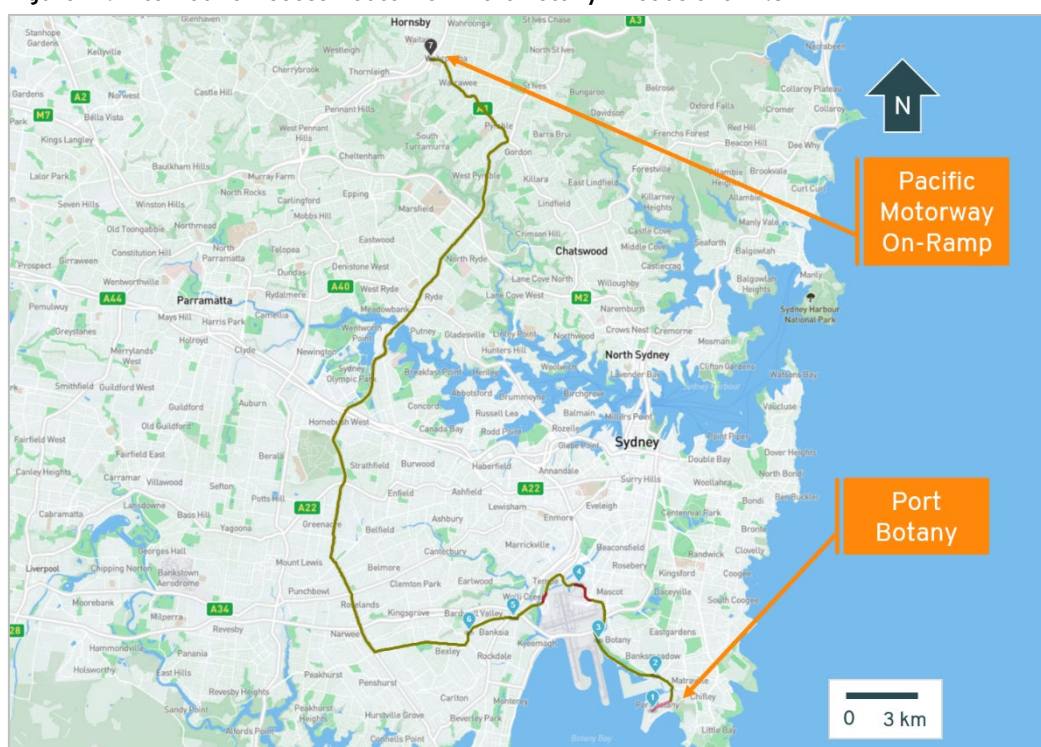
Source: NHVR Route Planner – Route ID: 20SIN-6 v1

Figure 20: Access Route from Port Botany - Loads up to 4.3m



Source: NHVR Route Planner - Route ID: 2P5MP-2 v1

Figure 21: Alternative Access Route from Port Botany - Loads over 4.3m



Source: NHVR Route Planner - Route ID: 2PLFA-3 v1

Table 11: 26 m B-Double Vehicle Routes - Access Roads

Road Name	State	Jurisdiction	B-Double Approved
Route from Port of Newcastle			
Selwyn Street	New South Wales	City of Newcastle	Approved
George Street		TfNSW	
Industrial Drive (A43)			
Pacific Highway/Maitland Road (A43)			
New England Highway (A1)			
John Renshaw Drive (A1)			
Hunter Expressway (M15)			
Wine Country Drive (B82)		Cessnock City Council	Unrated
Old North Road			
Route from Port Botany			
Friendship Road	New South Wales	Randwick City Council	Approved
Bumborah Point Road		TfNSW	
Botany Road			
Beauchamp Road			
Denison Street			
Wentworth Avenue			
Bunnerong Road			
Anzac Parade			
Eastern Distributor (M1)			Approved with conditions
Sydney Harbour Tunnel (M1)			
Warringah Freeway (M1)		Approved	
Gore Hill Freeway (M1)			
Pacific Highway (A1)			
Pacific Motorway (M11)			
Hunter Expressway (M15)			
Wine Country Drive (B82)			
Old North Road	Cessnock City Council	Unrated	

5.2 Plant Delivery – OSOM Vehicles

OSOM vehicles expected to access the site can be separated into the following categories:

- The vehicle combinations to transport the battery units which are anticipated to be a prime mover with 2 by 4 axle dolly and 4 by 4 axle low loader. These combinations would be kept under 3.5 metres width and less than 26 metres length and would not be classified as High Risk. However, these vehicles would likely be considered OSOM due to the mass of the load.
- The control and switch room components are anticipated to arrive in parts and be assembled on-site. These components are anticipated to be transported by a vehicle similar to the battery container vehicle or other OSOM vehicle classified as Class 1.

There are no high-risk OSOM vehicles anticipated during the construction of the Project. The largest vehicle expected to access the site is the battery container vehicle outlined above.

The OSOM vehicles would comply with the *National Heavy Vehicle Regulator Multi-State Class 1 Load Carrying Vehicle Mass Exemption Notice 2020 Information Sheet*. The vehicle types and any necessary permits would be confirmed and obtained from NHVR (as needed) once the construction methodology is determined.

5.2.1 OSOM Access Routes

The battery and control/switchroom components are expected to be delivered from Port of Newcastle or Port Botany. The following sections provide a review of the proposed access routes for Class 1 OSOM vehicles travelling from each of the ports.

5.2.1.1 Port of Newcastle

The OSOM vehicle from Port of Newcastle is proposed to utilise the route outlined within Figure 19, which adopts approved routes within the NSW Oversize Overmass Load Carrying Vehicles Network Map. Travel conditions are in effect on a number of roads on the route mostly associated with other major projects and time of travel. All roads with travel conditions are managed by TfNSW and are detailed in Table 12.

Table 12: Roads with Restrictions or Conditions on Class 1 OSOM Vehicle Routes

Road Name	Location	Restrictions or Conditions of Travel
Route from Newcastle		
Maitland Road	Between Sparke Street and Pacific Motorway	Approved with Conditions: Prior to travel on the Pacific Highway at Hexham, the operator must contact the Hexham Straight Widening Project on 1800 515 141 a minimum of five (5) days prior to your proposed commencement date. Failure to provide notice may result in delays to travel. Prior to travel on the Pacific Highway, New England Highway and Pacific Motorway between Tomago, Tarro and Lenaghan, the operator must contact the Black Hill to Tomago Project on 1800 094 895 a minimum of five (5) days prior to your proposed commencement date. Failure to provide notice may result in delays to travel.
New England Highway		
John Renshaw Drive		

Road Name	Location	Restrictions or Conditions of Travel
Hunter Expressway	Between John Renshaw Drive and Wine Country Drive	Approved with Conditions: Vehicles or combinations exceeding 3.2 metres wide are not permitted to travel from Monday to Friday from 5:00am to 9:00am and from Monday to Friday from 4:00pm to 6:00pm (except on state-wide public holidays).

5.2.1.2 Port Botany

The OSOM vehicle from Port Botany is proposed to generally utilise the route outlined within Figure 20, which adopts approved routes within the NSW Oversize Overmass Load Carrying Vehicles Network Map. Travel conditions are in effect on a number of roads on the route mostly associated with dimension limits and time of travel. All roads with travel conditions are managed by TfNSW and are detailed in Table 13.

Table 13: Roads with Restrictions or Conditions on Class 1 OSOM Vehicle Routes

Road Name	Location	Restrictions or Conditions of Travel
Route from Sydney		
Eastern Distributor	Between Moore Park Road and Pacific Highway	Restricted: Dimension limits: - Width: 2.5m - Height: 4.3m - Length: 19.0m If your vehicle exceeds the above dimensions you must apply for a Class 1 permit before you commence your journey.
Sydney Harbour Tunnel		
Pacific Highway	Between Epping Road and Pacific Motorway	Approved with Conditions: Vehicles or combinations exceeding 3.5 metres wide or 25 metres long are not permitted to travel between 8:30am and sunset on weekends and state-wide public holidays.
Pacific Motorway	Hawkesbury River Bridge and Central Coast Highway	Approved with Conditions: - Vehicles or combinations exceeding 3.5 metres wide or 25.0 metres long are not permitted to travel between sunrise and 9:00am and between 4:00pm and sunset on weekdays (except state-wide public holidays). - Travel is not permitted after 4.00pm on Sundays or state-wide public holidays.
Hunter Expressway	Between Pacific Motorway and Wine Country Drive	Approved with Conditions: Vehicles or combinations exceeding 3.2 metres wide are not permitted to travel from Monday to Friday from 5:00am to 9:00am and from Monday to Friday from 4:00pm to 6:00pm (except on state-wide public holidays).

5.2.1.3 Summary

The conditions for the OSOM access routes from Port of Newcastle and Port Botany to the site are not expected to impact the Project and can be suitably navigated as part of the NHVR permit application process.

5.3 Local Road Upgrades

The proposed access route for general construction traffic utilises Old North Road via Wine Country Drive. As outlined in Section 2.2, Old North Road has a carriageway width of approximately 6 metres adjacent to the site.

The *Austroads Guide to Road Design Part 3: Geometric Design* states the following in relation to rural road widths:

'The desirable lane width on rural roads is 3.5 m. This width allows large vehicles to pass or overtake without either vehicle having to move sideways towards the outer edge of the lane. The lane width and the road surface condition have a substantial influence on the safety and comfort of users of the roadway.'

The sealed width of Old North Road may require widening between Wine Country Drive and the site access to allow two heavy vehicles to pass. The design of any road widening on Old North Road would be undertaken in consultation with Council and in accordance with Council's Standard Drawings, or as otherwise agreed.

5.4 Mitigation Measures

A CTMP is to be developed which is recommended to include the following measures to minimise the impact of construction traffic:

- Community notifications will be undertaken where required. Neighbouring properties are to be notified regarding the timing of major deliveries which may require additional traffic control or disrupt access.

It is recommended that any OSOM movements are timed so they do not coincide with other OSOM vehicles within the surrounding area to limit the impact to the road network, which can be undertaken as part of the permit application process. Accordingly, it is concluded that the proposed routes are suitable for use by heavy vehicles and OSOM vehicles associated with the Project, with permits to be applied for as part of the finalisation of the CTMP.

6. Intersection Assessment

Vehicle access to the site is proposed via the existing crossover to Old North Road approximately 60 metres west of Wine Country Drive. Accordingly, all vehicles associated with the construction of the Project would travel through the Old North Road / Wine Country Drive intersection.

6.1 Intersection Design

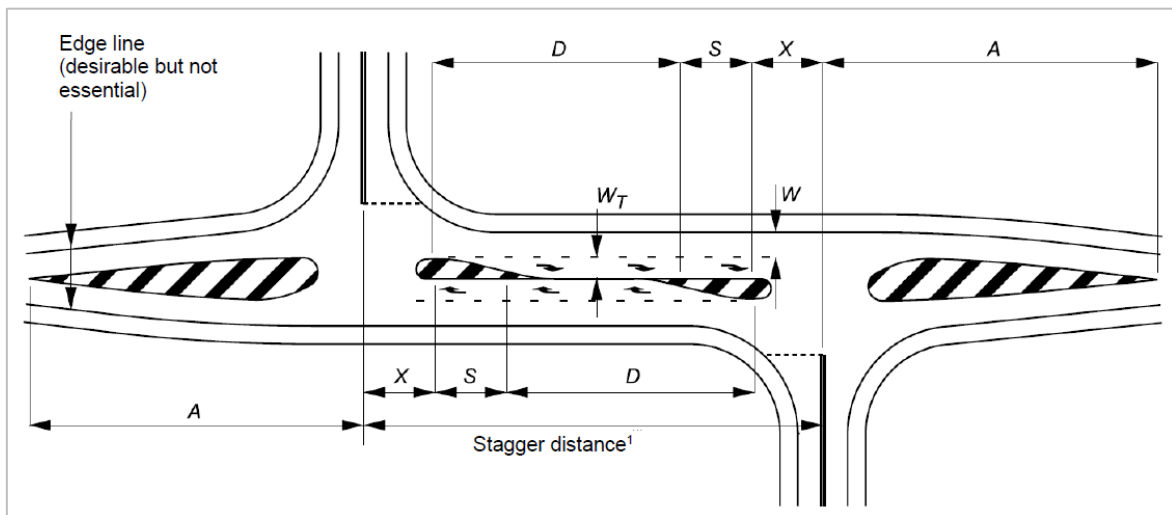
As determined in Section 4.2.6, the intersection of Old North Road / Wine Country Drive requires a BAL and CHR(s) turn treatment based on the estimated peak construction traffic volumes. There is a BAL provided at the intersection under existing conditions, however, if a CHR(s) were to be provided based on the design requirements of Section 7.2.3 of *Austroads Guide to Road Design Part 4A*, the turn treatment would extend to Blackburn Close as the intersections are separated by approximately 140 metres (centre to centre).

Due to the proximity of the intersections, an option could be to provide a rural left-right staggered T-intersection in accordance with Section 7.2.5 of *Austroads Guide to Road Design Part 4A*, which states the following:

'This layout may be suitable in situations where two existing minor roads are located relatively close to each other, or where constraints exist on both ends of the treatment which prevent it extending further along the major road.'

Figure 7.4 of the *Austroads Guide* shows an example of this design, which is reproduced in Figure 22 below. As shown in the figure, this type of turn treatment requires a relatively wide pavement area for the overlapping turns, and large islands at each end to shelter turning vehicles from both directions.

Figure 22: Rural left-right staggered T-Intersection



Source: *Austroads Guide to Road Design Part 4A*

Ausgrid will investigate the intersection of Wine Country Drive/Old North Road upgrade in discussion with Cessnock Council and TfNSW to understand the surrounding developments in the Rothbury area and how this may influence the scope. Once this has been determined, Ausgrid will seek the necessary approvals for the required works from the relevant authorities.

Any future design of the Old North Road / Wine Country Drive intersection should be based on a 26 m B-Double as the design vehicle, which has similar dimensions and manoeuvrability to the anticipated battery container vehicle. The intersection should be designed to confirm that simultaneous movements can occur by two 26 m B-Doubles.

It is considered that a rural left-right staggered T-intersection would allow the intersection to accommodate the vehicles expected to access the site during the construction phase of the Project, subject to detailed design which would be developed in consultation with TfNSW.

6.2 Site Access Design

It is proposed to use the existing site access off Old North Road to access the site. A swept path assessment has been completed for the site access using a 26 m B-Double which is attached at Appendix D. The assessment found that 26 m B-Doubles can enter and exit the site, however, simultaneous two-way passing cannot occur by these vehicles.

Given the low number of vehicles using Old North Road under existing conditions (less than 30 vehicles in the peak hours), that these larger vehicles will be limited to the construction phase of the Project only, and the low number of these vehicles accessing the site during the peak construction phase (up to seven B-Double/battery container vehicles per day), it is considered appropriate to manage heavy vehicle movements using traffic management measures rather than widening the crossover.

Heavy vehicles would be required to contact the site manager via radio to ensure there are no other heavy vehicles accessing the site at the same time. This is an acceptable outcome given the low level of heavy vehicle movements during the peak construction phase and that exiting vehicles have good sightlines to vehicles on Old North Road.

The details of the traffic management measures would be addressed within the CTMP for the Project, with a discussion provided at Section 7 of this report.

6.3 Sight Distance Assessment

Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections specifies the Safe Intersection Sight Distance (SISD) as the minimum sight distance which should be provided along the major road at any intersection. Table 3.1 of the guide specifies the SISD required for various design speeds. Given Wine Country Drive and Old North Road have a speed limit of 80km/hr³, a design speed of 90km/hr has been adopted.

A reaction time of 1.5 seconds has been adopted for the SISD assessment. This aligns with the *TfNSW Supplement to Austroads Guide to Road Design Part 3*, which specifies that a reaction time of 1.5 seconds is appropriate for design speed up to 90km/hr.

Based on the above, the intersection and site access require an SISD of 201 metres. The available sight distances at the intersection and site access are summarised in Table 14 and shown in Figure 23, with SISD drawings provided at Appendix E.

³ Speed limit on Wine Country Drive past the site has recently reduced to 80km/hr (October 2025).

Table 14: Sight Distance Assessment

Direction	Available Sight Distance (m)	Required Sight Distance (m)	Compliance
Old North Road / Wine Country Drive Intersection			
North	300+	201	Compliant
South	300+		Compliant
Site Access to Old North Road			
East	60 *	201	Compliant
West	250+		Compliant

* Sight distance through to intersection with Wine Country Drive

Figure 23: SISD Images



As shown in Figure 23, for the Old North Road / Wine Country Road intersection there are some low level shrubs that cause minor obstructions to sightlines to the north which are recommended to be trimmed. There is also a minor crest on Wine Country Drive approximately 100 metres south of Old North Road however, it was observed that the sightlines to the south are in excess of 300 metres and that the top of vehicles were visible when traveling through the crest.

The site access to Old North Road has excellent sightlines to the west and to the intersection with Wine Country Drive to the east. Accordingly, the available sight distance at the intersection and site access exceed the requirements of the Austroads Guide and vehicles are expected to safely enter and exit the State road network.



7. Traffic Management Plan

It is recommended that a CTMP be prepared prior to commencement of construction of the Project. The CTMP should be prepared and implemented in accordance with Australian Standard 1742.3 and the Work Health and Safety Regulation 2017. The CTMP would provide additional information regarding the traffic volumes and distribution of construction vehicles that is not available at this time including:

- Road transport volumes, distribution and vehicle types broken down into:
 - Hours and days of construction.
 - Schedules for phasing/staging of the Project.
- The origin, destination and routes for:
 - Employee and contractor light vehicles.
 - Heavy vehicle traffic.
 - Oversize/overmass vehicles.
- A map of the primary haulage routes highlighting critical locations.
- An induction process for vehicle operators and regular toolbox meetings.
- A complaint resolution and disciplinary procedure.
- Local climatic conditions that may impact road safety of employees throughout all project phases (e.g. fog, wet and significant dry, dusty weather).

The following provides recommended measures that should be adopted within the CTMP to minimise the impact of construction traffic along the road network.

7.1 Information and Communication

The implementation of a community information and awareness program would assist in managing potential traffic impacts. Prior to construction commencing and during the construction period, a program of consultation shall be initiated to ensure local residents are aware of construction traffic accessing the Project. This program may include elements of the following as appropriate to the phase of works:

- Press releases in local newspapers.
- Emails, newsletters and letter drops to neighbouring residents along the access route to the Project.
- Website providing details of the status of works and contact details for complaints or enquiries.
- Provide key contact personnel and contact details, including out of hours contact information to stakeholders operating alongside the local route.
- Community notifications will be undertaken where required. Neighbouring properties will be notified regarding the timing of major deliveries which may require additional traffic control or disrupt access.

7.2 Access Road Management Measures

As discussed at Section 6.2, simultaneous two-way passing cannot occur at the site access to Old North Road by two 26 m B-Doubles. Given the requirement for these larger vehicles will be limited to the construction phase of the Project only, and the low number of these vehicles accessing the site during the peak construction phase, it is considered appropriate to manage movements by these vehicles using traffic management measures.

The details of the traffic management measures would be addressed within the CTMP for the Project. However, it is anticipated that these would include the following:

- Scheduling of deliveries to minimise the likelihood of heavy vehicles arriving/departing the site at the same time.
- Driver protocols to radio the site manager/other drivers prior to arriving/departing the site to manage vehicle movements through the site access.
- Traffic controllers to hold exiting vehicles internally within the site while a 26 m B-Double/battery container vehicle arrives. It is noted that the default arrangement would be to give priority to arriving vehicles to prevent any queuing on Old North Road.

7.3 Signage

If required, warning signs advising of the changed traffic operations and heavy vehicles could be provided to inform road users of the changed traffic conditions. The type and location of warning signs would be determined in consultation with the road authorities as part of the CTMP approval process, as required.

7.4 Shuttle Buses

While not proposed at this stage, a shuttle bus program may be implemented to transport some of the workforce to and from site for a portion of the construction phase. A local bus company would be contracted to manage the service.

Measures to ensure any shuttle bus program can be practically implemented and monitored would be included within the Construction Environmental Management Plan and/or CTMP.

Recommended measures could include:

- Limiting car parking for light vehicles on-site.
- Regular toolbox meeting sessions identifying method of travel to work and strongly encouraging use of the shuttle buses.
- Identifying the bus drop off/pick up locations and clearly communicating these locations with the workforce.
- Allocating a team member to be responsible for enforcement and management of the shuttle buses.
- Identifying mechanisms to be put in place if shuttle bus passenger numbers are not achieved.

7.5 On-Site Mitigation Measures

On-site mitigation measures targeted at safety and reducing the impact of on-site transport would include:

- On-site speed restrictions.
- Appropriate dust suppression measures.
- Maintenance program for on-site access tracks to ensure safe access.
- Loading and unloading is proposed to occur within the site. No street or roads would be used for material storage at any time.
- Sufficient car parking is to be provided on-site to ensure vehicles do not park on the surrounding road network.
- All car parking and loading areas to be designed in accordance with the relevant Australian Standard (2890 series) and Council requirements.

It is noted that there are extensive areas available on the existing site for parking vehicles and as such, there is not anticipated to be any on-street parking impacts during construction of the Project.

7.6 Driver Protocols

Management of vehicular access to and from the site is essential in order to maintain the safety of the general public as well as the workforce. A Driver Code of Conduct is to be implemented as a measure to maintain safety within and around the site:

- All vehicles would enter and exit the site in a forward direction.
- Heavy vehicle movements should avoid peak school bus times to limit the interaction of larger vehicles and vulnerable road users.
- Safety initiatives for impacts to residential areas and/or school bus zones.
- Utilisation of only the designated transport routes.
- Construction vehicle movements are to abide by finalised schedules as agreed by the relevant authorities.
- All permits for working within the road reserve must be received from the relevant authority prior to works commencing.

The above recommendations will ensure the construction traffic would have a minimal impact to the capacity and safety of the surrounding road network. The CTMP would be prepared in conjunction with consultation with TfNSW and Cessnock City Council.

8. Mitigation Measure Summary

The assessment has identified a number of traffic management measures that are to be implemented during construction and recommended to be included in the CTMP. The key measures are summarised below:

- Prior to construction, a pre-condition survey of Old North Road should be undertaken by the appointed contractor in consultation with Council as the road manager. During construction, Old North Road is to be monitored and maintained to ensure continued safe use by all road users, and any faults attributed to construction of the Project rectified. At the end of construction, a post-condition survey would be undertaken to ensure the road is left in a condition equivalent to that at the start of construction.
- Neighbours of the Project are to be consulted and notified regarding the timing of major deliveries which may require additional traffic control and disrupt access.
- Traffic management measures to ensure the 26 m B-Double/battery container vehicle can safely access the site, as discussed at Section 7.2. These may include:
 - Scheduling of deliveries to minimise the likelihood of heavy vehicles arriving/departing the site at the same time.
 - Driver protocols to radio the site manager/other drivers prior to arriving/departing the site to manage vehicle movements at the site access.
 - Traffic controllers to hold exiting vehicles internally within the site while a 26 m B-Double/battery container vehicle arrives. It is noted that the default arrangement would be to give priority to arriving vehicles to prevent any queuing on Old North Road.
- Heavy vehicles should avoid travel during school bus operating times (where possible) to limit the interaction of larger vehicles and vulnerable road users. School buses operate along Wine Country Drive as outlined in Section 2.4.
- It is recommended that any OSOM vehicle trips be timed so they do not coincide with other OSOM vehicles within the surrounding area to limit the impact to the road network, which can be undertaken as part of the permit application.

8.1 Schedule of Road Upgrades

In addition to the above traffic management measures, it is proposed to provide road upgrades as part of the Project which are to be constructed prior to construction commencing. A schedule of the road upgrades is provided below:

- Upgrades at the intersection of Old North Road / Wine Country Drive to accommodate construction traffic. An option for a BAL and rural left-right staggered T-intersection is discussed at Section 6.1. The ultimate upgrades at the intersection would be developed in consultation with TfNSW.
- Upgrades to Old North Road between Wine Country Drive and the site access (i.e. for a distance of approximately 60 metres) as discussed in Section 5.3. The design of any upgrades would be developed in consultation with Council and in accordance with Council's Standard Drawings, or as otherwise agreed.

The inclusion of the proposed upgrades are suitable to accommodate the future traffic volumes to and from the Project.

9. Conclusion

Amber has assessed the traffic impacts of the proposed Rothbury BESS. The Project is located at 1309 Wine Country Drive in Rothbury within Cessnock City Council LGA and is approximately 45 km northwest of Newcastle. The Project is located on the site of the existing Ausgrid Rothbury Zone Substation, with the Project proposed on Lot 1 and 2 of DP 1318566. Vehicle access to the site is proposed via the existing crossover to Old North Road.

The construction period is expected to commence in mid-2027 and take approximately 22 months, with the peak construction period expected to take 6 months. A construction workforce of up to 100 personnel would be on-site during the peak construction phase. These staff would be primarily located in Newcastle, the Hunter Region and Sydney.

Project specific plant and components, such as the battery units, are expected to be delivered from the Port of Newcastle or Port Botany. More general construction materials and equipment will be sourced from the surrounding area.

The above assessment determined the following:

- The site is expected to generate up to 190 vehicle trips per day during the peak construction period, including 70 heavy vehicle trips and 120 light vehicle trips.
- The road network is able to accommodate the traffic generated by the Project during the construction, operation and decommissioning stages.
- The 26 m B-Double access route utilises roads that are generally designated within the TfNSW Restricted Access Vehicle Map, noting that Old North Road is unrated and will require approval from Council.
- The largest vehicle expected to access the site is the vehicle delivering the battery containers, which are expected to generate 10 trips per day during the peak construction phase. The access route for these vehicles would be from either Port of Newcastle or Port Botany. The vehicle combination would be generally kept under 3.5 metres width and less than 26 metres length and would not be classified as High Risk.
- The following road upgrades are required to allow vehicles to safely enter and exit the State road network:
 - Upgrades at the intersection of Old North Road / Wine Country Drive to accommodate construction traffic. An option for a BAL and rural left-right staggered T-intersection is discussed at Section 6.1. The ultimate upgrades at the intersection would be developed in consultation with TfNSW.
 - Upgrades to Old North Road between Wine Country Drive and the site access (i.e. for a distance of approximately 60 metres) as discussed in Section 5.3. The design of any upgrades would be developed in consultation with Council and in accordance with Council's Standard Drawings, or as otherwise agreed.
- The sight distance at the intersection of Old North Road / Wine Country Drive meets the Austroads Guide requirements, subject to trimming of vegetation within the road reserve as outlined in Section 6.3. This would be considered vegetation maintenance for the existing intersection.
- The existing site access to Old North Road can accommodate the Project traffic and is provided with adequate sight distance to allow vehicles to safely enter the road network, noting that traffic management measures will be required for heavy vehicles to access the site.

- In order to mitigate the impacts of the Project during construction a CTMP would be prepared which should include the recommendations provided within this TIA.

Based on the assessment above, it is concluded that the proposed access arrangements are suitable to accommodate the expected construction vehicle types and traffic volumes during the construction and operation phase of the Project.



Appendix A

Response to TfNSW Agency Advice



TfNSW Comment	Response
Hours, days and periods of construction.	The proposed construction hours and Project timeframe are provided within Section 3.2.
Schedule for phasing/staging of the project (including pre-construction, accommodation and ancillary infrastructure works) and identifying the traffic volumes for each stage.	The traffic assessment in Section 4 details the known works associated with the peak construction period.
Traffic volumes are to include a description of: – Surveyed existing background traffic at key intersections per Part 3 Austroads Guide to Traffic Management, with survey raw data included. – Project-related traffic volumes (measured as single vehicle trips per hour, AM/PM peak hour and per day) for each stage, including pre-construction, construction, operation, and decommissioning and identifying peak period(s) for traffic volumes. – Ratio of light vehicles to heavy vehicles. – Differentiation of Over Size/Over Mass (OSOM) that do or do not require an NHVR permit and proposed times of operation on the State road network. – Peak times for existing traffic and project-related traffic. – Transportation hours. – Distribution split, i.e. number turning left and right at each access or intersection. – Number of high-risk OSOM anticipated for the project.	Existing traffic is captured in surveys as outlined in Section 2.3 with the data provided in Appendix B. Project traffic is presented in Section 4.1. Section 4 shows different vehicle classifications using the road network, different impacts at differing peak times of day, factoring up of background traffic to the proposed end of construction year, and traffic distribution.
The origin, destination and routes (including maps for all stages of the project) for: – Employee and contractor light traffic. – Heavy vehicle traffic. – OSOM vehicle traffic. – OSOM high-risk loads.	The distribution of Project traffic on the road network is presented at Section 4.2.4. Heavy vehicle routes are discussed at Section 5.
A description of all non-high-risk OSOM vehicles and materials to be transported. The shortest and least trafficked route is to be given priority for the movement of materials and machinery to minimise risk and impact to other motorists, so far as is reasonably practicable.	There are no high-risk OSOM as part of the scope of this application. The heavy vehicle routes are discussed at Section 5.
Identify the location of each new or existing intersection and access point (including GPS coordinates for new locations) that will be used for project traffic and what types of vehicles.	The existing site access to Old North Road is proposed to be utilised via the intersection with Wine Country Drive. All project traffic is proposed to travel through this intersection and site access.
The assessment is to identify high-level enforceable mitigation measures to manage traffic volumes, driver behaviour and site access paths for all project stages.	Section 7 details measures to include in a future CTMP and Section 8 details general mitigation measures.

TfNSW Comment	Response
A turn warrant assessment for different scenarios (i.e. project peak hour is different to network peak hour, for worst case scenario (i.e. overlap of construction, pre-construction works and occupation of stages of workforce accommodation camp). The turn warrant assessments are to be prepared in accordance with section 3.25 of Part 6 of the Austroads Guide to Traffic Management. A turn warrant assessment will be required for each scenario identified above and for each access, access track and any other access along the project's identified routes with an interface or connection to the state road network. The methodology to be used for the turn warrants assessment is: – AM/PM peak project traffic volumes (including turn direction and traffic type ratios), – Applied to existing AM/PM network peak background traffic, – Include linear growth to the year of peak construction. – Including the cumulative traffic volumes for projects at EIS and approved stages that will be present in the background and turning traffic volumes at the site access or intersection.	Turn warrant assessment presented at Section 4.2.6 adopting methodology of TfNSW Agency Advice.
TIA is to detail the required intersection treatments and scope of upgrades at each intersection and proposed access point that is required to facilitate workforce accommodation facilities, transmission lines, compounds, ancillary infrastructure access, emergency access must be designed to facilitate the traffic volumes and safe turning of project traffic for each identified access or intersection with the State Road network. All strategic concept designs must be developed to demonstrate compliance with Austroads, TfNSW supplements, and TfNSW technical directions.	An overview of the required road upgrades is provided in Section 8.1. The turn treatment assessment is at Section 4.2.6 and the design at Section 6.1. The available sight distance is discussed at Section 6.3. Swept path analysis for largest vehicle accessing the site are attached at Appendix D.
Traffic safety assessment: – Local climate conditions that may affect road safety for vehicles used during construction, operation and decommissioning of the project (e.g. fog, wet weather, snow etc). – A review of crash data along the identified transport route/s for the most recent 5-year reporting period and an assessment of road safety along the proposed transport route(s). – Measures to be employed to ensure a high level of road safety for daily staff commutes between accommodation and construction site(s), specifically addressing impacts of unsafe driver behaviour and driver fatigue for all project stages and how measures employed will be enforced.	Recommendations for inclusion within the CTMP during local climate events detailed in Section 7. Refer to Section 2.6 for road safety review. Recommendations would be made within the CTMP for driver protocols, which are detailed at Section 7.6.

TfNSW Comment	Response
Pre-construction minor works assessment (prior to construction of intersection upgrade): – Identify the traffic volumes. – Traffic types, inclusive of the largest design vehicle. – Provide a swept path analysis of the existing intersection for the largest heavy vehicle, prepared following Austroads Design Vehicles and Turning Path Templates. The swept path analysis must demonstrate that the largest heavy vehicle can turn within the existing pavement and concurrently. If the design vehicle cannot turn, concurrently enforceable mitigation measures or additional temporary works will need to be implemented to manage and mitigate the impacts. – Provide an assessment of the existing SISD and measures that will be implemented to achieve a compliant SISD, i.e prohibition of turning movements, left in left out or vegetation removal. – Identify the AM/PM peak hour and proposed traffic volumes during this period. – Identify measures to reduce the project traffic and impacts during this period i.e carpooling, shuttle buses, staggering of traffic. – Identify mitigation measures to monitor and enforce the traffic volumes during this period. – Provide a schedule of the proposed pre-construction minor works and program of works. – The AM/PM peak hour must be consistent with the traffic volumes that would be generated during this period by the existing land use. Avoid network peak hours where possible. – Include measures to inform the community and key stakeholders of the increased traffic during this period. – Identify the hours for pre-construction minor works. – Identify the traffic volumes for any temporary workforce accommodation that will be occupied during this period. – Identify any temporary widening or works that may be required to accommodate swept paths for the design vehicle during this period within the strategic concept design.	Pre-construction minor works would represent up to two vehicles per day typically associated with surveyors or consultants visiting the site outside peak hours only using light vehicles or small trucks. The existing access into the site via Old North Road is considered appropriate to accommodate pre-construction minor works. There would be no overlap expected between the pre-construction and main construction works.

TfNSW Comment	Response
- Any overlap of construction and pre-construction minor works periods must be included in the traffic assessment for this stage, prior to completion of the intersection upgrade. - No OSOM will be permitted during this period, unless swept paths are provided that demonstrate that the intersection or access will be able to accommodate the turn of the OSOM movement within the existing pavement. - The sealing of the throat of the intersection (if unsealed) or access point may be required before the commencement of use of the intersection or access point for this stage. - Temporary traffic controls will not be permitted to be used at the intersection or access point for pre-construction minor works that is occurring before commencing the required road upgrades.	
In relation to the EIS, TfNSW requires the identification of ancillary infrastructure, such as Electricity Transmission Lines that are crossing or near the state-classified road network or rail infrastructure within TfNSW remit. With respect to this matter the following information is required: - The heights or depths (under boring) and the vertical and horizontal clearances (overhead) in accordance with Austroads. - The method for construction of the transmission lines across state road network, inclusive of any proposed hurdles or other temporary infrastructure. - location of infrastructure and impacts (excavation or fill) relative to the road reserve, including demarcation of local and state-classified road reserves. - Distance from road reserve if the transmission line is to be constructed in parallel to the state road network. - Access required to construct and maintain the infrastructure. Access points or access tracks required for ETLs or other infrastructure will require the same level of assessment as detailed above. - Any trenchless excavation of the pipeline or any transmission lines near or crossing the State road network must comply with TfNSW Technical Direction-Geotechnical (GTD208-002) for Trenchless Excavation within the Road and Maritime Infrastructure. - Strategic concept designs must be provided for each transmission line crossing the state-road network.	No connection works are proposed that cross State Roads.

Appendix B

Traffic Survey Data



TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

trafficsurvey.com.au



Intersection of Old N Rd and Wine Country Dr, Rothbury

GPS -32.713316, 151.327915

Date:	Thu 16/10/25
Weather:	Fine
Suburban:	Rothbury
Customer:	N/A

North:	Wine Country Dr
East:	N/A
South:	Wine Country Dr
West:	Old N Rd

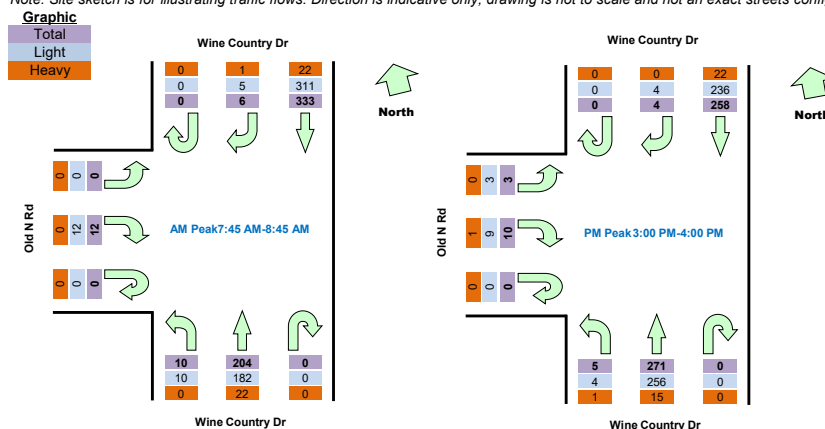
Survey	AM:	6:00 AM-10:00 AM
Period	PM:	3:00 PM-7:00 PM
Traffic	AM:	7:45 AM-8:45 AM
Peak	PM:	3:00 PM-4:00 PM

All Vehicles

Time		North Approach Wine Country			South Approach Wine Country			West Approach Old N Rd			Hourly Total	
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	Hour	Peak
6:00	6:15	0	0	20	0	49	3	0	1	0	355	
6:15	6:30	0	1	32	0	50	1	0	0	2	366	
6:30	6:45	0	0	47	0	34	1	0	5	0	390	
6:45	7:00	0	0	47	0	60	1	0	1	0	429	
7:00	7:15	0	0	44	0	37	2	0	0	1	463	
7:15	7:30	0	0	56	0	53	1	0	0	0	528	
7:30	7:45	0	0	78	0	47	1	0	0	0	557	
7:45	8:00	0	2	98	0	36	2	0	5	0	565	Peak
8:00	8:15	0	0	92	0	51	2	0	4	0	547	
8:15	8:30	0	2	67	0	65	2	0	3	0	515	
8:30	8:45	0	2	76	0	52	4	0	0	0	486	
8:45	9:00	0	1	72	0	46	2	0	2	2	444	
9:00	9:15	0	4	51	0	56	0	0	5	1	417	
9:15	9:30	0	1	60	0	44	0	0	5	0		
9:30	9:45	0	1	48	0	42	0	0	0	1		
9:45	10:00	0	0	48	0	41	0	0	8	1		
15:00	15:15	0	1	68	0	69	1	0	1	0	551	Peak
15:15	15:30	0	1	59	0	65	2	0	2	1	529	
15:30	15:45	0	1	69	0	63	1	0	3	1	528	
15:45	16:00	0	1	62	0	74	1	0	4	1	529	
16:00	16:15	0	0	51	0	63	2	0	1	1	519	
16:15	16:30	0	2	62	0	59	1	0	4	1	551	Peak
16:30	16:45	0	1	67	0	68	0	0	3	0	533	
16:45	17:00	0	0	69	0	60	3	0	1	0	541	
17:00	17:15	0	0	69	0	75	1	0	4	1	500	
17:15	17:30	0	0	39	0	67	1	0	3	1	433	
17:30	17:45	0	2	61	0	78	2	0	3	1	406	
17:45	18:00	0	0	54	0	36	0	0	2	0	327	
18:00	18:15	0	3	42	0	35	2	0	1	0	296	
18:15	18:30	0	0	52	0	30	0	0	1	1		
18:30	18:45	0	0	37	0	28	0	0	3	0		
18:45	19:00	0	0	27	0	32	0	0	2	0		

Peak Time		North Approach Wine Country			South Approach Wine Country			West Approach Old N Rd			Peak total
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	
7:45	8:45	0	6	333	0	204	10	0	12	0	565
15:00	16:00	0	4	258	0	271	5	0	10	3	551

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.



TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

trafficsurvey.com.au



Intersection of Blackburn CI and Wine Country Dr, Rothbury

GPS -32.712453, 151.328950

Date:	Thu 16/10/25
Weather:	Fine
Suburban:	Rothbury
Customer:	N/A

North:	Wine Country Dr
East:	Blackburn CI
South:	Wine Country Dr
West:	Site Access

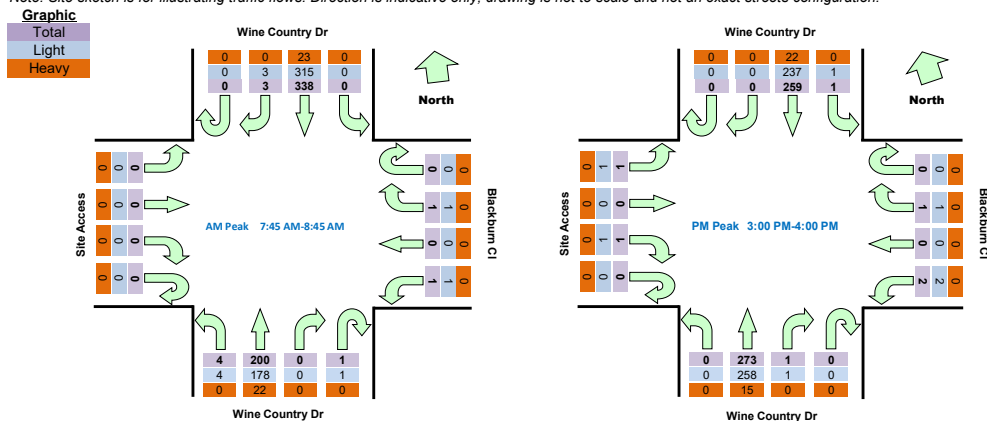
Survey Period	AM: 6:00 AM-10:00 AM PM: 3:00 PM-7:00 PM
Traffic Peak	AM: 7:45 AM-8:45 AM PM: 3:00 PM-4:00 PM

All Vehicles

Time		North Approach Wine Country Dr				East Approach Blackburn CI				South Approach Wine Country Dr				West Approach Site Access				Hourly Total	
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	Hour	Peak
6:00	6:15	0	0	20	0	0	1	0	0	0	0	49	0	0	0	0	0	343	
6:15	6:30	0	0	33	0	0	0	0	0	0	0	52	0	0	0	0	0	355	
6:30	6:45	0	0	47	0	0	0	0	0	0	0	34	0	0	0	0	0	379	
6:45	7:00	0	0	47	0	0	0	0	0	0	0	60	0	0	0	0	0	423	
7:00	7:15	0	0	44	0	0	0	0	0	0	0	38	0	0	0	0	0	452	
7:15	7:30	0	0	56	0	0	0	0	0	0	0	53	0	0	0	0	0	513	
7:30	7:45	0	0	78	0	0	0	0	0	0	0	47	0	0	0	0	0	539	
7:45	8:00	0	0	99	0	0	0	0	1	0	0	36	0	0	0	0	0	548	Peak
8:00	8:15	0	0	92	0	0	0	0	0	0	0	51	0	0	0	0	0	534	
8:15	8:30	0	1	69	0	0	0	0	0	0	0	65	0	0	0	0	0	503	
8:30	8:45	0	2	78	0	0	1	0	0	1	0	48	4	0	0	0	0	475	
8:45	9:00	0	0	73	0	0	1	0	0	0	1	47	0	0	0	0	0	433	
9:00	9:15	0	0	54	0	0	0	0	1	0	1	56	0	0	0	0	0	401	
9:15	9:30	0	0	60	1	0	0	0	0	0	0	44	0	0	1	0	1		
9:30	9:45	0	0	49	0	0	0	0	0	0	0	43	0	0	0	0	0		
9:45	10:00	0	0	48	0	0	0	0	0	0	0	42	0	0	0	0	0		
15:00	15:15	0	0	69	0	0	0	0	0	0	0	69	0	0	0	0	0	539	Peak
15:15	15:30	0	0	58	0	0	0	0	2	0	1	65	0	0	0	0	0	519	
15:30	15:45	0	0	70	1	0	1	0	0	0	0	64	0	0	0	0	0	517	
15:45	16:00	0	0	62	0	0	0	0	0	0	0	75	0	0	1	0	1	517	
16:00	16:15	0	0	51	1	0	2	0	0	0	0	64	0	0	0	0	0	507	
16:15	16:30	0	0	64	0	0	0	0	0	0	0	60	0	0	0	0	0	534	
16:30	16:45	0	0	68	0	0	0	0	0	0	0	68	0	0	0	0	0	517	
16:45	17:00	0	0	69	0	0	0	0	0	0	0	60	0	0	0	0	0	523	
17:00	17:15	0	0	69	0	0	0	0	0	0	1	75	0	0	0	0	0	484	
17:15	17:30	0	0	39	0	0	0	0	0	0	2	66	0	0	0	0	0	419	
17:30	17:45	0	0	63	0	0	0	0	0	0	0	79	0	0	0	0	0	395	
17:45	18:00	0	0	54	0	0	0	0	0	0	0	36	0	0	0	0	0	318	
18:00	18:15	0	0	45	0	0	0	0	0	0	2	33	0	0	0	0	0	287	
18:15	18:30	0	0	52	0	0	0	0	0	0	0	31	0	0	0	0	0		
18:30	18:45	0	0	37	0	0	0	0	0	0	0	28	0	0	0	0	0		
18:45	19:00	0	0	27	0	0	0	0	0	0	0	32	0	0	0	0	0		

Peak Time		North Approach Wine Country Dr				East Approach Blackburn Cl				South Approach Wine Country Dr				West Approach Site Access				Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
7:45	8:45	0	3	338	0	0	1	0	1	1	0	200	4	0	0	0	0	548
15:00	16:00	0	0	259	1	0	1	0	2	0	1	273	0	0	1	0	1	539

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.



TRANS TRAFFIC SURVEY

trafficsurvey.com.au

T. 1300 82 88 82 - F. 1300 83 88 83 - E. traffic@trafficsurvey.com.au - W. www.trafficsurvey.com.au

AUTOMATIC COUNT SUMMARY

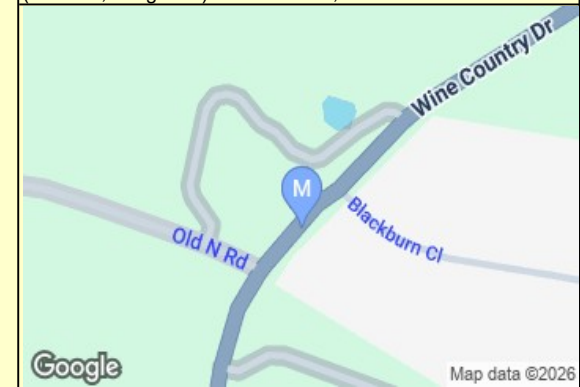
Street Name :	Wine Country Dr	Location :	Between Old North Rd and Blackburn Cl
Suburb :	Rothbury	Start Date :	00:00 Wed 15/October/2025
Machine ID:	WM613BYT	Finish Date :	00:00 Wed 22/October/2025
Site ID:	4193	Speed Zone :	90 km/h
Prepared By :	Vo Son Binh	Email:	binh@trafficsurvey.com.au

GPS information Lat 32° 42' 46.26 South Long 151° 19' 42.61 East		Direction of Travel		
		Both directions	Northbound	Southbound
Traffic Volume : (Vehicles/Day)	Weekdays Average	6,526	3,358	3,168
	7 Day Average	6,214	3,198	3,016
Weekday AM	08:00	489	198	291
Peak hour starts PM	15:00	528	279	249
Speeds : (Km/Hr)	85th Percentile	88.6	88.3	88.9
	Average	81.8	81.5	82.1
Classification % :	Light Vehicles up to 5.5m	84.5%	84.7%	84.4%

Location

GPS Information [Load Google Map \(internet required\)](#)

(Latitude, Longitude) -32.712849, 151.328502



[Speed Data](#)

[Speed Graph](#)

[Speed Bin](#)

[Volume Data](#)

[Volume Graph](#)

[Classification](#)



QUALITY ASSURED COMPANY BY ISO 9001:2015

OH&S SYSTEM CERTIFIED TO ISO 4801:2001

ENVIRONMENT MANAGEMENT SYSTEM CERTIFIED TO ISO14001:2015

TRANS TRAFFIC SURVEY

 trafficsurvey.com.au

Site Wine Country Dr

Direction Northbound ▼

[Back to Site Summary Page](#)

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	7 days		Weekday		Weekend	
Date	20/10/2025	21/10/2025	15/10/2025	16/10/2025	17/10/2025	18/10/2025	19/10/2025	Total	Average	Total	Average	Total	Average
AM Peak	11:00	06:00	07:00	08:00	11:00	11:00	11:00	N/A	11:00	N/A	11:00	N/A	11:00
PM Peak	16:00	15:00	15:00	15:00	15:00	12:00	16:00	N/A	15:00	N/A	15:00	N/A	16:00
00:00	16	11	5	5	16	22	24	99	14	53	11	46	23
01:00	3	14	6	10	11	10	11	65	9	44	9	21	11
02:00	3	9	10	8	10	5	9	54	8	40	8	14	7
03:00	22	28	29	23	22	11	8	143	20	124	25	19	10
04:00	176	171	183	204	180	75	65	1054	151	914	183	140	70
05:00	191	200	175	194	177	79	60	1076	154	937	187	139	70
06:00	170	207	193	195	173	44	18	1000	143	938	188	62	31
07:00	178	161	205	174	172	86	62	1038	148	890	178	148	74
08:00	200	177	204	216	201	149	98	1245	178	998	200	247	124
09:00	184	164	162	186	214	207	199	1316	188	910	182	406	203
10:00	173	151	192	190	210	203	185	1304	186	916	183	388	194
11:00	201	199	186	207	215	259	226	1493	213	1008	202	485	243
12:00	177	161	183	225	225	249	213	1433	205	971	194	462	231
13:00	180	180	178	217	270	223	201	1449	207	1025	205	424	212
14:00	246	220	246	263	254	219	215	1663	238	1229	246	434	217
15:00	257	289	269	274	300	217	225	1831	262	1389	278	442	221
16:00	283	270	255	252	281	247	226	1814	259	1341	268	473	237
17:00	219	261	246	259	234	234	176	1629	233	1219	244	410	205
18:00	103	114	112	126	132	139	108	834	119	587	117	247	124
19:00	68	83	92	100	79	86	62	570	81	422	84	148	74
20:00	61	72	71	76	76	112	66	534	76	356	71	178	89
21:00	46	45	57	53	72	90	48	411	59	273	55	138	69
22:00	22	31	21	36	62	71	28	271	39	172	34	99	50
23:00	14	14	23	16	42	49	16	174	25	109	22	65	33
Total	3193	3232	3303	3509	3628	3086	2549	22500	3214	16865	3373	5635	2818
% Heavy	17.41%	15.41%	16.71%	16.44%	15.55%	12.80%	11.85%	15.31%		16.29%		12.37%	

TRANS TRAFFIC SURVEY

 trafficsurvey.com.au

Site Wine Country Dr

Direction Southbound ▼

[Back to Site Summary Page](#)

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	7 days		Weekday		Weekend	
Date	20/10/2025	21/10/2025	15/10/2025	16/10/2025	17/10/2025	18/10/2025	19/10/2025	Total	Average	Total	Average	Total	Average
AM Peak	07:00	07:00	08:00	08:00	08:00	11:00	11:00	N/A	08:00	N/A	08:00	N/A	11:00
PM Peak	17:00	16:00	15:00	15:00	14:00	12:00	12:00	N/A	15:00	N/A	15:00	N/A	12:00
00:00	6	20	21	19	18	23	21	128	18	84	17	44	22
01:00	4	8	4	9	16	16	16	73	10	41	8	32	16
02:00	4	12	3	8	17	11	10	65	9	44	9	21	11
03:00	6	12	8	4	11	6	6	53	8	41	8	12	6
04:00	16	22	22	17	24	11	9	121	17	101	20	20	10
05:00	60	54	63	64	63	35	20	359	51	304	61	55	28
06:00	128	160	147	147	149	92	76	899	128	731	146	168	84
07:00	284	285	289	278	287	146	92	1661	237	1423	285	238	119
08:00	271	266	299	312	308	184	144	1784	255	1456	291	328	164
09:00	193	186	210	213	214	232	212	1460	209	1016	203	444	222
10:00	180	171	173	188	206	262	193	1373	196	918	184	455	228
11:00	169	152	190	193	233	263	250	1450	207	937	187	513	257
12:00	176	157	200	199	236	254	216	1438	205	968	194	470	235
13:00	188	170	183	218	208	220	186	1373	196	967	193	406	203
14:00	230	198	214	254	263	195	166	1520	217	1159	232	361	181
15:00	242	254	256	262	236	174	147	1571	224	1250	250	321	161
16:00	225	274	240	252	248	162	143	1544	221	1239	248	305	153
17:00	253	266	225	225	210	179	107	1465	209	1179	236	286	143
18:00	136	168	161	161	152	190	102	1070	153	778	156	292	146
19:00	87	105	95	115	103	110	110	725	104	505	101	220	110
20:00	50	49	64	67	74	76	67	447	64	304	61	143	72
21:00	36	24	35	47	54	58	34	288	41	196	39	92	46
22:00	11	20	21	23	42	37	20	174	25	117	23	57	29
23:00	14	12	27	16	21	45	13	148	21	90	18	58	29
Total	2969	3045	3150	3291	3393	2981	2360	21189	3027	15848	3170	5341	2671
% Heavy	17.14%	16.03%	16.41%	16.92%	16.21%	13.59%	12.50%	15.67%		16.54%		13.11%	

TRANS TRAFFIC SURVEY

 trafficsurvey.com.au

Site Wine Country Dr

Direction Both directions ▼

[Back to Site Summary Page](#)

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	7 days		Weekday		Weekend	
Date	20/10/2025	21/10/2025	15/10/2025	16/10/2025	17/10/2025	18/10/2025	19/10/2025	Total	Average	Total	Average	Total	Average
AM Peak	08:00	07:00	08:00	08:00	08:00	11:00	11:00	N/A	08:00	N/A	08:00	N/A	11:00
PM Peak	16:00	16:00	15:00	15:00	15:00	12:00	12:00	N/A	15:00	N/A	15:00	N/A	12:00
00:00	22	31	26	24	34	45	45	227	32	137	27	90	45
01:00	7	22	10	19	27	26	27	138	20	85	17	53	27
02:00	7	21	13	16	27	16	19	119	17	84	17	35	18
03:00	28	40	37	27	33	17	14	196	28	165	33	31	16
04:00	192	193	205	221	204	86	74	1175	168	1015	203	160	80
05:00	251	254	238	258	240	114	80	1435	205	1241	248	194	97
06:00	298	367	340	342	322	136	94	1899	271	1669	334	230	115
07:00	462	446	494	452	459	232	154	2699	386	2313	463	386	193
08:00	471	443	503	528	509	333	242	3029	433	2454	491	575	288
09:00	377	350	372	399	428	439	411	2776	397	1926	385	850	425
10:00	353	322	365	378	416	465	378	2677	382	1834	367	843	422
11:00	370	351	376	400	448	522	476	2943	420	1945	389	998	499
12:00	353	318	383	424	461	503	429	2871	410	1939	388	932	466
13:00	368	350	361	435	478	443	387	2822	403	1992	398	830	415
14:00	476	418	460	517	517	414	381	3183	455	2388	478	795	398
15:00	499	543	525	536	536	391	372	3402	486	2639	528	763	382
16:00	508	544	495	504	529	409	369	3358	480	2580	516	778	389
17:00	472	527	471	484	444	413	283	3094	442	2398	480	696	348
18:00	239	282	273	287	284	329	210	1904	272	1365	273	539	270
19:00	155	188	187	215	182	196	172	1295	185	927	185	368	184
20:00	111	121	135	143	150	188	133	981	140	660	132	321	161
21:00	82	69	92	100	126	148	82	699	100	469	94	230	115
22:00	33	51	42	59	104	108	48	445	64	289	58	156	78
23:00	28	26	50	32	63	94	29	322	46	199	40	123	62
Total	6162	6277	6453	6800	7021	6067	4909	43689	6241	32713	6543	10976	5488
% Heavy	17.28%	15.71%	16.57%	16.68%	15.87%	13.19%	12.16%	15.48%		16.41%		12.73%	

TRANS TRAFFIC SURVEY

trafficsurvey.com.au

T. 1300 82 88 82 - F. 1300 83 88 83 - E. traffic@trafficsurvey.com.au - W. www.trafficsurvey.com.au

AUTOMATIC COUNT SUMMARY

Street Name :	Old North Rd	Location :	Approx. 50m west of Wine Country Dr
Suburb :	Rothbury	Start Date :	00:00 Wed 15/October/2025
Machine ID:	P850JAQV	Finish Date :	00:00 Wed 22/October/2025
Site ID:	4192	Speed Zone :	60 km/h
Prepared By :	Vo Son Binh	Email:	binh@trafficsurvey.com.au

GPS information Lat 32° 42' 47.20 South		Direction of Travel		
		Both directions	Westbound	Eastbound
Long 151° 19' 38.73 East				
Traffic Volume : (Vehicles/Day)	Weekdays Average	311	149	162
	7 Day Average	318	150	168
Weekday AM	09:00	25	14	11
Peak hour start PM	15:00	27	13	14
Speeds : (Km/Hr)	85th Percentile	64.1	61.0	67.0
	Average	57.7	55.6	59.6
Classification % :	Light Vehicles up to 5.5m	92.4%	92.9%	91.8%

Location

GPS Information [Load Google Map \(internet required\)](#)
(Latitude, Longitude) -32.713110, 151.327424



[Speed Data](#) [Speed Graph](#) [Speed Bin](#)
[Volume Data](#) [Volume Graph](#) [Classification](#)



QUALITY ASSURED COMPANY BY ISO 9001:2015

OH&S SYSTEM CERTIFIED TO ISO 4801:2001

ENVIRONMENT MANAGEMENT SYSTEM CERTIFIED TO ISO14001:2015

TRANS TRAFFIC SURVEY

 trafficsurvey.com.au

Site Old North Rd

Direction Westbound ▼[Back to Site Summary Page](#)

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	7 days		Weekday		Weekend	
Date	20/10/2025	21/10/2025	15/10/2025	16/10/2025	17/10/2025	18/10/2025	19/10/2025	Total	Average	Total	Average	Total	Average
AM Peak	09:00	09:00	06:00	08:00	09:00	11:00	11:00	N/A	09:00	N/A	09:00	N/A	11:00
PM Peak	15:00	12:00	15:00	12:00	16:00	14:00	12:00	N/A	14:00	N/A	15:00	N/A	14:00
00:00	1	0	1	0	0	0	0	2	0	2	0	0	0
01:00	2	2	1	1	1	1	1	9	1	7	1	2	1
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	1	1	1	3	1	0	1	8	1	7	1	1	1
04:00	3	2	4	4	4	2	0	19	3	17	3	2	1
05:00	8	13	8	10	7	1	2	49	7	46	9	3	2
06:00	4	10	12	7	3	1	9	46	7	36	7	10	5
07:00	6	6	11	8	12	6	5	54	8	43	9	11	6
08:00	11	11	8	15	9	12	5	71	10	54	11	17	9
09:00	14	23	10	6	19	14	7	93	13	72	14	21	11
10:00	7	9	7	4	10	12	6	55	8	37	7	18	9
11:00	9	4	8	12	16	16	14	79	11	49	10	30	15
12:00	5	14	9	11	11	15	8	73	10	50	10	23	12
13:00	11	8	8	10	12	13	4	66	9	49	10	17	9
14:00	11	5	6	11	16	46	7	102	15	49	10	53	27
15:00	19	8	18	9	10	16	5	85	12	64	13	21	11
16:00	14	3	7	9	25	10	7	75	11	58	12	17	9
17:00	7	2	7	6	15	6	2	45	6	37	7	8	4
18:00	2	5	1	5	10	13	5	41	6	23	5	18	9
19:00	7	0	4	3	5	4	5	28	4	19	4	9	5
20:00	4	3	1	4	7	3	4	26	4	19	4	7	4
21:00	5	2	6	3	12	8	0	36	5	28	6	8	4
22:00	0	0	2	2	4	6	2	16	2	8	2	8	4
23:00	4	0	0	1	1	10	1	17	2	6	1	11	6
Total	155	131	140	144	210	215	100	1095	156	780	156	315	158
% Heavy	10.32%	11.45%	5.71%	5.56%	6.67%	5.58%	4.00%	7.03%		7.82%		5.08%	

TRANS TRAFFIC SURVEY

 trafficsurvey.com.au

Site Old North Rd

Direction Eastbound ▼

[Back to Site Summary Page](#)

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	7 days		Weekday		Weekend	
Date	20/10/2025	21/10/2025	15/10/2025	16/10/2025	17/10/2025	18/10/2025	19/10/2025	Total	Average	Total	Average	Total	Average
AM Peak	11:00	11:00	10:00	09:00	08:00	10:00	09:00	N/A	09:00	N/A	09:00	N/A	10:00
PM Peak	14:00	17:00	17:00	14:00	12:00	21:00	15:00	N/A	15:00	N/A	17:00	N/A	15:00
00:00	0	4	0	0	0	0	5	9	1	4	1	5	3
01:00	1	0	0	1	0	0	1	3	0	2	0	1	1
02:00	0	0	0	0	1	0	0	1	0	1	0	0	0
03:00	0	1	1	0	2	3	0	7	1	4	1	3	2
04:00	1	0	1	2	0	1	2	7	1	4	1	3	2
05:00	0	0	1	3	1	1	0	6	1	5	1	1	1
06:00	7	5	2	9	2	4	4	33	5	25	5	8	4
07:00	13	9	6	6	4	6	4	48	7	38	8	10	5
08:00	5	9	3	11	13	7	14	62	9	41	8	21	11
09:00	8	8	10	21	10	8	21	86	12	57	11	29	15
10:00	9	6	13	8	10	19	15	80	11	46	9	34	17
11:00	18	13	7	12	7	14	13	84	12	57	11	27	14
12:00	10	10	6	5	20	15	12	78	11	51	10	27	14
13:00	8	10	9	21	15	9	12	84	12	63	13	21	11
14:00	19	9	15	23	17	16	7	106	15	83	17	23	12
15:00	19	15	15	13	13	15	16	106	15	75	15	31	16
16:00	6	15	9	11	15	12	6	74	11	56	11	18	9
17:00	15	16	16	15	16	17	9	104	15	78	16	26	13
18:00	9	9	5	8	18	8	8	65	9	49	10	16	8
19:00	5	4	4	5	6	9	3	36	5	24	5	12	6
20:00	7	2	5	4	4	7	2	31	4	22	4	9	5
21:00	5	1	2	3	3	19	1	34	5	14	3	20	10
22:00	11	0	6	3	7	13	0	40	6	27	5	13	7
23:00	2	0	1	0	1	12	0	16	2	4	1	12	6
Total	178	146	137	184	185	215	155	1200	171	830	166	370	185
% Heavy	15.17%	8.22%	8.03%	9.24%	9.19%	3.26%	7.10%	8.50%		10.12%		4.86%	

TRANS TRAFFIC SURVEY

 trafficsurvey.com.au

Site Old North Rd

Direction Both directions ▼

[Back to Site Summary Page](#)

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	7 days		Weekday		Weekend	
Date	20/10/2025	21/10/2025	15/10/2025	16/10/2025	17/10/2025	18/10/2025	19/10/2025	Total	Average	Total	Average	Total	Average
AM Peak	11:00	09:00	09:00	09:00	09:00	10:00	09:00	N/A	09:00	N/A	09:00	N/A	11:00
PM Peak	15:00	12:00	15:00	14:00	16:00	14:00	15:00	N/A	14:00	N/A	15:00	N/A	14:00
00:00	1	4	1	0	0	0	5	11	2	6	1	5	3
01:00	3	2	1	2	1	1	2	12	2	9	2	3	2
02:00	0	0	0	0	1	0	0	1	0	1	0	0	0
03:00	1	2	2	3	3	3	1	15	2	11	2	4	2
04:00	4	2	5	6	4	3	2	26	4	21	4	5	3
05:00	8	13	9	13	8	2	2	55	8	51	10	4	2
06:00	11	15	14	16	5	5	13	79	11	61	12	18	9
07:00	19	15	17	14	16	12	9	102	15	81	16	21	11
08:00	16	20	11	26	22	19	19	133	19	95	19	38	19
09:00	22	31	20	27	29	22	28	179	26	129	26	50	25
10:00	16	15	20	12	20	31	21	135	19	83	17	52	26
11:00	27	17	15	24	23	30	27	163	23	106	21	57	29
12:00	15	24	15	16	31	30	20	151	22	101	20	50	25
13:00	19	18	17	31	27	22	16	150	21	112	22	38	19
14:00	30	14	21	34	33	62	14	208	30	132	26	76	38
15:00	38	23	33	22	23	31	21	191	27	139	28	52	26
16:00	20	18	16	20	40	22	13	149	21	114	23	35	18
17:00	22	18	23	21	31	23	11	149	21	115	23	34	17
18:00	11	14	6	13	28	21	13	106	15	72	14	34	17
19:00	12	4	8	8	11	13	8	64	9	43	9	21	11
20:00	11	5	6	8	11	10	6	57	8	41	8	16	8
21:00	10	3	8	6	15	27	1	70	10	42	8	28	14
22:00	11	0	8	5	11	19	2	56	8	35	7	21	11
23:00	6	0	1	1	2	22	1	33	5	10	2	23	12
Total	333	277	277	328	395	430	255	2295	328	1610	322	685	343
% Heavy	12.91%	9.75%	6.86%	7.62%	7.85%	4.42%	5.88%	7.80%		9.01%		4.96%	

Appendix C

SIDRA Results

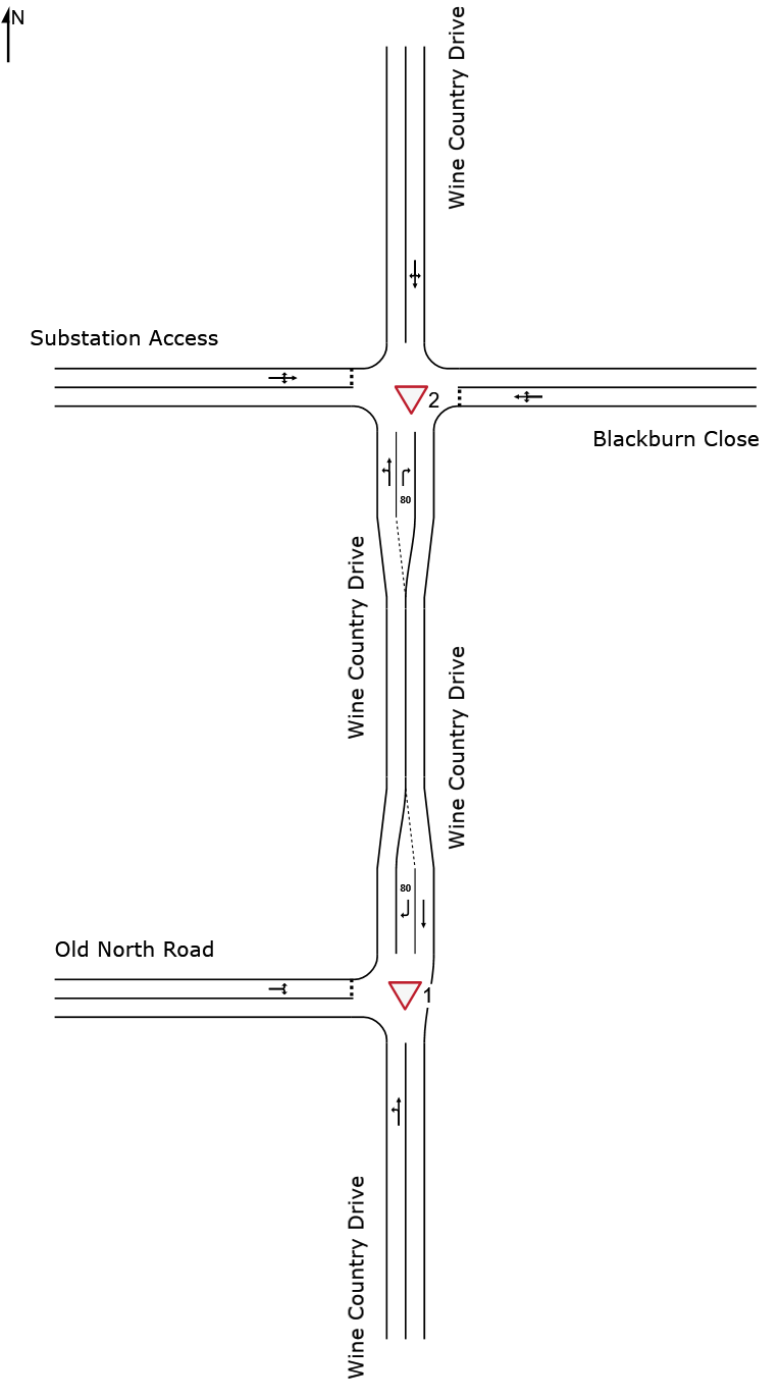


NETWORK LAYOUT

 Network: [1] Project AM (Folder1)

New Network
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



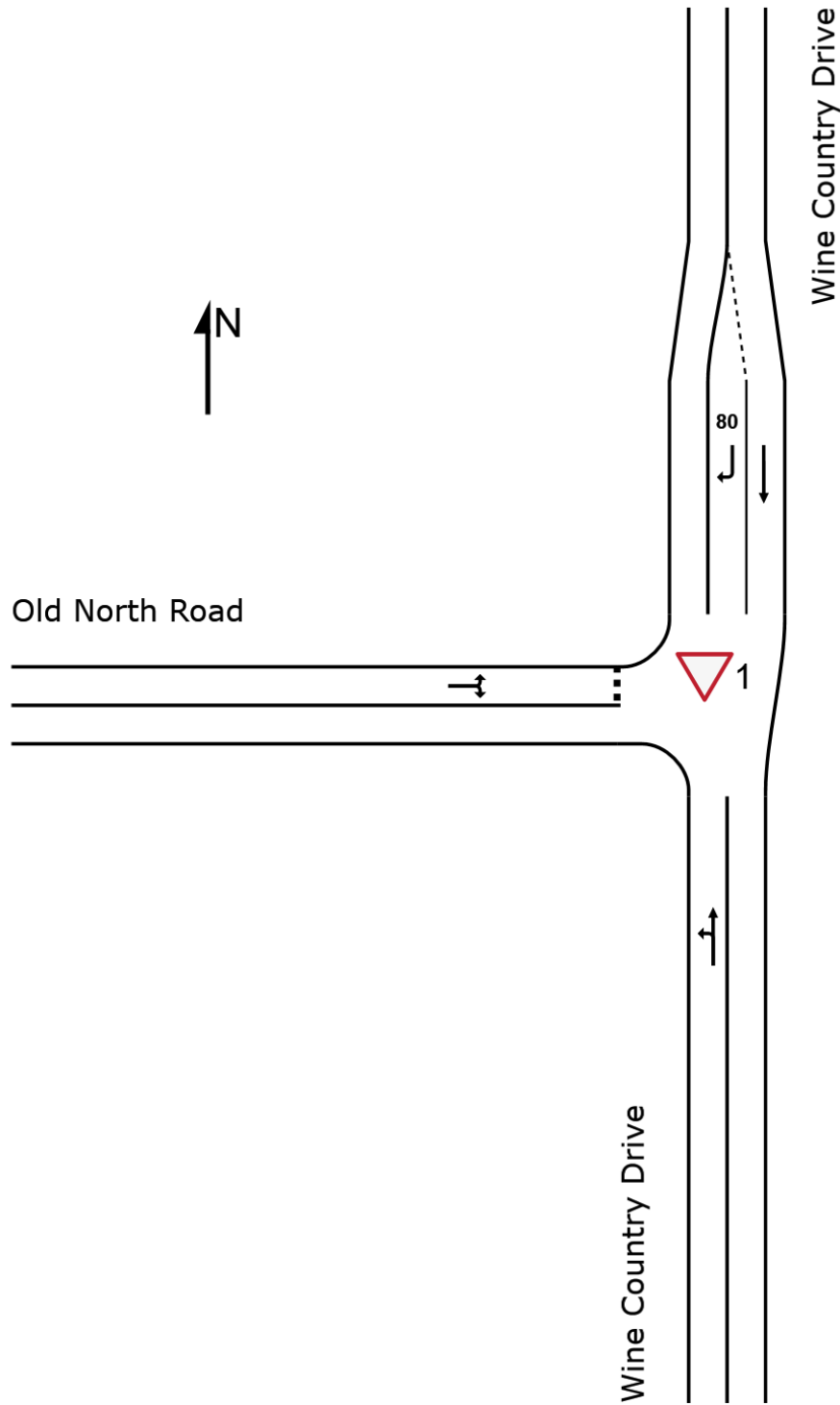
SITES IN NETWORK		
Site ID	CCG ID	Site Name
▽1	NA	Wine Country Drive/Old North Road
▽2	NA	Wine Country Drive/Blackburn Close

SITE LAYOUT

 Site: [1] Wine Country Drive/Old North Road (Project AM)

New Site
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITE LAYOUT

 Site: [2] Wine Country Drive/Blackburn Close (Project AM)

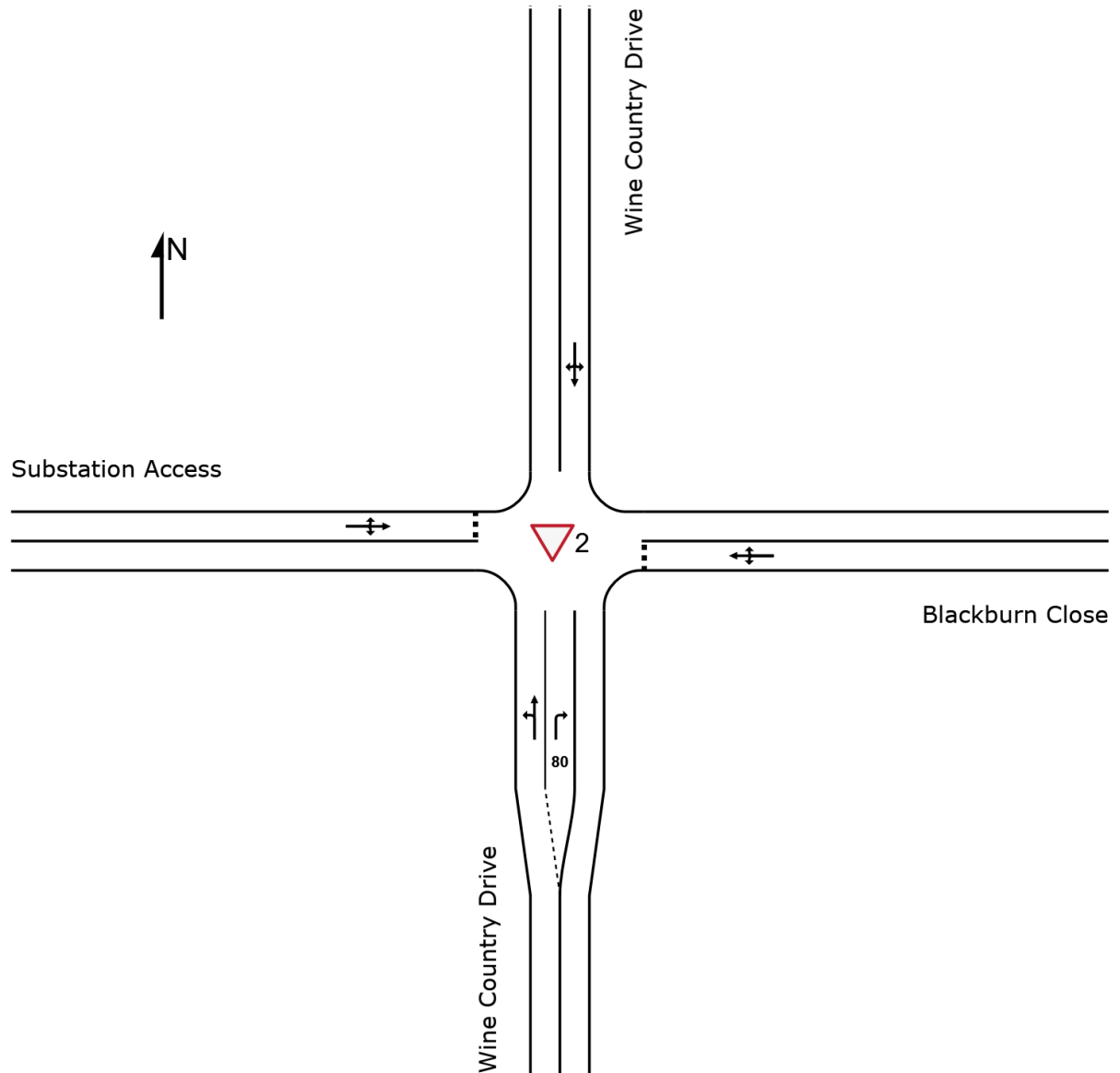
New Site

Site Category: (None)

Give-Way (Two-Way)

Site Scenario: 1 | Local Volumes

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: AMBER ORGANISATION | Licence: NETWORK / 1PC | Created: Tuesday, 6 January 2026 2:37:51 PM

Project: C:\Users\Kirk Ballantyne\OneDrive - Amber Organisation Pty Ltd\Amber\Jobs\1296 - Rothbury BESS\Modelling\260106.sipx

MOVEMENT SUMMARY

 **Site: [1] Wine Country Drive/Old North Road (Project AM)**
Output produced by SIDRA INTERSECTION Version: 10.0.3.210

New Site
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop of Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]		[Total HV]					[Veh. veh	Dist] m				km/h
			veh/h	%	veh/h	%	v/c	sec							
South: Wine Country Drive															
1	L2	All MCs	57	0.0	57	0.0	0.145	7.0	LOS A	0.0	0.0	0.00	0.14	0.00	71.2
2	T1	All MCs	209	10.6	209	10.6	0.145	0.0	LOS A	0.0	0.0	0.00	0.14	0.00	75.7
Approach			266	8.3	266	8.3	0.145	1.5	NA	0.0	0.0	0.00	0.14	0.00	74.3
North: Wine Country Drive															
8	T1	All MCs	158	3.3	158	3.3	0.083	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
9	R2	All MCs	17	18.8	17	18.8	0.014	7.1	LOS A	0.1	0.5	0.37	0.60	0.37	42.8
Approach			175	4.8	175	4.8	0.083	0.7	NA	0.1	0.5	0.04	0.06	0.04	73.8
West: Old North Road															
10	L2	All MCs	5	60.0	5	60.0	0.018	6.3	LOS A	0.1	0.6	0.44	0.59	0.44	30.4
12	R2	All MCs	7	28.6	7	28.6	0.018	8.6	LOS A	0.1	0.6	0.44	0.59	0.44	43.9
Approach			13	41.7	13	41.7	0.018	7.6	LOS A	0.1	0.6	0.44	0.59	0.44	38.6
All Vehicles			454	7.9	454	7.9	0.145	1.4	NA	0.1	0.6	0.03	0.12	0.03	71.8

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

MOVEMENT SUMMARY

Site: [1 (2)] Wine Country Drive/Old North Road (Project PM)
Output produced by SIDRA INTERSECTION Version: 10.0.3.210

New Site
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop of Cycles Rate to Depart	Number of Cycles	Aver. Speed
			[Total HV]		[Total HV]					[Veh. veh	Dist] m				km/h
			veh/h	%	veh/h	%	v/c	sec							
South: Wine Country Drive															
1	L2	All MCs	4	25.0	4	25.0	0.147	7.4	LOS A	0.0	0.0	0.00	0.01	0.00	63.9
2	T1	All MCs	278	1.9	278	1.9	0.147	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	79.7
Approach			282	2.2	282	2.2	0.147	0.1	NA	0.0	0.0	0.00	0.01	0.00	79.2
North: Wine Country Drive															
8	T1	All MCs	241	3.5	241	3.5	0.126	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
9	R2	All MCs	5	60.0	5	60.0	0.005	7.6	LOS A	0.0	0.2	0.41	0.59	0.41	41.2
Approach			246	4.7	246	4.7	0.126	0.2	NA	0.0	0.2	0.01	0.01	0.01	78.4
West: Old North Road															
10	L2	All MCs	19	16.7	19	16.7	0.117	5.9	LOS A	0.5	3.3	0.52	0.71	0.52	31.3
12	R2	All MCs	63	0.0	63	0.0	0.117	8.5	LOS A	0.5	3.3	0.52	0.71	0.52	49.0
Approach			82	3.8	82	3.8	0.117	7.9	LOS A	0.5	3.3	0.52	0.71	0.52	44.9
All Vehicles			611	3.4	611	3.4	0.147	1.2	NA	0.5	3.3	0.07	0.10	0.07	69.3

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

MOVEMENT SUMMARY



Site: [2] Wine Country Drive/Blackburn Close (Project AM)
Output produced by SIDRA INTERSECTION Version: 10.0.3.210

New Site
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]	[Total HV]	[Total HV]	[Total HV]				[Veh.]	[Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Wine Country Drive															
1	L2	All MCs	1	0.0	1	0.0	0.118	6.4	LOS A	0.0	0.0	0.00	0.00	0.00	70.2
2	T1	All MCs	214	11.3	214	11.3	0.118	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
3	R2	All MCs	1	0.0	1	0.0	0.001	6.5	LOS A	0.0	0.0	0.28	0.55	0.28	44.1
Approach			216	11.2	216	11.2	0.118	0.1	NA	0.0	0.0	0.00	0.01	0.00	79.5
East: Blackburn Close															
4	L2	All MCs	1	0.0	1	0.0	0.004	5.1	LOS A	0.0	0.1	0.42	0.53	0.42	41.1
5	T1	All MCs	1	0.0	1	0.0	0.004	6.9	LOS A	0.0	0.1	0.42	0.53	0.42	26.7
6	R2	All MCs	1	0.0	1	0.0	0.004	7.7	LOS A	0.0	0.1	0.42	0.53	0.42	49.9
Approach			3	0.0	3	0.0	0.004	6.5	LOS A	0.0	0.1	0.42	0.53	0.42	36.2
North: Wine Country Drive															
7	L2	All MCs	1	0.0	1	0.0	0.094	7.0	LOS A	0.0	0.1	0.01	0.01	0.01	59.4
8	T1	All MCs	175	4.8	175	4.8	0.094	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	78.8
9	R2	All MCs	1	0.0	1	0.0	0.094	6.7	LOS A	0.0	0.1	0.01	0.01	0.01	32.1
Approach			177	4.8	177	4.8	0.094	0.1	NA	0.0	0.1	0.01	0.01	0.01	77.5
West: Substation Access															
10	L2	All MCs	1	0.0	1	0.0	0.004	0.6	LOS A	0.0	0.1	0.43	0.24	0.43	29.4
11	T1	All MCs	1	0.0	1	0.0	0.004	2.6	LOS A	0.0	0.1	0.43	0.24	0.43	27.0
12	R2	All MCs	1	0.0	1	0.0	0.004	3.4	LOS A	0.0	0.1	0.43	0.24	0.43	21.5
Approach			3	0.0	3	0.0	0.004	2.2	LOS A	0.0	0.1	0.43	0.24	0.43	26.2
All Vehicles			399	8.2	399	8.2	0.118	0.1	NA	0.0	0.1	0.01	0.01	0.01	75.9

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

MOVEMENT SUMMARY

Site: [2 (2)] Wine Country Drive/Blackburn Close (Project PM)
Output produced by SIDRA INTERSECTION Version: 10.0.3.210

New Site
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

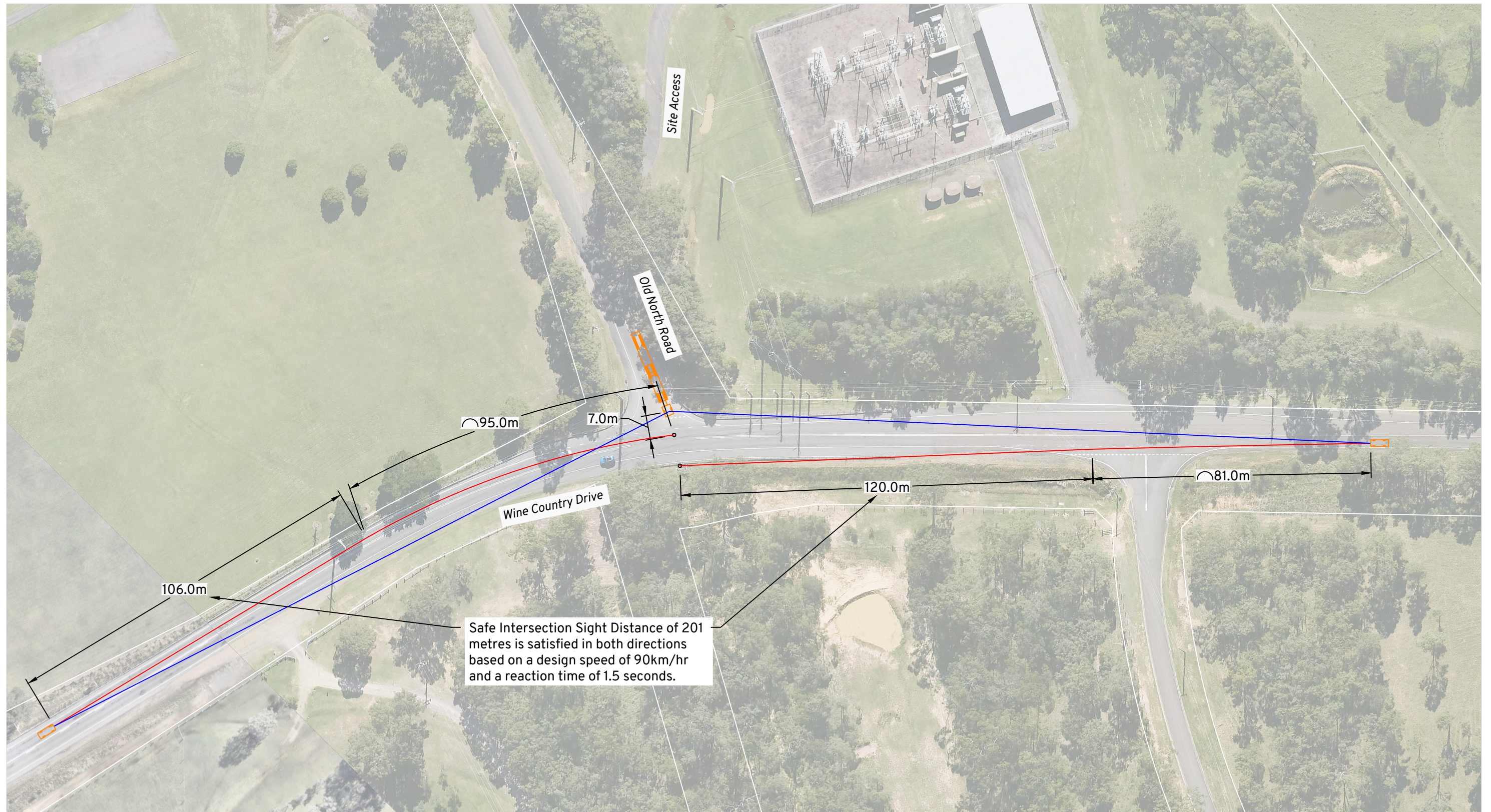
Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop of Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh.]	Dist]				km/h
South: Wine Country Drive															
1	L2	All MCs	1	0.0	1	0.0	0.154	6.4	LOS A	0.0	0.0	0.00	0.00	0.00	70.2
2	T1	All MCs	294	2.9	294	2.9	0.154	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
3	R2	All MCs	3	0.0	3	0.0	0.002	6.7	LOS A	0.0	0.1	0.34	0.56	0.34	43.8
Approach			298	2.8	298	2.8	0.154	0.1	NA	0.0	0.1	0.00	0.01	0.00	79.1
East: Blackburn Close															
4	L2	All MCs	1	0.0	1	0.0	0.005	5.3	LOS A	0.0	0.1	0.50	0.56	0.50	40.1
5	T1	All MCs	1	0.0	1	0.0	0.005	8.3	LOS A	0.0	0.1	0.50	0.56	0.50	26.5
6	R2	All MCs	1	0.0	1	0.0	0.005	9.5	LOS A	0.0	0.1	0.50	0.56	0.50	49.0
Approach			3	0.0	3	0.0	0.005	7.7	LOS A	0.0	0.1	0.50	0.56	0.50	35.6
North: Wine Country Drive															
7	L2	All MCs	1	0.0	1	0.0	0.132	7.0	LOS A	0.0	0.1	0.01	0.01	0.01	59.3
8	T1	All MCs	247	4.7	247	4.7	0.132	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	78.7
9	R2	All MCs	1	0.0	1	0.0	0.132	6.8	LOS A	0.0	0.1	0.01	0.01	0.01	32.0
Approach			249	4.6	249	4.6	0.132	0.1	NA	0.0	0.1	0.01	0.01	0.01	77.8
West: Substation Access															
10	L2	All MCs	1	0.0	1	0.0	0.005	0.9	LOS A	0.0	0.1	0.51	0.32	0.51	29.1
11	T1	All MCs	1	0.0	1	0.0	0.005	4.0	LOS A	0.0	0.1	0.51	0.32	0.51	26.7
12	R2	All MCs	1	0.0	1	0.0	0.005	5.2	LOS A	0.0	0.1	0.51	0.32	0.51	21.2
Approach			3	0.0	3	0.0	0.005	3.3	LOS A	0.0	0.1	0.51	0.32	0.51	25.9
All Vehicles			554	3.6	554	3.6	0.154	0.1	NA	0.0	0.1	0.01	0.01	0.01	76.5

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

Appendix D

Site Access Design – Swept Path Assessment





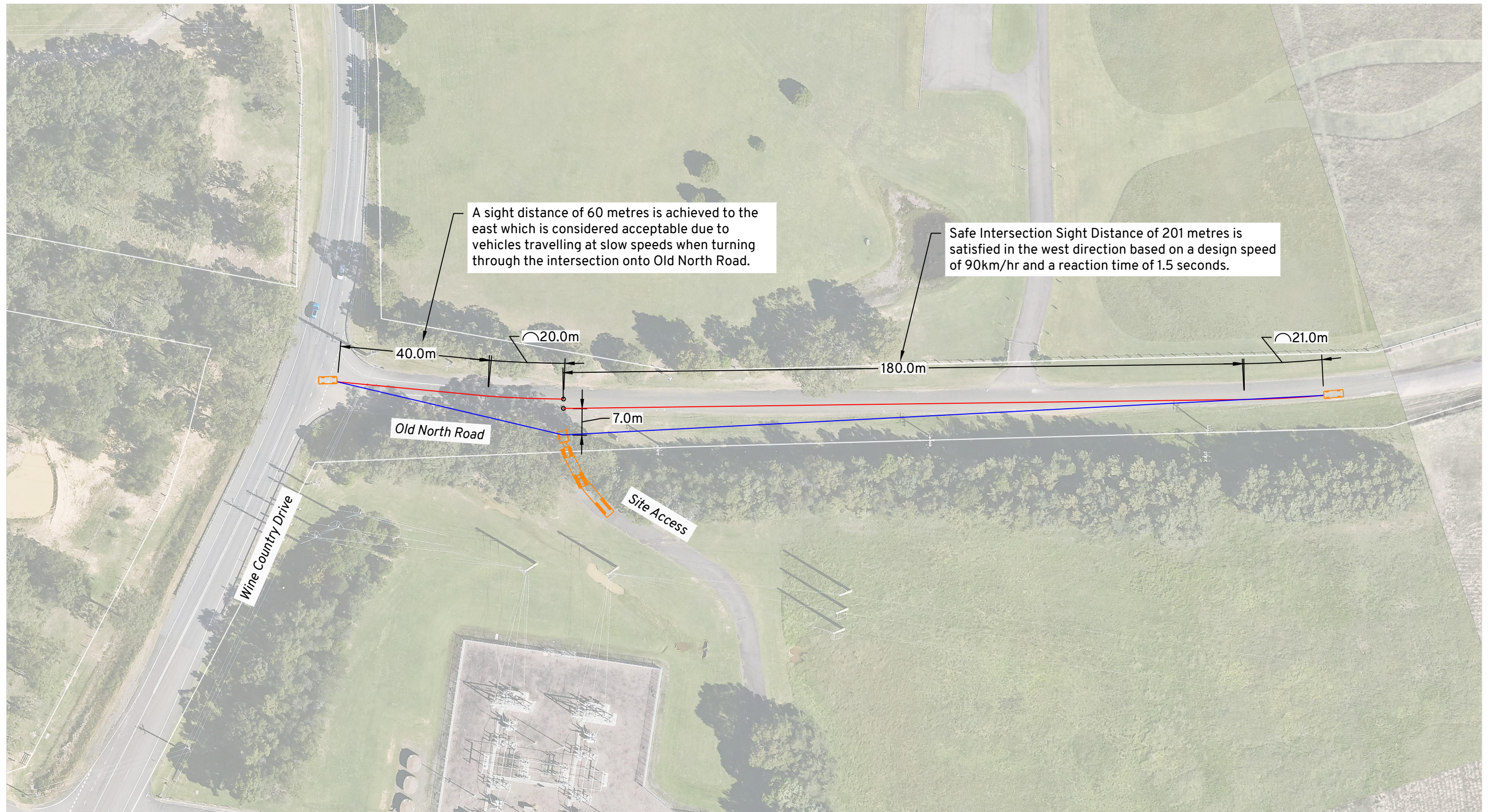
Sight Distance

Sight Line

Wine Country Dr / Old North Rd Intersection Rothbury BESS Sight Distance Assessment

DRAWN: WC
 DATE: 09/01/2026
 DWG NO: 1296 S01C
 SCALE at A3: 1:1100

Amber SD1



Sight Distance

Sight Line

Old North Rd / Site Access Rothbury BESS Sight Distance Assessment

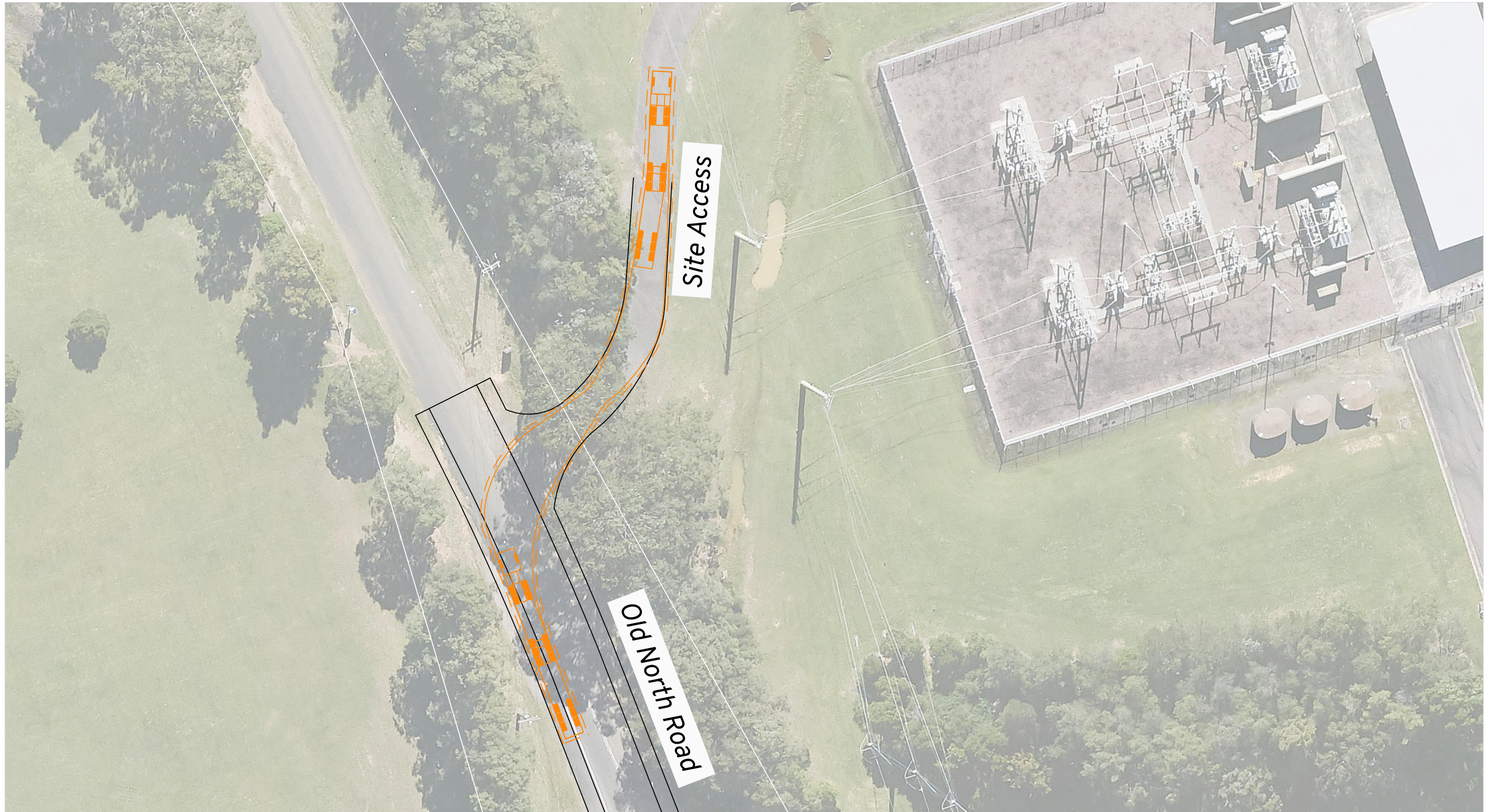
DRAWN: WC
DATE: 09/01/2026
DWG NO: 1296 S01C
SCALE at A3: 1:1000

Amber SD2

Appendix E

Sight Distance Assessment

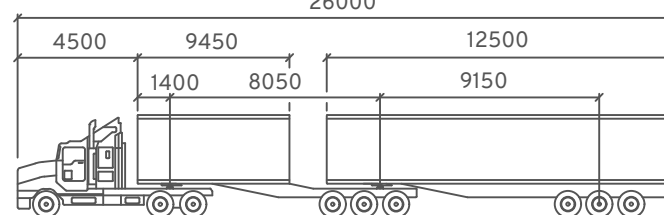




Entry Manoeuvre

Vehicle Envelope
 500mm Clearance
 Reverse Manoeuvre
 Min. Design Speed 15km/h

26.0m B-Double

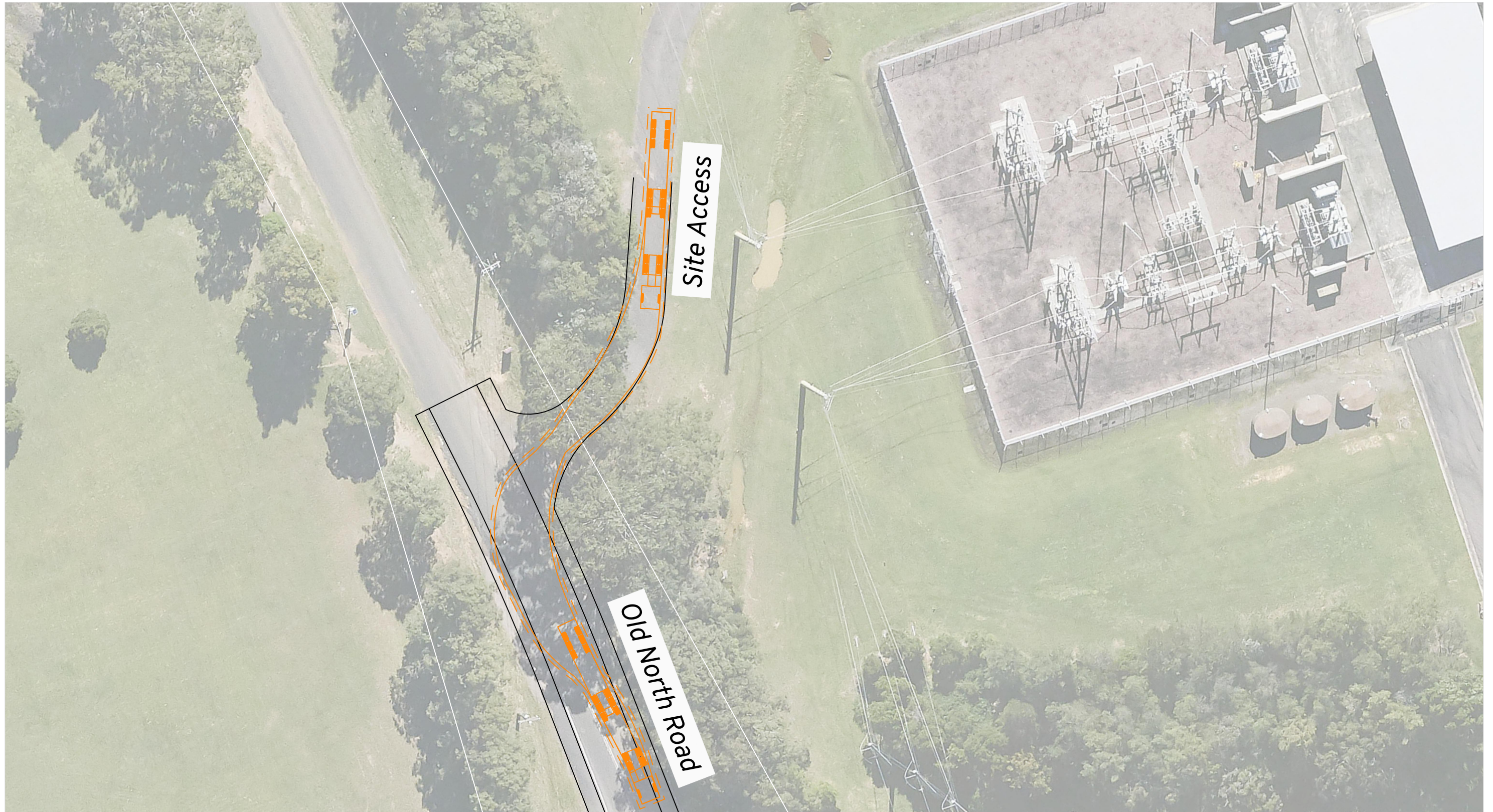


Tractor Width : 2500
 Trailer Width : 2500
 Tractor Track : 2500
 Trailer Track : 2500
 Lock to Lock : 6.0s
 Steering Angle : 22.2
 Articulating Angle : 70.0

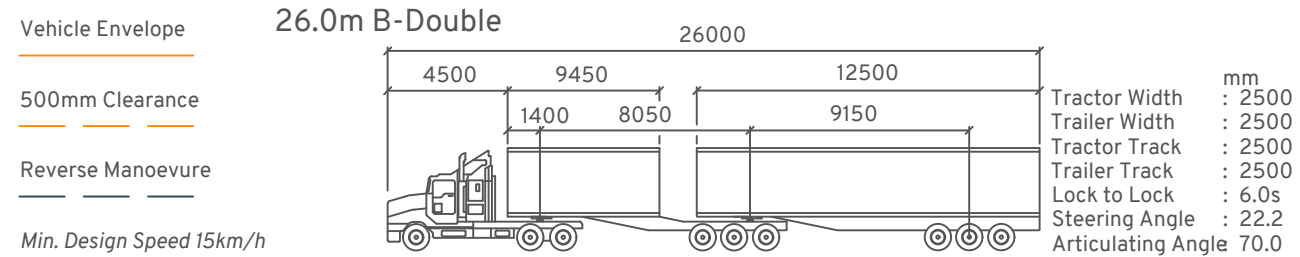
Old North Rd / Site Access
 Rothbury BESS
 Swept Path Assessment



DRAWN: WC
 DATE: 09/01/2026
 DWG NO: 1296 S01B
 SCALE at A3: 1:500



Exit Manoeuvre



Old North Rd / Site Access
Rothbury BESS
Swept Path Assessment



DRAWN: WC
DATE: 09/01/2026
DWG NO: 1296 S01B
SCALE at A3: 1:500



Right In / Left Out

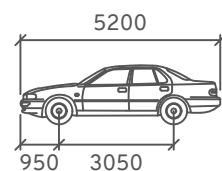
Vehicle Envelope

300mm Clearance

Reverse Manoeuvre

Min. Design Speed 5km/h

B99



Width	: 1940	mm
Track	: 1840	
Height	: 2200	
Lock to Lock	: 6.0s	
Steering Angle	: 33.9	

Old North Rd / Site Access

Rothbury BESS

Swept Path Assessment



DRAWN: WC
DATE: 09/01/2026
DWG NO: 1296 S01B
SCALE at A3: 1:500

Amber 06