TECHNICAL REPORT 3

Traffic, Transport and Access Impact Assessment

ILLABO TO STOCKINBINGAL ENVIRONMENTAL IMPACT STATEMENT

Technical and Approvals Consultancy Services: Illabo to Stockinbingal

Technical Paper 3 – Traffic, Transport and Access Impact Assessment

August 2022

2-0001-220-ITR-00-RP-0001

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Glossary

ABS	Australian Bureau of Statistics
ALCAM	Australian Level Crossing Assessment Model
ARTC	Australian Rail Track Corporation Ltd.
CEMP	Construction Environmental Management Plan
CSSI	Critical State Significant Infrastructure
DOS	Degree of Saturation
DIPNR	Department of Infrastructure, Planning and Natural Resources (NSW)
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
Freight	Goods transported by truck, train, ship, or aircraft
HV	Heavy Vehicles
Impact	Any change to the existing situation that can be attributed directly or indirectly to the proposal.
Inland Rail	The Inland Rail program encompasses the design and construction of a new Inland Rail connection between Melbourne and Brisbane, via Wagga, Parkes, Moree, and Toowoomba. The route for Inland Rail is about 1,700 kilometres in length. Inland Rail will involve a combination of upgrades of existing rail track and the provision of new track.
IRDJV	Inland Rail Design Joint Venture (WSP|MM JV legal entity)
LEPs	Local Environmental Plans
LGA	Local Government Areas are approximated with whole Mesh Blocks.
Local road	Road used primarily to access properties located along the road.
LOS	Level of Service
LV	Light Vehicles
MNES	Matters of National Environmental Significance
NSW	New South Wales
Program	Inland Rail Program

Proposal	The construction and operation of the Illabo to Stockinbingal section of Inland Rail.
Proposal site	The area that would be directly affected by construction works. It includes the location of proposal infrastructure, the area that would be directly disturbed by the movement of construction plant and machinery, and the location of the storage areas/compounds sites etc., that would be used to construct that infrastructure.
Project	The Illabo to Stockinbingal section of Inland Rail.
Rail alignment	The exact positioning of the track accurately defined both horizontally and vertically, along which the rail vehicles operate.
Rail corridor	The corridor within which the rail tracks and associated infrastructure are located.
RMAR	Rail Maintenance Access Road
RMS	Roads and Maritime Services (NSW) (agency now dissolved and functions transferred to Transport for NSW)
RSA	Road Safety Audit
RTA	Roads & Traffic Authority (preceded Roads and Maritime Services)
SEARs	Secretary's Environmental Assessment Requirements
SEPPs	State Environmental Planning Policies
SFAIRP	So Far As Is Reasonably Practical
Short-stacking	Vehicles stopping on a railway crossing due to a short distance to an intersection or gate
TfNSW	Transport for NSW
TIA	Traffic, Transport and Access Impact Assessment
TMP	Traffic Management Plan
Trip	A movement along a route from one location to another
TSR	Travelling Stock Reserves
WSP | MM	WSP Australia | Mott MacDonald Joint Venture trading as IRDJV.

1 Introduction

1.1 Overview

The Australian Government has committed to delivering a significant piece of national transport infrastructure by constructing a high performance and direct interstate freight rail corridor between Melbourne and Brisbane. Inland Rail involves the design and construction of a new inland rail connection, about 1,700km long, between Melbourne and Brisbane. Inland Rail is a major national proposal that will enhance Australia's existing national rail network and serve the interstate freight market.

Australian Rail Track Corporation Ltd (ARTC) is seeking approval to construct and operate the Illabo to Stockinbingal section of Inland Rail ('the proposal'), which has a total extent of about 42.5km, and consists of about 39km of new, greenfield single track standard gauge railway and associated infrastructure between Illabo and Stockinbingal.

The proposal requires approval from the NSW Minister for Planning under Division 5.2 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The proposal is also a controlled action under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and requires approval from the Australian Government Minister for the Environment.

This report has been prepared by Inland Rail Design Joint Venture (WSP/Mott MacDonald) as part of the environmental impact statement (EIS) for the proposal. The EIS has been prepared to accompany the application for approval of the proposal and addresses the Secretary's Environmental Assessment Requirements (SEARs) from the Secretary of the (then) NSW Department of Planning, Industry and Environment (now the Department of Planning and Environment), issued on 30 April 2021.

1.2 The proposal

The proposal is located between Illabo and Stockinbingal within the Riverina region of NSW. The location of the proposal is shown in Figure 1.1.

1.2.1 Key features

The key features of the proposal (which would be confirmed during detailed design) are shown in Figure 1.2 and includes:

- a total extent of about 42.5km, including about 39km of new, greenfield single track standard gauge railway between Illabo and Stockinbingal, including:
  - a combination of track vertical alignments on existing ground level, on embankments and in cuttings
  - 8 new bridges at watercourses, two road overbridges and one grade separated (road over rail) at Burley Griffin Way
  - one crossing loop and associated maintenance siding
  - construction of new level crossings and alterations of existing level crossings (at public roads and private accesses)
  - stock underpasses and other vehicular crossings on private land to allow for the movement of livestock and vehicles across the rail line
  - installation and upgrade of about 88 new and existing cross drainage culverts below the rail formation and 27 longitudinal drainage culverts below level crossings
  - removal of redundant sections of track along the existing Stockinbingal to Parkes line and Lake Cargelligo line at Stockinbingal
- upgrades of about 3km of existing track for the tie-in works to the existing Main South rail line at Illabo, and tie ins to the Stockinbingal to Parkes rail line at Stockinbingal

- construction of about 1.7km of new track to maintain the existing connection of the Lake Cargelligo rail line either side of the proposal
- realignment of a 1.4km section of the Burley Griffin Way to provide a road over rail bridge at Stockinbingal
- realignment of Ironbong Road to allow for safe sight lines at the new active level crossing.

Associated infrastructure would include signalling and communications, signage, fencing and services and utilities. The construction of the proposal would also require the following works:

- construction access roads and access tracks
- watercourse crossings
- temporary changes to the road network
- construction compounds.

1.2.2 Timing and operation

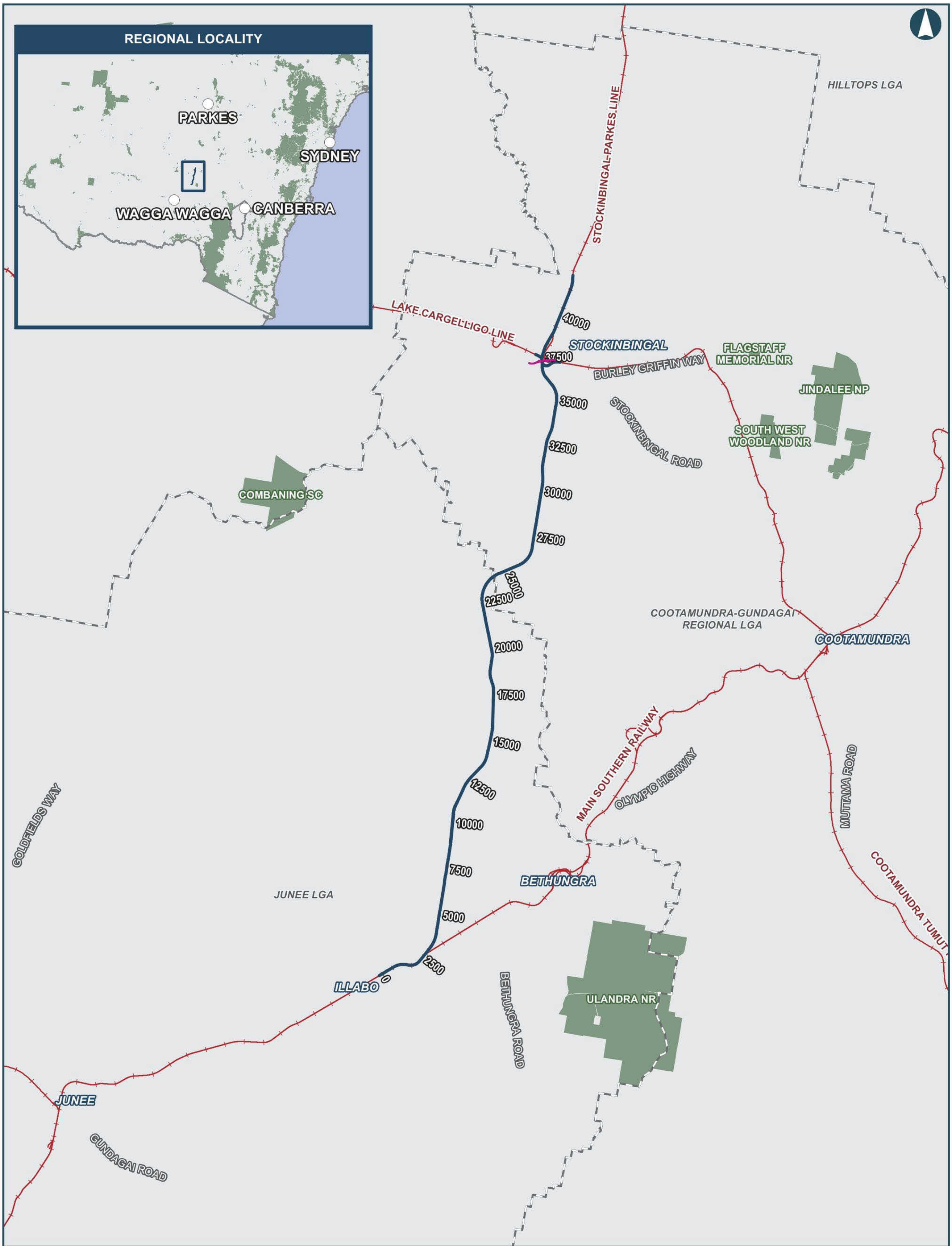
Subject to approval of the proposal, construction of the proposal is planned to start in mid-2024 and is expected to be completed by mid-2026.

The proposal would form part of the rail network managed and maintained by ARTC. Train services would be provided by a variety of operators. It is estimated the Illabo to Stockinbingal section of Inland Rail would be trafficked by an average of six trains per day (both directions) from commencement of operations in late 2026, increasing to about 11 trains per day (both directions) in 2040.

The new rail line will be a faster, more efficient route that bypasses the Sydney rail network and will enable the use of double stacked trains (up to 6.5m high) along its entire length.

The trains would be diesel powered, and would be a mix of grain, intermodal (freight), and other general transport trains up to 1,800m in length.

The proposal is expected to be operational, as part of Inland Rail as a whole, once all 13 sections are complete, which is estimated to be in 2027. Prior to that, regional rail movements may occur on the Illabo to Stockinbingal section once complete.



ILLABO TO STOCKINBINGAL 1.1 Location of the proposal

0 2 4 6 km

Coordinate System: GDA 1994 MGA Zone 55

ARTC makes no representation or warranty and assumes no duty of care or other responsibility to any party as to the completeness, accuracy or suitability of the information contained in this GIS map. The GIS map has been prepared from material provided to ARTC by an external source and ARTC has not taken any steps to verify the completeness, accuracy or suitability of that material.
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Date: 7/23/2021 Paper: A3
Author: IRDJV Scale: 1:200,000

Data Sources: ARTC, NSWSS, ESRI

Key features of proposal

- Key features of proposal
- 40950 Chainage (distance in metres from southern limit of the proposal)
- Burley Griffin Way realignment

Existing features

- Local Government area boundary
- Existing rail
- Parks and reserves
- Sub-arterial road
- Arterial road

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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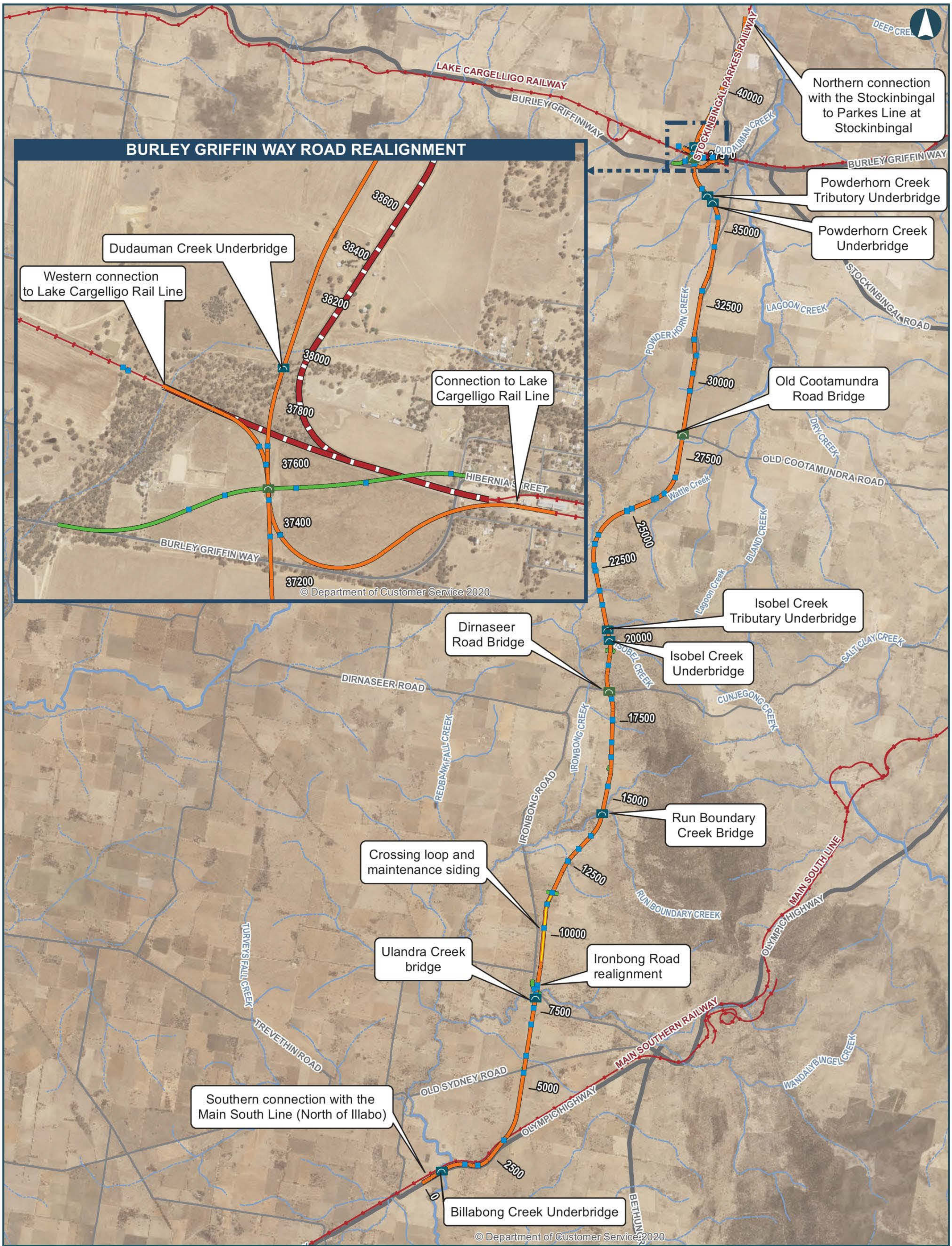

ILLABO TO STOCKINBINGAL 1.2 Key features of the proposal

0 1 2 3 km

Coordinate System: GDA 1994 MGA Zone 55

Date: 7/23/2021 Paper: A3
Author: IRDJV Scale: 1:120,000
Data Sources: ARTC, NSWSS, ESRI

Key features of proposal
- New track/track upgrade
- 40950 Chainage (distance in metres from southern limit of the proposal)
- Crossing Loop & Maintenance Siding
- Burley Griffin Way Road realignment
- Culvert
- Bridge (road crossing)
- Bridge (water crossing)

Existing features
- Sub-arterial road
- Arterial road
- Existing Rail
- Major Watercourse
- Minor Watercourse
- Redundant sections of rail to be decommissioned

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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1.3 Scope and purpose

This report has been prepared to specifically address the SEARs issued by the (then) NSW Department of Planning, Infrastructure and Environment on 30 April 2021. The SEARs relevant to traffic and transport, and references to sections where they have been addressed in the report are presented below in Table 1.1.

Table 1.1 Secretary's Environmental Assessment Requirements – Transport and traffic

SEAR Number	Requirement	Where addressed in this report
3. Transport and Traffic	1) Construction transport and traffic (vehicle, pedestrian and cyclists) impacts, including, but not necessarily limited to:	
	a) the likely construction access routes (including haul routes) and the scheduling of construction vehicle movements;	Section 5.3.1, 5.3.3 and 5.3.4
	b) the indicative number, frequency and size of construction related vehicles (passenger, commercial and heavy vehicles, including spoil management movements and track machines);	Section 5.3.2 and 5.3.3
	c) construction worker parking;	Section 5.4.6
	d) the nature of existing traffic (types and number of movements) on construction access routes (including consideration of peak traffic times, movement of livestock, agricultural machinery, farm vehicles and other farm infrastructure) and assessment of traffic impacts on these routes including identifying traffic management measures to mitigate any issues;	Section 4.2.1, 4.2.4, 5.4.1, 5.4.2, 5.4.7 and Chapter 6
	e) provisions proposed to ensure safe access and egress to/from the classified road network;	Chapter 6
	f) the nature of any train paths (types and number of movements) and potential impact to these train paths due to additional track possession requirements; and	Section 5.4.3
	g) the need to close, divert or otherwise reconfigure elements of the road and cycle network associated with construction of the project and the duration of these changes.	Section 5.4.8 and 5.5.2
	2) Operational transport impacts of the project for both road and rail, including:	
	a) forecast travel demand and traffic volumes for the project (road and rail);	Section 5.5.1 and 5.5.3
	b) travel time analysis;	Section 5.5.1 and 5.5.3
	c) performance of key intersections and level crossings by undertaking a level of service analysis at key locations;	Section 5.5.3
	d) wider transport interactions (local and regional roads, cycling, movement of livestock or farm vehicles, intermodal hubs. public and freight transport and the broader NSW rail network); and	Section 5.5.1, 5.5.4, 5.5.5 and 5.5.7
	e) identification of traffic and transport measures to mitigate any impacts.	Chapter 6
	The assessment must include the modelling of the operational impact of the project.	Section 5.5.1 and 5.5.3

SEAR Number	Requirement	Where addressed in this report
	3) Assess the feasibility of level crossings (existing and proposed) and justify the safety and operational impacts and/or benefits of the proposed crossing type, taking into account the NSW Government's Construction of New Level Crossings Policy.	Section 4.3.1 and 5.5.3
	4) In the assessment of level crossings, the EIS must:	
	a) provide a safety assessment for each level crossing. The safety assessment is to be consistent with ALCAM, and any Interface Agreements and related Safety Management Plans;	Section 5.5.3 and Appendix A
	b) demonstrate how the risks identified in the So Far As Is Reasonably Practical (SFAIRP) process will be reduced in consultation with the relevant road authority and TfNSW.	Section 5.5.3 and Appendix A
	c) assess potential short-stacking impacts;	Section 5.5.3 and Appendix A
	d) confirm road approaches to level crossings are fit for purpose, safe and designed and constructed in accordance with Austroads Guide to Road Design; and	Section 5.5.3 and Appendix A
	e) account any rationalisation of private and public level crossings in line with the NSW Government's Level Crossing Closure Policy.	Section 5.5.3 and Appendix A

1.4 Structure of this report

The structure of this report is outlined below:

- **Chapter 1 – Introduction** – provides an introduction to the report.
- **Chapter 2 – Legislation and policy context** – describes the legislative and policy context for the assessment and relevant guidelines.
- **Chapter 3 – Methodology** – describes the methods and assessment criteria adopted in this report to characterise and assess potential impacts on the transport network.
- **Chapter 4 – Existing environment** – describes the existing transport network environment including road, rail and public transport services.
- **Chapter 5 – Impact assessment** – identifies and assesses potential transport network impacts from construction and operation of the proposal.
- **Chapter 6 – Mitigation and management measures** – details recommended mitigation and management measures to reduce transport network impacts.
- **Chapter 7 – Conclusion** – overview of the key findings of the report.

2 Legislation and policy context

Key legislation relevant to the proposal and policies relevant to traffic and transport referenced in the SEARs are described below.

2.1 Commonwealth legislation

2.1.1 Environment Protection and Biodiversity Conservation Act 1999

The objective of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is to protect and manage prescribed Matters of National Environmental Significance (MNES). Under the EPBC Act, proposed 'actions' that have the potential to significantly impact on MNES, the environment of Commonwealth land, or that are being carried out by a Federal Government agency, must be referred to the Federal Minister for the Environment for assessment.

As a result of the potential for impacts on protected matters, the proposal was referred to the (then) Australian Government Minister for the Environment in June 2018 (EPBC Referral No 2018/8233). On 6 August 2018, the (then) Australian Government Department of the Environment and Energy notified that the proposal is a controlled action, with the controlling provisions being 'listed threatened species and communities' (under section 18 & 18A of the EPBC Act).

2.2 NSW legislation

2.2.1 Environmental Assessment and Planning Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) and Environmental Planning and Assessment Regulation 2021 (EP&A Regulation) establish a framework for the assessment and approval of developments in NSW. They also provide for the making of environmental planning instruments, including state environmental planning policies (SEPPs) and local environmental plans (LEPs), which determine the permissibility and approval pathway for development proposals and form a part of the environmental assessment process. In accordance with the provisions of the EP&A Act, the proposal is State Significant Infrastructure.

SSI may also be declared to be critical State significant infrastructure (CSSI) in accordance with section 5.13 of the EP&A Act, if it is of a category that, in the opinion of the Minister for Planning is essential for the State for economic, environmental or social reasons. The proposal was declared as CSSI in 2021.

Under section 5.14 of the EP&A Act, the approval of the Minister for Planning is required for State significant infrastructure (including CSSI), and an EIS has been prepared under Division 5.2 of the EP&A Act.

SEARs have been provided by the (then) NSW Department of Planning, Industry and Environment and those that are relevant to traffic and transport are summarised in Table 1.1.

2.2.2 Roads Act 1993

The *Roads Act 1993* (Roads Act) provides guidance on the classification of public roads, the procedures for closure of a public road, and regulates the carrying out of various activities on public roads. It is noted in section 138 that consent from the relevant road authority is required to carry out various works in, on or under a public road. If the road is a classified road under the Act, then the concurrence of Transport for NSW (TfNSW) is also required before the roads authority can grant its consent.

2.3 Policies and strategic plans

2.3.1 Future Transport 2056 Strategy (TfNSW, 2018a)

Future Transport 2056 (TfNSW, 2018) provides an overarching, customer focused 40-year strategy that outlines a vision, strategic directions and customer outcomes for the transport system in NSW. Future Transport includes a number of strategies to improve the movement of people and goods within the Greater Sydney area. In particular, Inland Rail is discussed as a major focus of Australian governments, to provide an enhanced link between Melbourne and Brisbane and support intermodal hubs in regional NSW.

2.3.2 NSW Freight and Ports Plan 2018-2023 (TfNSW, 2018b)

The NSW Freight and Ports Plan 2018-2023 (TfNSW, 2018) is a call to action for government and industry to collaborate on clear initiatives and targets to make the NSW freight task more efficient and safe. Key objectives of the Plan are to increase economic growth, increase efficiency, connectivity and access, greater freight capacity, improved safety and enhanced sustainability. To achieve the objectives, the NSW Government have created 117 initiatives to action within the accompanying Implementation Plan, which includes supporting the delivery of Inland Rail. Investment in improving the east-west rail freight network with NSW ports is recognised as critical to optimising the benefits of the Inland Rail project for NSW and the Plan details a number of measures recommended to maximise the benefits of Inland Rail.

2.3.3 Guide to Traffic Generating Developments Version 2.2 (RTA, 2002)

This guideline outlines the appropriate methodology for conducting traffic impact studies and compiling traffic impact statements as per the SEARs requirements. It includes a checklist style table of information required to conduct such studies, which this TIA has adhered to, where relevant to the project. It also sets out the Level of Service definitions which are recommended as a baseline for assessments. This guide has been adopted as the overarching methodology in producing the Traffic Impact Assessment.

2.3.4 Guide to Traffic Management – Part 3 Traffic Studies and Analysis (Austroads, 2007)

Part 3 of Austroads' Guide to Traffic Management (Austroads, 2007) outlines the importance of traffic data and its analysis for the purpose of traffic management and traffic control within a network. It serves as a means to ensure some degree of consistency in conducting traffic studies and surveys. It provides guidance on the different types of traffic studies and surveys that can be undertaken, their use and application, and methods for traffic data collection and analysis. The traffic assessment that was completed for the proposal was conducted with consideration of the requirements in this guide.

2.3.5 Cycling Aspects of Austroads Guides (Austroads, 2017)

Cycling Aspects of Austroads Guides is a collection of information that relates to the planning, design and traffic management of cycling facilities sourced from Austroads Guides, primarily the Guide to Road Design, the Guide to Traffic Management and the Guide to Road Safety. Its use is intended as a guide for planning, design, construction and management of cycling facilities. As there is no cycling infrastructure currently in place in the key interface areas with the proposal, this guide has not been used in the assessment.

2.3.6 NSW Bicycle Guidelines v 1.2 (RTA, 2005)

This manual is provided as a guide to practitioners on how bicycle network facilities should be developed as part of the wider NSW transportation network. The TfNSW policy on bicycles is set out in *Action for Bikes – Bikeplan 2010 (RTA, 1999).* It lists the government's four strategies as:

- improving the bike network by making provisions for cyclists on new major road infrastructure projects
- making it safer to cycle
- improving personal and environmental health by promoting benefits of cycling; and
- raising the community awareness of the importance of cycling and raising community involvement.

As this section of the proposal does not require any design and construction of new cycleways, this guide has not been used in the assessment.

2.3.7 NSW Sustainable Design Guidelines Version 4.0 (TfNSW, 2017)

The NSW Sustainable Design Guidelines (TfNSW, 2017) seek to deliver sustainable development practices into the planning, design, construction, operations and maintenance of transport infrastructure projects. Key aims of the guidelines are to:

- minimise impacts of transport on the environment, through transport operations, infrastructure delivery and maintenance
- ensure development, expansion and management of the transport network is sustainable and resilient to climate change; and
- procure, deliver and promote sustainable transport options that achieve value for money and reduced life cycle costs.

Within the assessments undertaken as part of the EIS which included climate change and sustainability assessment, the aims of this guideline have been considered in the delivery of the proposal, as relevant.

2.3.8 Planning Guidelines for Walking and Cycling (DIPNR, 2004)

This guideline aims to improve consideration of walking and cycling in the planning of new infrastructure. The guideline has been designed to provide a walking and cycling focus to the NSW Government's *Integrating Land Use & Transport Planning Policy Package*. It is primarily targeted at land-use planners and development on private land. As there are no changes planned to the active transport infrastructure as part of the proposal, this guide has not been used in the assessment.

2.3.9 Australian Level Crossing Assessment Model: ALCAM in Detail (ALCAM, 2016)

The Australian Level Crossing Assessment Model (ALCAM) is a tool used to identify key potential risks at level crossings and assess the overall effects of proposed treatments. It does not specify what treatment is warranted at level rail-road crossing sites nor attempt to define a 'safe' or acceptable level of risk. It is a risk model used to support a decision making process, with the decision to be made for each jurisdiction based on the standard of existing crossings, upgrade budgets and the level of risk prepared to be tolerated. ALCAM assessments have been undertaken for all public road level crossings proposed as part of the proposal.

2.3.10 Level Crossing Closures Policy (TfNSW, undated)

The purpose of this policy is to provide guidance and direction in the ongoing development and management of the NSW rail network. Due to the safety risk associated with level crossings, it is Government policy that where alternative access exists and following consultation with affected parties, level crossings be closed whenever possible and where it is practical and cost effective to do so. It is preferable to manage access by a grade separation or by redirecting traffic via an alternate approved access route. Formal closure of any level crossing requires Ministerial approval under the *Transport Administration Act 1988.*

2.3.11 Construction of New Level Crossing Policy (TfNSW, undated)

The purpose of this policy is to provide guidance and direction to transport planners and infrastructure managers in the ongoing development and management of the NSW rail network. The approach taken by TfNSW and rail and road agencies is to avoid building new level crossings wherever possible given the inherent risk attached to any level crossing, even those with modern active controls. Construction and operation of the proposal introduces several new level crossings, a decision which has been made in accordance with information and recommendations provided within the policy.

2.3.12 Speed Limit on Approach to Active Level Crossings Policy (TfNSW, 2019)

The purpose of this policy is to help reduce the risk of crashes at level crossings between road vehicle and train by reducing road speeds on high-speed approaches to actively controlled level crossings. The proposal has considered the policy for approaches to actively controlled level crossings. ARTC will continue to consult with TFNSW during to ensure that the design complies with the policy.

2.3.13 Railway Crossing Safety Series 2011, Plan: Establishing a Railway Crossing Safety Management Plan (RTA, 2011)

Railway crossings are an integral part of the NSW road network. However, their existence and operation present a risk to the safety of road users within the state. This guideline outlines the process, procedures and tools required to meet the legislative, occupational health and safety and project management requirements for safety at railway crossings. The planning and management of safety risks, safety management measures and railway crossing safety management plans requires a systematic planning approach, involving collaboration with both internal and external stakeholders. This plan has been considered throughout the proposal to maximise safety outcomes at railway crossings.

3 Methodology

3.1 Approach

The study area, in terms of the Traffic Impact Assessment Report, is defined as all road and rail corridors that are potentially impacted by the construction and operation of the proposal, including routes designated as construction routes from surrounding town centres.

To assess the impacts of the construction and operation of the proposal on the existing transport networks including road, rail and public transport services, the following has been undertaken:

- identification of the following within the study area:
  - surrounding roads and population centres to the proposal
  - roads (links) that provide access to the proposal from the identified population centres (construction routes)
  - existing intersections on the construction routes with the highest levels of background traffic, on which construction vehicles will undertake turning movements (construction route intersections)
  - intersections (existing and proposed) which would provide direct access to the proposal from the roads that form the construction routes (construction access intersections)
  - livestock highways and travelling stock reserves (TSR) near the proposal using NSW Local Land Services TSR online mapping software
  - public and active transport infrastructure and services in the vicinity of the proposal
  - analysis of the most recently made available crash data, a five year period (2016–2020), on proposed construction routes
- obtaining of traffic count data for the roads identified in the study area from the following sources:
  - RMS online traffic volumes viewer
  - traffic surveys provided by Junee Shire Council between 2006 to 2016 for roads in the vicinity of the proposal
  - project specific traffic surveys undertaken in 2018 and 2019, provided in Appendix B
- estimation of future baseline traffic volumes by applying a compounding 0.5 per cent annual growth rate to the received traffic count data, for:
  - during construction (2024–2026)
  - first year of operation (2027, applied conservatively, after opening of the proposal in late 2026)
  - 10-year design horizon (2037)
- identification of construction modelling inputs:
  - review of forecast workforce and construction vehicle types, quantities and staging
  - identification of construction vehicle origins and access routes
  - identification of peak workforce and construction vehicle movements
  - identification of haulage routes between construction sections
- assessment of construction traffic impacts:
  - link assessment of roads identified for use as construction routes, during the peak period of construction by assessing the two-way demand of light and heavy vehicles on each road and comparing it to the capacity
    - in this assessment a Level of Service (LOS) performance standard is applied. This is described in more detail in the performance criteria section below

   - construction route intersection and construction access intersection assessments, during peak period of construction using SIDRA 8.0 modelling software and qualitative analysis. Each road undergoes an independent analysis to establish background traffic, light and heavy construction vehicles, including plant and equipment deliveries, quarry deliveries, concrete trucks, water tankers and earthworks haulage vehicles operating between construction sections. Intersections with the highest predicted demand undergo the intersection assessment
      - in this assessment the average delay, Degree of Saturation (DOS) and LOS by approach is output by the SIDRA 8.0 analysis for each intersection for base and project scenarios. This assessment has been undertaken using LOS measured by delay. This is described in more detail in the performance criteria section below
   - qualitative review of the impacts to the rail network, public and active transport, road safety and parking
   - review of livestock highways and travelling stock reserves (TSR) near the proposal using NSW Local Land Services TSR online mapping software
   - identification of detour routes and associated travel time using Google Maps
- assessment of operational impacts:
   - qualitative review of the impacts on the road network considering local and regional roads, cycling, public and freight transport, parking, livestock highways and the broader NSW rail network
   - rail maintenance workforce movements
   - qualitative assessment of the realignment of Burley Griffin Way and Ironbong Road
   - assessment of feasibility of level crossings including preferred treatments and calculation of delays, determined using crossing frequency and speed of train services for 2027 and 2037
- review of cumulative impacts from other projects during the construction or operation of the proposal
- identification of mitigation and management measures or strategies where impacts have been identified.

3.2 Performance criteria

As summarised above, the assessment of the impact of construction vehicles on surrounding roads to the proposal has been carried out in the following ways:

- link assessment of roads identified for use as construction routes
- construction route intersection and construction access intersection assessments using SIDRA 8.0 modelling software.

To assess compliance of the results, the Guide to Traffic Generating Developments (RTA, 2002) has been used. It is understood that the proposal is not a traffic generating development however the methodology and performance standards has been applied to inform the assessment of construction traffic impacts on the local road network.

The Guide to Traffic Generating Developments (RTA, 2002) states:

*An important consideration in determining the impact of a development proposal on the road system is to assess the effect on traffic efficiency, the objective of which is to maintain the existing level of service. Adverse effects must be identified and corrective measures designed. The level of service is used as the performance standard. This is a qualitative assessment of the quantitative effect of factors such as speed, volume of traffic, geometric features, traffic interruptions, delays and freedom to manoeuvre. There are six levels of service (LOS), as described below (*Table 3.1*), from AUSTROADS Guide to Traffic Engineering Practice - Part 2: Roadway Capacity, (1988).*

Table 3.1 Level of Service description

Level of Service	Average delay per vehicle (secs/veh)	Intersection performance	Description
A	<14	Good operation	Free flow in which individual drivers are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high, and the general level of comfort and convenience provided is excellent.
B	15 to 28	Good with acceptable delays and space capacity	Stable flow and drivers still have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream, although the general level of comfort and convenience is little less than that of the Level of Service A.
C	29 to 42	Satisfactory	Stable flow, but most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience declines noticeably at this level.
D	43 to 56	Operating near capacity	Close to the limit of stable flow but is approaching unstable flow. All drivers are severely restricted in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience is poor, and small increases in traffic flow will generally cause operational problems.
E	57 to 70	At capacity	Traffic volumes are at or close to capacity and there is virtually no freedom to select desired speeds or to manoeuvre within the traffic stream. Flow is unstable and minor disturbances within the traffic stream will cause a traffic-jam.
F	>70	At or over capacity	This service level is in the zone of forced flow. With it, the amount of traffic approaching the point under consideration exceeds that which can pass it. Flow break-down occurs and queuing and delays result.

The Guide also provides a table (replicated in Table 3.2) for determining peak hour LOS on rural roads. The table provides LOS criteria for level, rolling and mountainous terrain types, of which level has been deemed the most appropriate terrain type for the roads under assessment.

The table sets out two-way hourly road capacities for two-lane roads for different levels of service, with a design speed of 100km/hr. The capacity assumes a 60/40 directional split of traffic. Where design speeds of 80km/hr are used, the resulting capacities are between 85–95 per cent of the figures quoted, depending on the level of service. The design speed capacities for 100km/hr and 80km/hr have been adopted for this assessment.

Table 3.2 Peak hour flow on two-lane rural roads (veh/hr) (Design speed of 100km/hr)

Terrain	Level of Service	0% HV	5% HV	10% HV	15% HV
Level	B	630	590	560	530
	C	1,030	970	920	870
	D	1,630	1,550	1,480	1,410
	E	2,630	2,500	2,390	2,290

As HV percentages on some roads under assessment are higher than 15 per cent, the peak hour flows shown in Table 3.2 have been extrapolated to provide LOS parameters for an HV percentage of up to 60 per cent as shown in Table 3.3.

Table 3.3 Extrapolated peak hour flow (Design speed of 100km/hr)

Terrain	Level of Service	20% HV	25% HV	30% HV	35% HV	40% HV	45% HV	50% HV	55% HV	60% HV
Level	B	500	470	440	410	380	350	320	290	260
	C	820	770	720	670	620	570	520	470	420
	D	1,340	1,270	1,200	1,130	1,060	990	920	850	780
	E	2,190	2,090	1,990	1,890	1,790	1,690	1,590	1,490	1,390

To account for roads with design speeds of 80km/hr, peak hour flows (85 per cent of the flows in Table 3.3) have been calculated, as shown in Table 3.4.

Table 3.4 Extrapolated peak hour volumes (Design speed of 80 km/hr)

Terrain	Level of Service	20% HV	25% HV	30% HV	35% HV	40% HV	45% HV	50% HV	55% HV	60% HV
Level	B	425	400	374	349	323	298	272	247	221
	C	697	655	612	570	527	485	442	400	357
	D	1,139	1,080	1,020	961	901	842	782	723	663
	E	1,862	1,777	1,692	1,607	1,522	1,437	1,352	1,267	1,182

For the construction link assessment undertaken for this proposal, the target performance is to maintain operation within capacity across the network.

The SIDRA analysis outputs average delay, Degree of Saturation (DOS) and Level of Service (LOS) by approach.

Delay, is defined in SIDRA as:

> *The additional (excess) travel time experienced by a vehicle or pedestrian relative to a base travel time, e.g. the free-flow travel time. Average delay considering all vehicles or pedestrians that are queued and not queued is a common performance measure used for intersection and network analysis.*

Degree of Saturation (DOS), is defined in SIDRA as:

> *The ratio of arrival (demand) flow rate to capacity during a given flow period. Also, known as the volume to capacity ratio (v/c ratio), utilisation ratio, utilisation factor and traffic intensity.*

Level of Service (LOS), is defined in SIDRA as:

> *An index of the operational performance of traffic on a given roadway, traffic lane, approach, intersection, route or network, based on measures such as delay and degree of saturation etc. during a given flow period. This provides a quantitative stratification of a performance measure or measures that represent quality of service, measured on an A to F scale, with LOS A representing the best operation conditions from the traveller's perspective and LOS F the worst.*

The construction route intersection and construction access intersection assessments have been undertaken using LOS measured by delay, as is recommended in the RMS guideline, with a target to have intersections operating within capacity during construction.

4 Existing environment

4.1 Location

The proposal site crosses two Local Government Areas (LGA), with the southern section of the proposal located in the Junee Shire LGA and the northern section in the Cootamundra-Gundagai Regional LGA. The land throughout the LGAs is predominantly rural land used for agriculture and grazing.

Illabo is a small town located at the southern end of the proposal, 16km north-east of Junee and 32km south-west of Cootamundra. The town is located on the Olympic Highway between Junee and Bethungra.

Stockinbingal is located at the northern extent of the proposal in the Cootamundra-Gundagai Regional LGA. The town is located on Burley Griffin Way between Temora and Harden, 19km north-west of Cootamundra.

The major towns surrounding the proposal are Wagga Wagga, about 50km to the south, Young to the north-east and Cootamundra to the east.

4.2 Existing road network

The proposal intersects one highway, Burley Griffin Way (B94), towards its northern extent. Other major highways in the vicinity of the project are the Olympic Highway (A41) to the east and south east and Goldfields Way (B85) to the west. The proposal also crosses a number of local and private roads. There are no major towns located along the proposal site between Illabo and Stockinbingal.

Table 4.1 shows the roads intersected by the proposal and those required to support construction activities for the proposal, including whether they provide direct access to a construction site.

Table 4.1 Roads intersected by alignment and required to support construction activities

Road name	Intersected by alignment	Rail chainage at which road intersects	Provides direct access to site construction section
Burley Griffin Way	Yes	37,539m	Yes
Hibernia Street	No	N/A	Yes
Troy Street	No	N/A	No
Grogan Road	Yes*	40,800m	Yes
Freemans Lane	Yes*	41,672m	No
McLaughlins Lane	Yes*	40,678m	No
Dudauman Road	No	N/A	Yes
Corbys Lane	Yes	33,769m	No
Old Cootamundra Road	Yes	28,263m	Yes
Blackgate Road	No	N/A	No
Dirnaseer Road	Yes	18,470m	Yes
Ironbong Road	Yes	8,152m	Yes
Old Sydney Road	Yes	5,588m	Yes
Olympic Highway	No	N/A	Yes
Goldfields Way	No	N/A	No

Road name	Intersected by alignment	Rail chainage at which road intersects	Provides direct access to site construction section
Retreat Road	No	N/A	No
Junee Reefs Road	No	N/A	No
Stockinbingal Road	No	N/A	No
Warrens Lane	No	N/A	No
Eulomo Settlement Road	No	N/A	No
Suttons Lane	No	N/A	No

*road intersected by existing rail line, however no works proposed in this location as part of the proposal.

Table 4.2 shows the profile of the roads noted in Table 4.1. Where no posted speed limits have been noted on the roads under assessment, Transport for New South Wales (TfNSW) guidance on default speed limits on rural roads has been adopted as per the following:

- *In NSW there are two default speed limits, default urban speed limit for roads in built-up areas (i.e. where there are buildings next to the road or where there is street lighting) and a default speed limit for all other roads:*
  - *Default urban speed limit is 50 km/h; and*
  - *Default speed limit for all other roads is 100 km/h (RMS, 2018).*

Table 4.2 Road profile

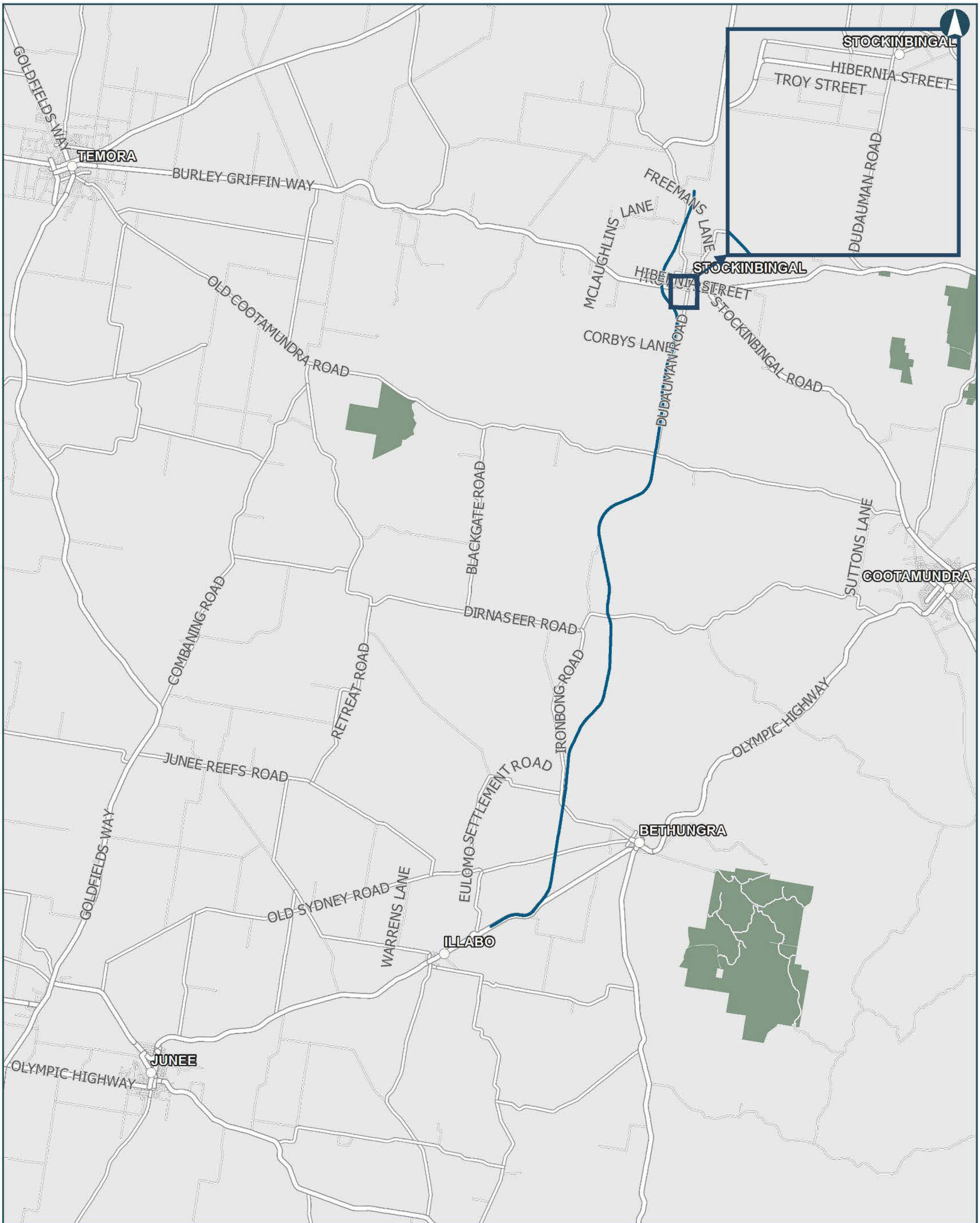
Road name	State or local road controlled	Sealed and delineated	No. of lanes at proposal site	Width^	Speed limit (in vicinity of proposal) (kmph)
Burley Griffin Way	State – TfNSW	Yes	One lane (two-way)	Approx. 7m	100
Hibernia Street	State – TfNSW	Yes	One lane (two-way)	Approx. 6m	60
Troy Street	Local – Cootamundra-Gundagai Regional Council	Sealed, delineated at intersections	One lane (two-way)	Approx. 5m	50*
Grogan Road	Local – Cootamundra-Gundagai Regional Council	Yes	One lane (two-way)	Approx. 7m	100
Freemans Lane	Local – Cootamundra-Gundagai Regional Council	No	One lane (two-way)	Approx. 6m	100*
McLaughlins Lane	Local – Cootamundra-Gundagai Regional Council	Unsealed, delineated at intersections	One lane (two-way)	Approx. 5m	100*
Dudauman Road	Local – Cootamundra-Gundagai Regional Council	Sealed, delineated at intersections	One lane (two-way)	Approx. 7m	100*

Road name	State or local road controlled	Sealed and delineated	No. of lanes at proposal site	Width^	Speed limit (in vicinity of proposal) (kmph)
Corbys Lane	Local – Cootamundra-Gundagai Regional Council	No	One lane (two-way)	Approx. 7m	100*
Old Cootamundra Road	Local – Cootamundra-Gundagai Regional Council	Yes	One lane (two-way)	Approx. 6m	100*
Blackgate Road	Local – Junee Shire Council	Sealed, no delineation	One lane (two-way)	Approx. 5m	100*
Dirnaseer Road	Local – Junee Shire Council	Yes	One lane (two-way)	Approx. 7m	100*
Ironbong Road	Local – Junee Shire Council	Sealed, no delineation	One lane (two-way)	Approx. 5m	100*
Old Sydney Road	Local – Junee Shire Council	No	One lane (two-way)	Approx. 5m	100*
Olympic Highway	State – TfNSW	Yes	One lane (two-way)	Approx. 8m	100*
Goldfields Way	Local – Junee Shire Council	Yes	One lane (two-way)	Approx. 7m	100*
Retreat Road	Local – Junee Shire Council	Sealed, no delineation	One lane (two-way)	Approx. 5m	100*
Junee Reefs Road	Local – Junee Shire Council	Sealed, no delineation	One lane (two-way)	Approx. 5m	100*
Stockinbingal Road	Local – Cootamundra-Gundagai Regional Council	Yes	One lane (two-way)	Approx. 8m	100*
Warrens Lane	Local – Junee Shire Council	Sealed, no delineation	One lane (two-way)	Approx. 5m	100*
Eulomo Settlement Road	Local – Junee Shire Council	Sealed, no delineation	One lane (two-way)	Approx. 5m	100*
Suttons Lane	Local – Cootamundra-Gundagai Regional Council	Yes	One lane (two-way)	Approx. 7m	100*

^determined by measuring road width (pavement/dirt edge to edge) on Google Maps

*default speed limit adopted.

The location of the roads in Table 4.2, in relation to the proposal, can be seen in Figure 4.1. The roads in Stockinbingal which are discussed within this report are shown in Figure 4.2.



ILLABO TO STOCKINBINGAL 4.1 Road network

0 1 2 3 4 5 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 3/17/2022 Paper: A3
Author: IRDJV Scale: 1:180,000
Data Sources: ARTC, NSWSS, ESRI

Proposal site
Parks and reserves
Arterial road
Sub-arterial road
Local road

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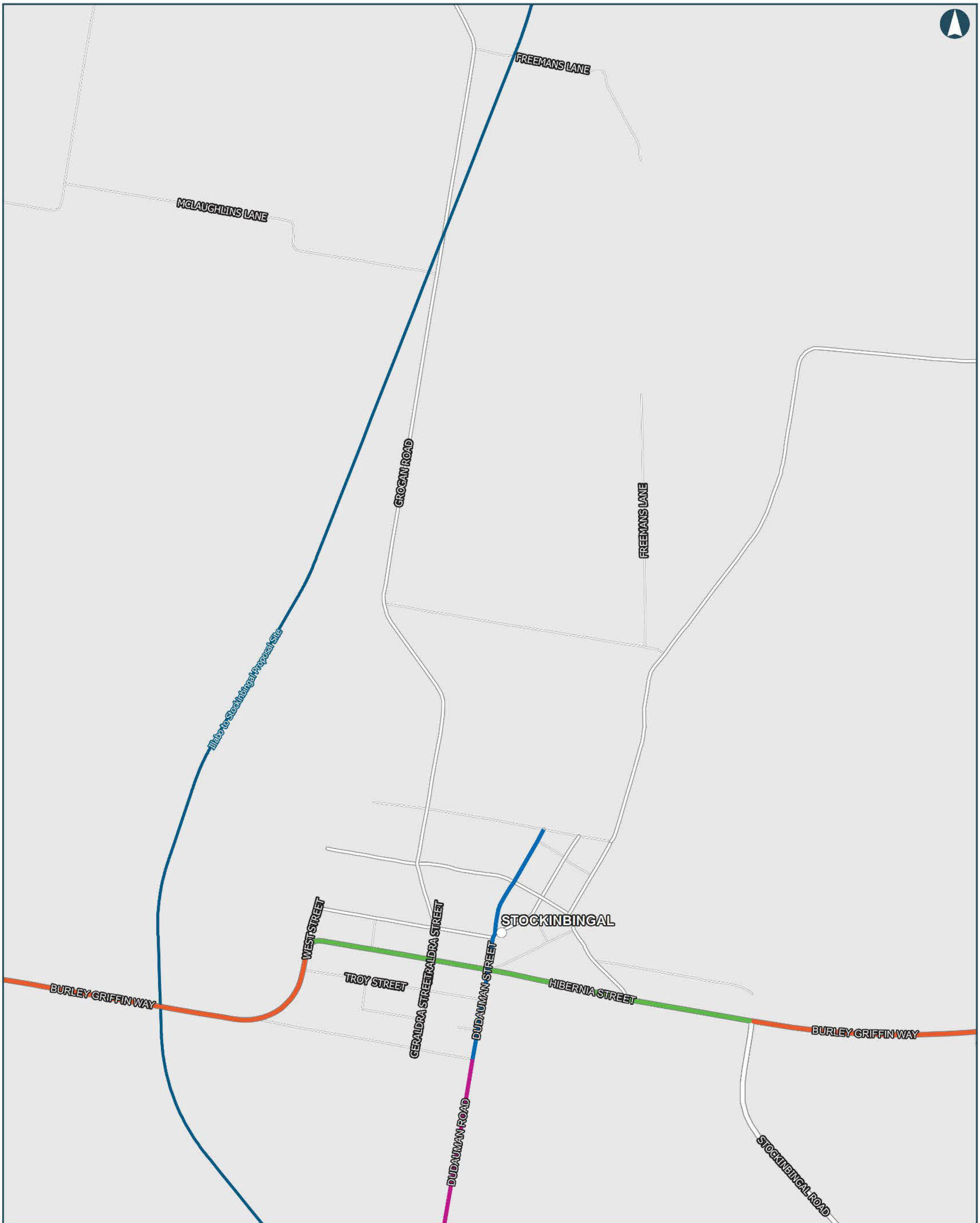
ILLABO TO STOCKINBINGAL 4.2 Stockinbingal Road network



0 100 200 300 400 500 Meters

Coordinate System: GDA 1994 MGA Zone 55

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Date: 3/17/2022 Paper: A3
Author: IRDJV Scale: 1:15,000
Data Sources: ARTC, NSWSS, ESRI

- Proposal site
- BURLEY GRIFFIN WAY
- DUDAUMAN ROAD
- DUDAUMAN STREET
- HIBERNIA STREET
- Arterial road
- Sub-arterial road
- Local road

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4.2.1 Existing traffic movements

Background traffic data was obtained from the following sources:

- Traffic Volume Viewer (TfNSW, 2021)
- Traffic surveys provided by Junee Shire Council completed between 2006 to 2016
- Project specific traffic surveys undertaken in August 2018 and February 2019, provided in Appendix B (commissioned for this study).

The background traffic data and the years in which data was available is shown in Table 4.3 for the roads most impacted during construction or operation of the proposal. Freemans Lane and McLaughlins Lane have been excluded from this table as they are already intersected by the existing rail line and no works are proposed in this location as part of the proposal.

Table 4.3 Background Two-way Average Annual Daily Traffic (AADT)

Road name	2006	2014	2015	2016	2018	2019	% HV
Burley Griffin Way (East of Ellwood Street)	–	–	–	–	825*	–	37
Burley Griffin Way (West of Temora Street)	–	–	–	–	1,058*	–	32
Grogan Road	–	–	–	–	83	–	34
Hibernia Street	–	–	–	–	–	1,187*	26
Blackgate Road	–	77	–	–	–	–	–
Troy Street	–	–	–	–	–	28	26
Dudauman Road	–	–	–	–	83*	–	34
Corbys Lane	–	–	–	–	–	28*	26
Old Cootamundra Road	–	–	–	–	266*	–	26
Dirnaseer Road (East of Ironbong Road)	–	–	–	–	66*	–	15
Ironbong Road	57	–	48	–	24*	–	26
Old Sydney Road	44	36	–	–	16*	–	12
Eulomo Settlement Road	–	–	–	–	24	–	26
Olympic Highway (West of Bethungra)	–	–	–	–	1,705*	–	21
Warrens Lanes	–	–	–	44	–	–	14
Retreat Road	44	–	–	44	–	–	14
Junee Reefs Road	36	–	–	–	–	–	16
Goldfields Way	–	–	–	–	1,705	–	21
Stockinbingal Road	–	–	–	–	266	–	26
Suttons Lane	36	–	–	–	–	–	16

* Collected from project traffic surveys

Traffic data was not available for Grogan Road, Goldfields Way, Stockinbingal Road, Eulomo Settlement Road, Suttons Lane, Warrens Lane or Troy Street. Background demands on roads with no survey data have been based on nearby roads of the same order that are expected to have similar or higher traffic demand characteristics. As such:

- traffic volumes for Grogan Road have been based on Dudauman Road
- traffic volumes for Goldfields Way have been based on the Olympic Highway
- traffic volumes for Stockinbingal Road have been based on Old Cootamundra Road
- traffic volumes for Eulomo Settlement Road have been based on Ironbong Road
- traffic volumes for Suttons Lane have been based on Junee Reefs Road
- traffic volumes for Warrens Lane have been based on Retreat Road
- traffic volumes for Troy Street have been based on Corbys Lane.

It is noted that background traffic volumes are likely influenced by agricultural land use in the area and may fluctuate due to the seasonal nature of farming activities such as periods of harvest. This may result in periods of higher traffic volumes. The variation in traffic volumes between peak and off-peak harvesting seasons may be significant however regarded insignificant in relation to the maximum capacity of the road.

It is also noted that the Local Government Areas surrounding the site participate in the NSW Grain Harvest Management Scheme, which allows heavy vehicles to exceed the regulated total mass limits by up to 5% when delivering some cereals, oilseeds and pulses. This applies from the farm to the participating grain receivers, of which there are a few within proximity of the proposal: Manildra Stockinbingal off Burley Griffin Way, three GRAINCORP facilities off Olympic Highway and a cluster of Grain Receiver Sites in Temora. This may result in increased heavy vehicle traffic on some of the roads assessed at certain times. As above, this variation is regarded insignificant in relation to the maximum capacity of the road.

4.2.2 Traffic growth rate

A review of changes in historic traffic data was undertaken to determine a traffic growth rate. The review indicated a decrease in traffic volumes on the roads for which more than one year's worth of traffic data was available. This can be seen in Table 4.3 on Ironbong Road and Old Sydney Road.

A review of Australian Bureau of Statistics (ABS) population data of surrounding population centres was undertaken to assist in determining an appropriate growth rate. The review of ABS data showed an overall population growth rate between 2011–2016 across the urban areas of Stockinbingal, Junee, Bethungra and Cootamundra of 0.3 per cent as shown in Table 4.4.

Table 4.4 Town population

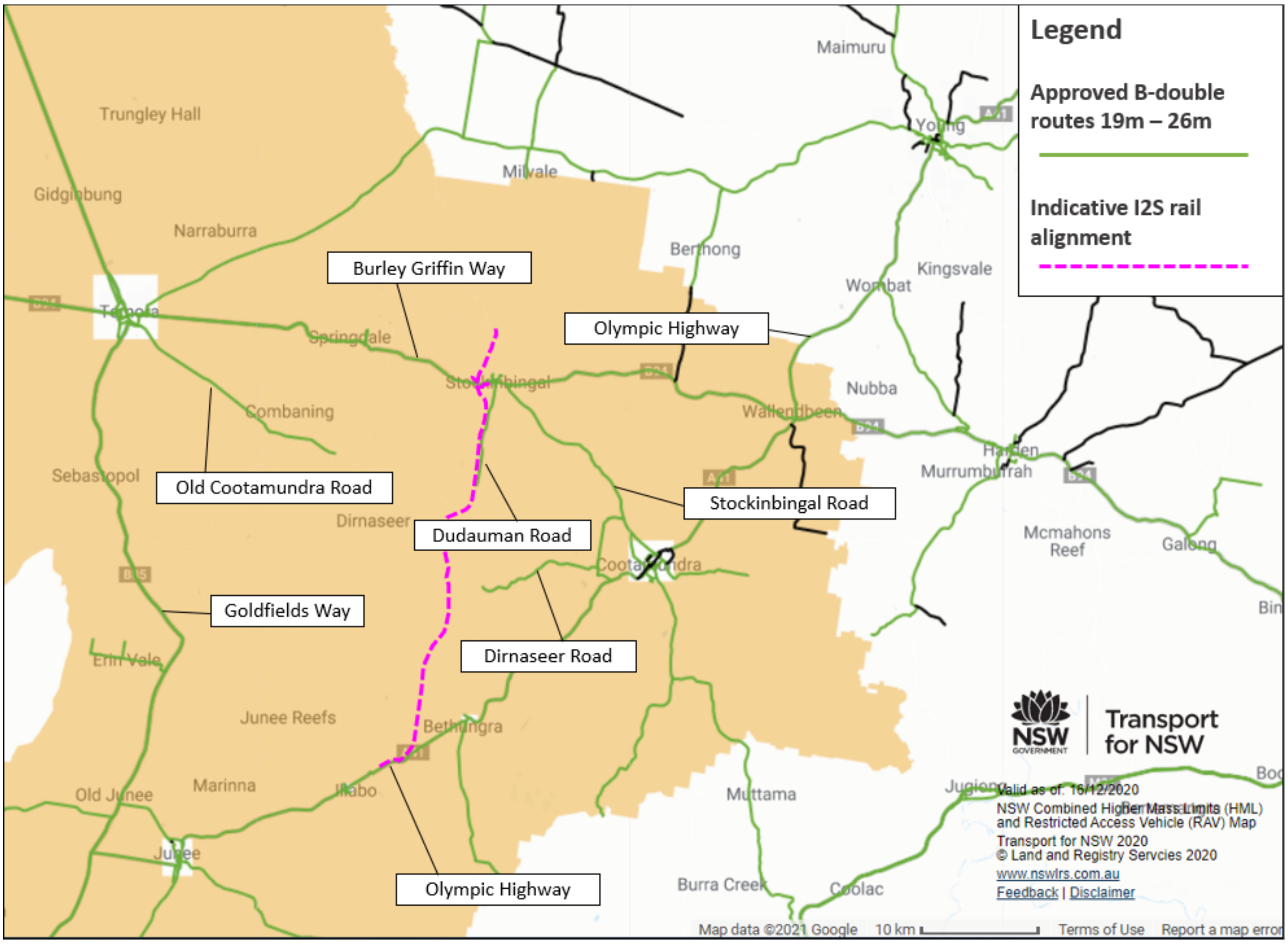
Location	2011	2016	Annual % growth
Stockinbingal	244	202	-3.7
Junee	4,578	4,922	1.5
Bethungra	414	164	-16.9
Cootamundra	5,579	5,669	0.3
Total	10,815	10,957	0.3

A compounding annual growth rate of 0.5 per cent per year has been used to determine future background traffic volumes, which provides a conservative growth rate above recorded population growth rates. Higher background traffic volumes provides a more conservative analysis of the links and intersections under assessment as their performance is directly related to traffic volumes.

4.2.3 Approved B-double routes

Heavy vehicles have limitations on which roads they may use within the NSW road network. B-double vehicles are restricted from many roads due to their length, height and mass. TfNSW have designated which roads may be used by B-doubles without permission being granted, to ensure safety of road users and the longevity of roads.

Figure 4.3 shows the approved B-double routes for B-double vehicles between 19m–26m on the road network surrounding the proposal.



Source: https://www.rms.nsw.gov.au/business-industry/heavy-vehicles/maps/restricted-access-vehicles-map/map/index.html

Figure 4.3 Approved B-double routes (19m–26m)

The major roads surrounding the proposal, Olympic Highway, Goldfields Way and Burley Griffin Way are all approved B-double routes. Additional approved B-double routes connecting from the major roads towards the proposal are Old Cootamundra Road from Temora, Stockinbingal Road between Stockinbingal and Cootamundra, and Dirnaseer Road from Cootamundra. A small section of Old Cootamundra Road, north of Cootamundra, Suttons Lane, between Old Cootamundra Road and Dirnaseer Road is also approved for B-double access.

4.2.4 Travelling stock reserves and livestock highways

Travelling Stock Reserves (TSR) are parcels of Crown Land reserved under the *Crown Land Management Act 2016* for use by travelling stock. TSRs include stock routes which are corridors on Crown Lands that connect smaller watering and camping reserves. Stock routes may be alongside public roads.

A livestock highway, although not a TSR under the *Crown Land Management Act*, is a public road used for travelling stock.

Figure 4.4 shows the location of the livestock highway and TSRs in the vicinity of the proposal. The livestock highway currently crosses the existing Lake Cargelligo rail line via the level crossing on Dudauman Road, and the existing Stockinbingal-Parkes rail line via the level crossing on Grogan Road.

4.2.5 Parking

No formalised public parking, or parking restrictions are known along the extent of the proposal. The location of the proposal is within a rural setting with low demands for parking. It is noted that provision for on-street parking is found on Hibernia Street in Stockinbingal, servicing the local town centre.

4.3 Existing rail network

4.3.1 Overview

The existing rail network in the area includes the Main South line, the Lake Cargelligo line and the Stockinbingal–Parkes line. The Main South line runs from Albury, in a north-east direction, through Illabo to Cootamundra where it continues to Goulburn, Mittagong and Sydney. The Lake Cargelligo line branches off from Cootamundra north to Stockinbingal, continuing to Lake Cargelligo. The Stockinbingal-Parkes line begins at Stockinbingal and runs north to the towns of Forbes and Parkes. The Illabo and Stockinbingal stations are no longer in use as passenger stations. Figure 4.5 shows the existing railway lines adjacent to the proposal.

Within the roads identified in Table 4.1 there are six existing public level crossings in place in the locality. The location of these are indicated in Figure 4.6. They are:

1. unnamed Road from Olympic Highway at chainage 2,789m (on the new rail alignment) and on the Main Southern Line
2. Dudauman Street between Hibernia Street and Troy Street on the Lake Cargelligo Line
3. Burley Griffin Way between West Street and Troy Street on the Lake Cargelligo Line
4. McLaughlins Lane, about 30m west of Grogan Road, on the Stockinbingal-Parkes Line
5. Grogan Road about 160m north of McLaughlins Lane on the Stockinbingal-Parkes Line
6. Freemans Lane, about 170m east of Grogan Road, on the Stockinbingal-Parkes Line.

The level crossings on Dudauman Street, Burley Griffin Way and Grogan Road have active traffic controls in place, while the other three level crossings noted are passive.

Three private roads cross the existing rail network. These are indicated in Figure 4.6 and are as below:

1. unnamed road within private property about 830m north west of the Burley Griffin Way crossing in Stockinbingal on the Stockinbingal-Parkes Line. The nearest road connection is to Grogan Road
2. unnamed road within private property about 630m north west of the Burley Griffin Way crossing in Stockinbingal on the Stockinbingal-Parkes Line. The nearest road connection is to Burley Griffin Way
3. unnamed road from Burley Griffin Way about 1.1km west of the Burley Griffin Way crossing in Stockinbingal on the Lake Cargelligo Line. The nearest road connection is to Burley Griffin Way.

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ILLABO TO STOCKINBINGAL

4.4 Travelling stock reserves and livestock highways

Key features of proposal

- Proposal Site

Existing features

- Local road
- Sub-arterial road
- Arterial road
- Major Road
- Livestock highway
- Existing rail
- Travelling stock reserves

0 2 4 6 8 10 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 3/18/2022 Paper: A3
Author: IR GIS Scale: 1:250,000
Data Sources: ####

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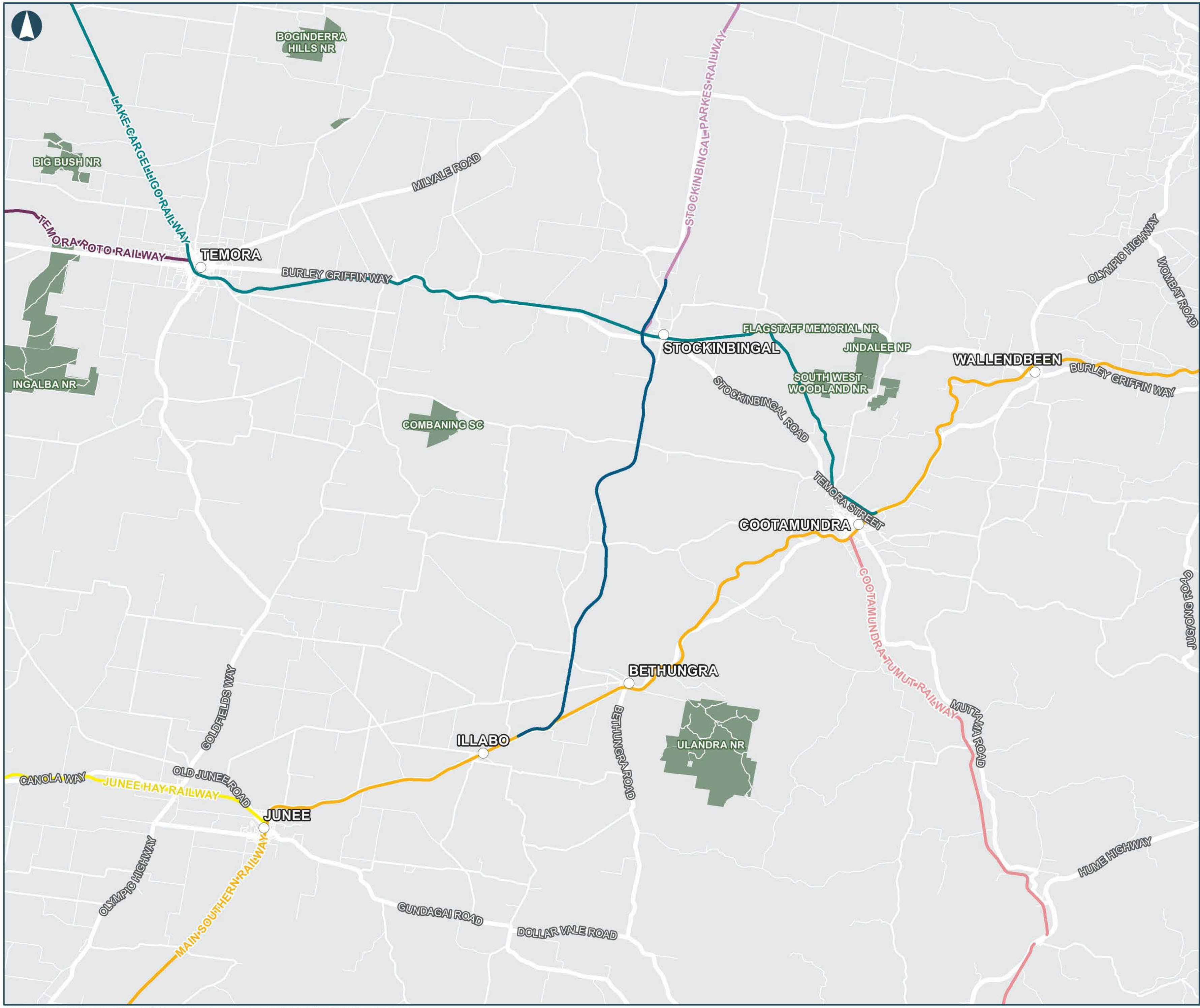
4.5 Existing Rail Network



Populated Places
Proposal site
Local road
Sub-arterial road
Arterial road
Parks and reserves

Existing rail

Cootamundra Tumut Railway
Junee Hay Railway
Lake Cargelligo Railway
Main Southern Railway
Stockinbingal Parkes Railway
Temora Roto Railway

0 5 10 Km

Coordinate System: GCS GDA 1994

Date: 8/18/2021 Paper: A3
Author: IRDJV Scale: 1:300,000
Data Sources: ARTC, NSWSS, ESRI

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ILLABO TO STOCKINBINGAL 4.6 Location of existing level crossings

0 200 400 600 m

Coordinate System: GDA 1994 MGA Zone 55

Date: 8/18/2021 Paper: A3
Author: IRDJV Scale: 1:15,000
Data Sources: ARTC, NSWSS, ESRI

Key features of proposal
- Proposal Site
- 40950 Chainage (distance in metres from southern limit of the proposal)
- Central alignment of new track/track upgrade

Existing features
- Sub-arterial road
- Arterial road
- Major Watercourse
- Minor Watercourse
- Public road level crossing
- Private road level crossing

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4.3.2 Existing lines

Illabo is located on the existing Main South line that runs from Albury to Liverpool in Sydney. This line is a double non-electrified track along the Mittagong to Junee section, after which it becomes a single track to Albury. ARTC has a lease for the line south of Macarthur until 2064. The Main South line continues north-east from Illabo through the Bethungra Spiral to Cootamundra and continues to Sydney. The Bethungra Spiral is a location where the rail line loops and crosses over itself. This was constructed in the 1940s to ease the grade where the topography would have required the line to be too steep.

The Lake Cargelligo line branches north-west from Cootamundra and links to Stockinbingal and continues to Lake Cargelligo. This line was opened in 1917 and was used initially for passenger services and goods freight. Passenger services were ceased in 1983 and the line is now primarily used for grain haulage and freight trains to bypass Sydney.

The Stockinbingal–Parkes line (also known as the ‘Forbes’ line) runs north-south joining Stockinbingal to Parkes on the Main West line. This line was completed between Parkes and Forbes in 1893, and Forbes and Stockinbingal in 1918. Passenger services operated on the line between Stockinbingal and Forbes until 1974 and Forbes and Parkes until 1983. No regular passenger services currently use the line, although the Main West line passenger services occasionally divert over the line when track work closes the main route. This line is part of the main route for goods trains travelling between Sydney and the west of NSW as it allows freight to bypass the Blue Mountains from Cootamundra to Parkes.

4.4 Public and active transport networks

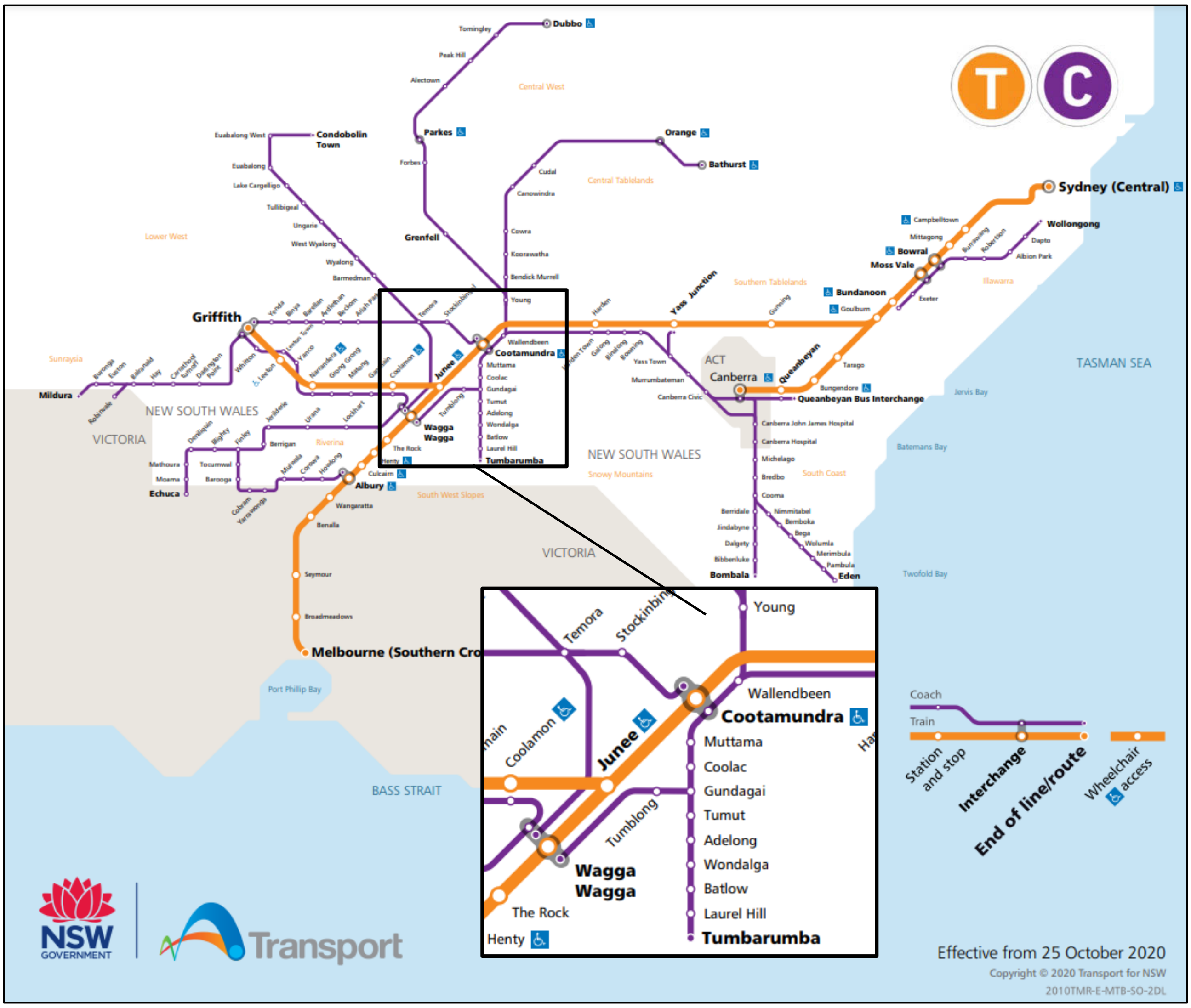
4.4.1 Public transport

Temora, Stockinbingal and Cootamundra are serviced by four coach services per day. These services traverse Hibernia Street, Burley Griffin Way and Stockinbingal Road on the route between Cootamundra and Griffith. A bus stop (Stockinbingal Coach Stop Hibernia Street) is located on Hibernia Street approximately 80m west of Dudauman Street.

Daily passenger and school bus services operate between Junee and Wagga Wagga. These services traverse the Olympic Highway. A coach services operates between Junee and Cootamundra, however, does not stop in Illabo.

The coach and bus services mentioned operate on approved B-double routes as shown in Figure 4.3.

The Cootamundra and Junee railway stations remain open to passengers travelling on the Main South line, however as identified previously, neither the Illabo nor Stockinbingal stations currently service passengers. NSW TrainLink operates two services a day along the line in each direction between Sydney and Melbourne. The services that are currently offered by TfNSW in the southern region of NSW are shown in Figure 4.7.



Source: https://transportnsw.info/regional-southern-line

Figure 4.7 Southern NSW TrainLink network

4.4.2 Active transport

Due to the regional nature of the area, active transport infrastructure is limited.

No pedestrian or cycling infrastructure is in place on Hibernia Street, Burley Griffin Way in Stockinbingal or on the Olympic Highway through Illabo.

4.5 Road safety

Consideration of road safety has been undertaken by assessing the available crash data from areas surrounding the proposal.

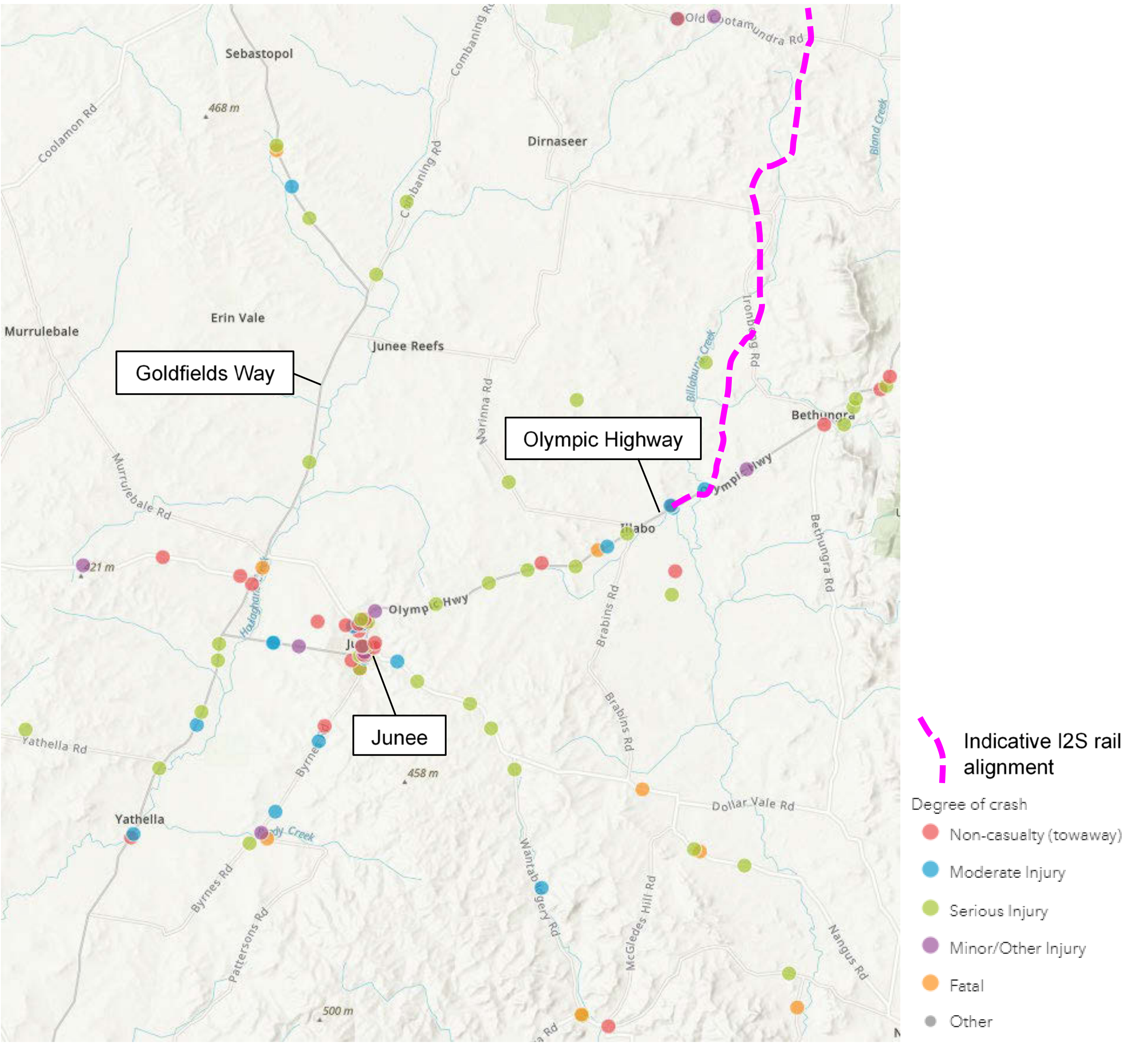
The most recent available crash data is from a five-year period (2016–2020), taken from Transport for NSW crash and casualty statistics (TfNSW, 2022). The crash data is provided per local government area (LGA) for roads which are to be considered as construction routes. Crash data has been obtained for the LGAs traversed by the construction routes proposed in section 5.3.4; Junee Shire Council, Wagga City Council, Temora Shire Council, Cootamundra-Gundagai Regional Council and Hilltops Council.

4.5.1 Junee Shire Council crash data

As can be seen in Figure 4.8, the highest densities of crashes occur in Junee town centre. A large proportion of the crashes in Junee also occur along the Olympic Highway and Goldfields Way. One fatal crash occurred on Goldfields Way, south of Old Junee Road, in 2019 and one on Olympic Highway in 2020.

Fourteen serious crashes have occurred on the Olympic Highway in the Junee Shire LGA in the five years from 2016 to 2020. A concentration (relative to the wider study area) of three crashes (two moderate and one non-casualty) occurred on the Olympic Highway, near its intersection with Warrens Lane.

The areas in which crashes have occurred should be considered in the Road Safety Assessment (RSA), further discussed in section 5.4.5.



Source: *https://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats*

Figure 4.8 Crash data (2016–2020) Junee Shire LGA

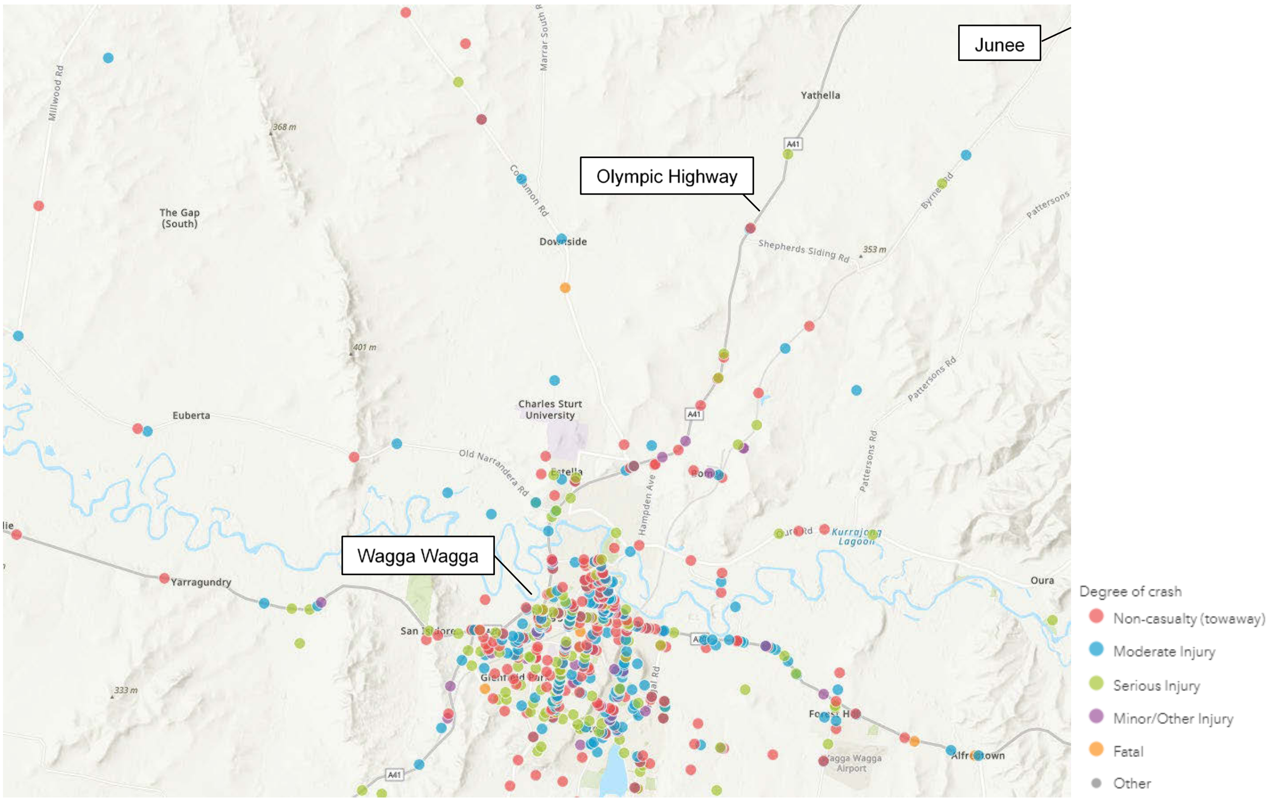
4.5.2 Wagga City Council crash data

As can be seen in Figure 4.9 the highest densities of crashes occur in Wagga Wagga town centre. A large proportion of the crashes recorded also occur along the Sturt Highway and Olympic Highway.

Six serious injury crashes have been noted on the Olympic Highway along the route towards Junee.

Several more minor injury crashes occurred along this route but no fatal crashes were recorded.

Areas in which crashes have occurred should be considered in the RSA, further discussed in section 5.4.5.



Source: *https://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats*

Figure 4.9 Crash data (2016–2020) Wagga Wagga LGA

4.5.3 Temora Shire Council crash data

As can be seen in Figure 4.10, higher densities of crashes occur in Temora town centre, with moderate to fatal crashes recorded along Burley Griffin Way.

Seven crashes involving serious injuries were recorded on Burley Griffin Way within the Temora Shire LGA. Three of these are between the town of Temora and the intersection with Beckom to the west. The other four are about mid-way between Temora and Stockinbingal. Two fatal crashes are also recorded along Burley Griffin Way.

Areas in which crashes have occurred should be considered in the RSA, further discussed in section 5.4.5.

Source: *https://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats*

Figure 4.10 Crash data (2016–2020) Temora Shire LGA

4.5.4 Cootamundra-Gundagai Regional Council crash data

As can be seen in Figure 4.11, higher densities of crashes occur in Cootamundra town centre, Stockinbingal town centre and along the Olympic Highway. The town centre of Cootamundra recorded one fatal and six serious crashes on Temora Street and the Olympic Highway.

One fatal and one serious crash has taken place on Olympic Highway south of Cootamundra.

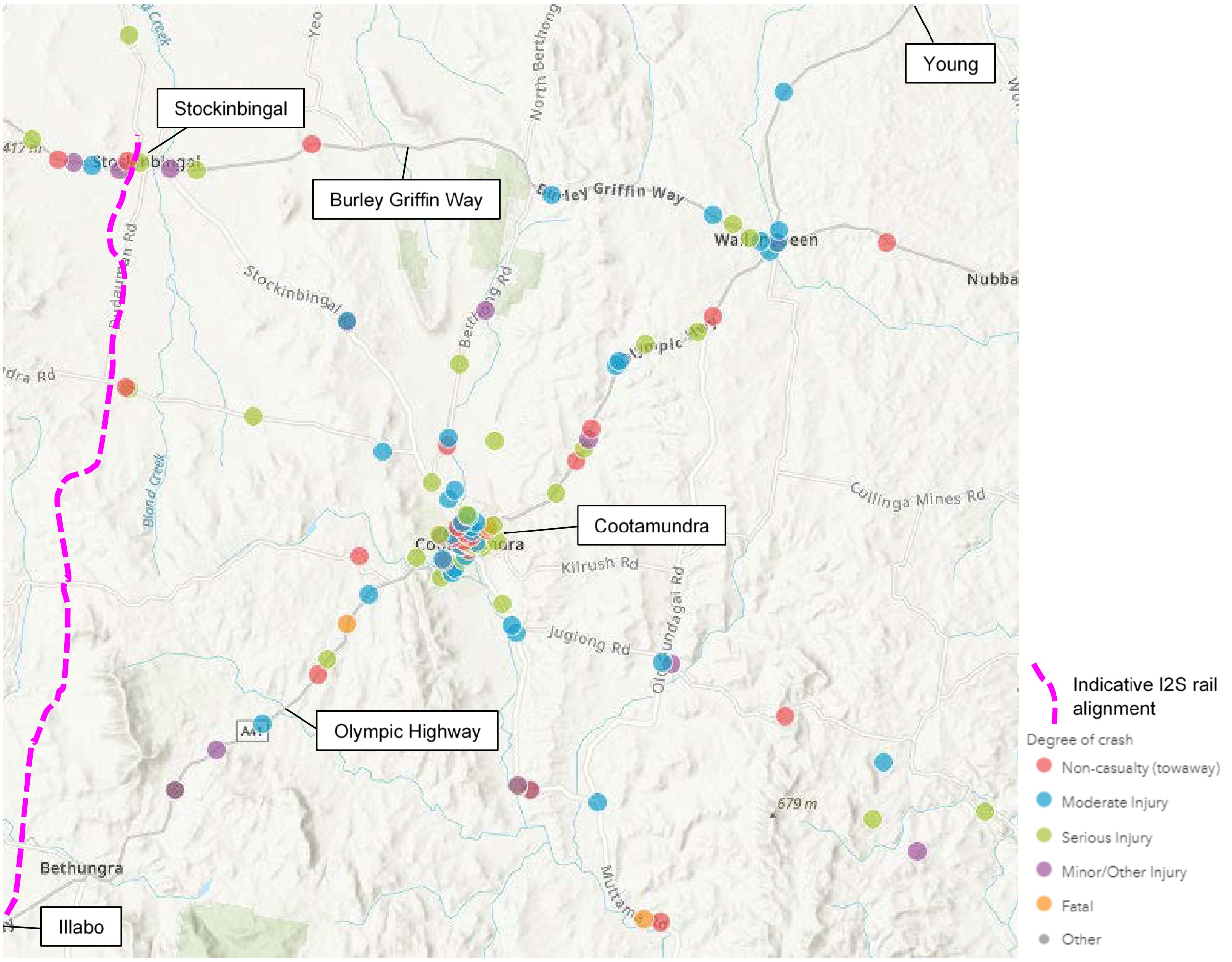
Two serious crashes have occurred on Old Cootamundra Road between Cootamundra and Stockinbingal, both on a relatively straight stretches of road.

Two crashes were recorded along Stockinbingal Road in the reporting period. In Stockinbingal town centre, two serious crashes have been noted on Hibernia Street, and another serious crash further west on Burley Griffin Way. No fatal crashes have been recorded in Stockinbingal.

From the town of Wallendbeen, on the Olympic Highway towards Cootamundra, four serious crashes have been recorded.

The route from Wallendbeen to Stockinbingal along Burley Griffin Way has seen three serious crashes in the reporting period, but generally has a lower concentration of crashes than in town centres or along the Olympic Highway.

Areas in which crashes have occurred should be considered in the RSA, further discussed in section 5.4.5.



Source: https://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats

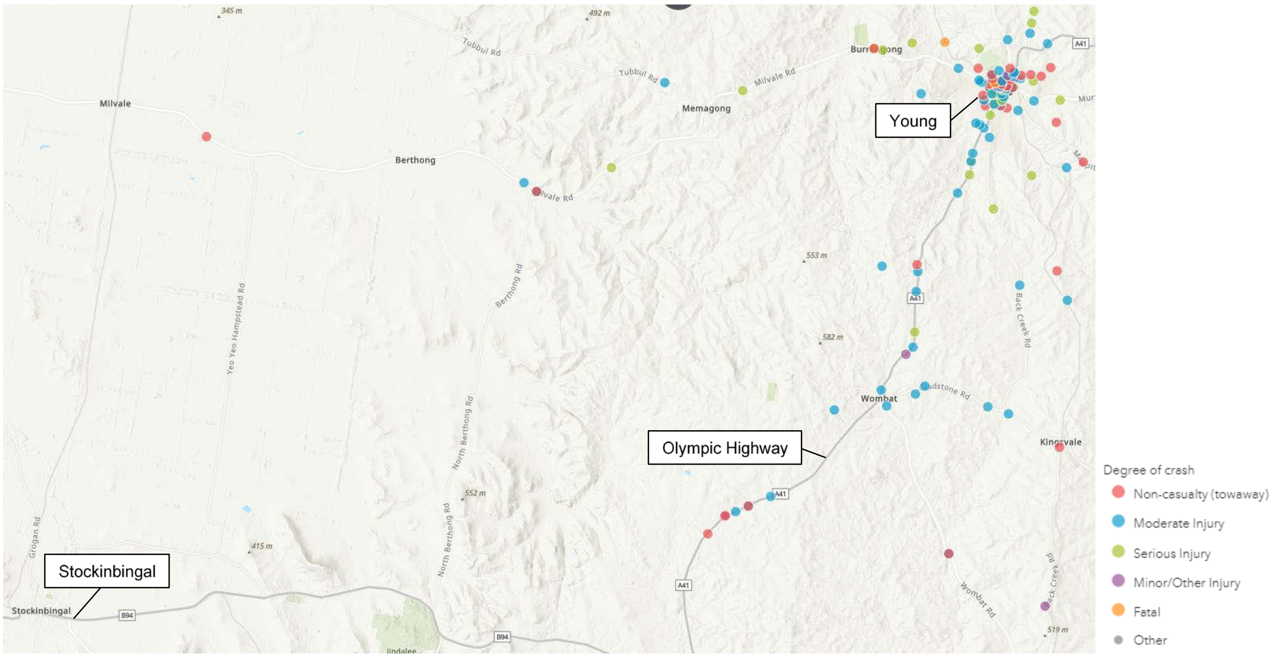
Figure 4.11 Crash data (2016–2020) Cootamundra-Gundagai LGA

4.5.5 Hilltops Council crash data

As can be seen in Figure 4.12, a higher concentration of crashes occur in the town centre of Young and along Olympic Highway.

There are no fatal crashes recorded on the route from Young towards Burley Griffin Way and Cootamundra. There are three serious crashes noted along Olympic Highway outside of the town centre of Young.

Areas in which crashes have occurred should be considered in the RSA, further discussed in section 5.4.5.



Source: https://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats

Figure 4.12 Crash data (2016–2020) Hilltops LGA

5 Impact assessment

5.1 Assumptions

For the assessment of the impacts of construction of the proposal, the following assumptions have been made for workforce and construction vehicle distributions:

- Projected background traffic volumes for the following years are used in the assessment: 2026 (construction link assessment), 2025 (SIDRA models of construction route intersections) and 2024 (SIDRA models of construction access intersections). The use of these differing base years are the result of changes being made to the assumed construction start date late in the development of the traffic and transport technical paper. Consideration was given to revising the assessment to consistently utilise 2026 baseline data. However, the application of the different base years for different aspects of the assessment (2024, 2025, 2026) is not expected to alter the results in any notable way – the assumed growth rate of 0.5 per cent per year (as detailed in section 4.2.2) results in only minimal differences between these years, as the background volumes are low (less than 160 vehicles per hour on all roads assessed). This is illustrated further in section 5.2.
- Estimated construction traffic volumes during the peak of construction have been used for the SIDRA modelling and construction link assessment. This is consistent across all modelling regardless of the year assessed.
- During the peak construction period the workforce is predicted to travel to the proposal site from accommodation in surrounding population centres based on the following proportions:
  - Cootamundra (30 per cent)
  - Wagga Wagga (25 per cent)
  - Young (25 per cent)
  - Temora (10 per cent)
  - Junee (10 per cent).

  The traffic impacts of the workforce accommodation camp is not included in this report but is discussed separately in Appendix I: Workforce accommodation camp assessment of the EIS.
- The above distributions equate to 55 per cent of workforce vehicles arriving from the east and 45 per cent from the west of the alignment.
- The workforce would arrive to the construction sites two per vehicle (on average). The possibility of workers being transported to the construction sites by bus may be explored during detailed design, which would reduce the number of vehicles travelling to the sites. The assumption of two persons per vehicle has been maintained for conservatism.
- The workforce have been assumed to all arrive in the AM peak hour and all depart in the PM peak hour, where the AM and PM peak hours coincide with the peak background traffic. Although it is likely that the construction peaks would be different to the background traffic peaks, this is done to provide a more robust assessment.
- The peak workforce requirement for a construction section, considering phases and sections occurring in parallel, is assessed as a worst-case scenario. It is assumed that earthworks and drainage, track works, road overbridges works and crushing work may be taking place concurrently on a single section.
- The heavy vehicle numbers have been calculated based on a worst-case for any phase of construction. They are assumed to operate all day including in the same AM and PM peak hours as workforce light vehicles, to provide a conservative assessment.
- Plant vehicles will be transported individually to the site on a low loader articulated vehicle in one single instance. These deliveries have been included within the construction vehicle numbers assessed in this report for conservatism.

- Inter-section haulage will take place where formation material is needed to be transported from one section to another through use of any construction site access and any designated haulage route road. For the purposes of the assessment, it is assumed that a maximum of two fleets of inter-section haulage may be in operation during a peak period.
- Earthworks general fill haulage will take place on some designated haulage routes between site access gates of construction sections 1 and 2, and sections 4 and 5.
- Water tankers will use construction site accesses and haulage routes to collect water from a water source and then operate continually within the proposal site boundary.
- Other materials required for construction (including ballast, steel, railway sleepers etc) would be sourced from a range of suppliers and transported to site. These vehicle numbers are considered to be included within the estimated construction vehicles. However, some vehicle movements may take place beyond the routes identified in this assessment.
- The total number of vehicles calculated per section have been applied in full to each construction access intersection, for conservatism.

5.2 Future background traffic

The future background traffic data has been extrapolated from the existing traffic volumes given in Table 4.3, using the 0.5 per cent compounding annual growth rate, as per section 4.2.2, to determine future background traffic volumes in key construction years. The 2024-2026 future background traffic volumes and proportion of heavy vehicles (HV) are shown in Table 5.1. The difference in background traffic volumes between the three years during construction is very minimal given the low overall volumes and low growth rate. Operation of the proposal does not include significant impacts to traffic movements, however estimation of traffic volumes on roads with level crossings have been considered for 2027 and 2037 in section 5.5.3.

Table 5.1 Future background traffic two-way Average Annual Daily Traffic (AADT)

Road name	2024 (AADT)	2025 (AADT)	2026 (AADT)	% HV
Burley Griffin Way (East of Ellwood Street)	850	854	859	37
Burley Griffin Way (West of Temora Street)	1,090	1,096	1,101	32
Grogan Road	86	86	86	34
Hibernia Street	1,217	1,223	1,229	26
Troy Street	29	29	29	26
Dudauman Road	86	86	86	34
Corbys Lane	29	29	29	26
Old Cootamundra Road	274	275	277	26
Dirnaseer Road (East of Ironbong Road)	68	68	69	15
Ironbong Road	25	25	25	26
Old Sydney Road	16	17	17	12
Olympic Highway (West of Bethungra)	1,757	1,766	1,774	21
Retreat Road	46	46	46	14
Junee Reefs Road	39	40	40	16
Goldfields Way	1,757	1,766	1,774	21
Stockinbingal Road	274	275	277	26

Analysis of daily traffic count data at the Dudauman Road & Hibernia Street intersection (2018) in Stockinbingal has showed that AM and PM peak hour volumes both equate to 9 per cent of daily traffic volumes. This factor has been used to calculate future background peak hour traffic volumes from Table 5.1, as shown in Table 5.2 (applicable for both AM and PM peaks). These are given for 2026, but the peak hour volumes for 2024 and 2025 are almost equivalent, with a maximum variation of four vehicles per hour on the busiest roads.

Table 5.2 2026 future background traffic (peak hour, two-way)

Road name	Light vehicles* (vehicles/hour)	Heavy vehicles* (vehicles/hour)	Total vehicles* (vehicles/hour)
Burley Griffin Way (East of Ellwood Street)	49	29	77
Burley Griffin Way (West of Temora Street)	67	32	99
Grogan Road	5	3	8
Hibernia Street	82	29	111
Troy Street	2	1	3
Dudauman Road	5	3	8
Corbys Lane	2	1	3
Old Cootamundra Road	18	6	25
Dirnaseer Road (East of Ironbong Road)	5	1	6
Ironbong Road	2	1	2
Old Sydney Road	1	0	1
Olympic Highway (West of Bethungra)	126	34	160
Retreat Road	4	1	4
Junee Reefs Road	3	1	4
Goldfields Way	126	34	160
Stockinbingal Road	18	6	25

*Numbers are rounded

5.3 Construction modelling inputs

This section presents details of the construction process and sites, vehicles required and the roads and intersections assessed.

5.3.1 Activity areas

5.3.1.1 Project sections

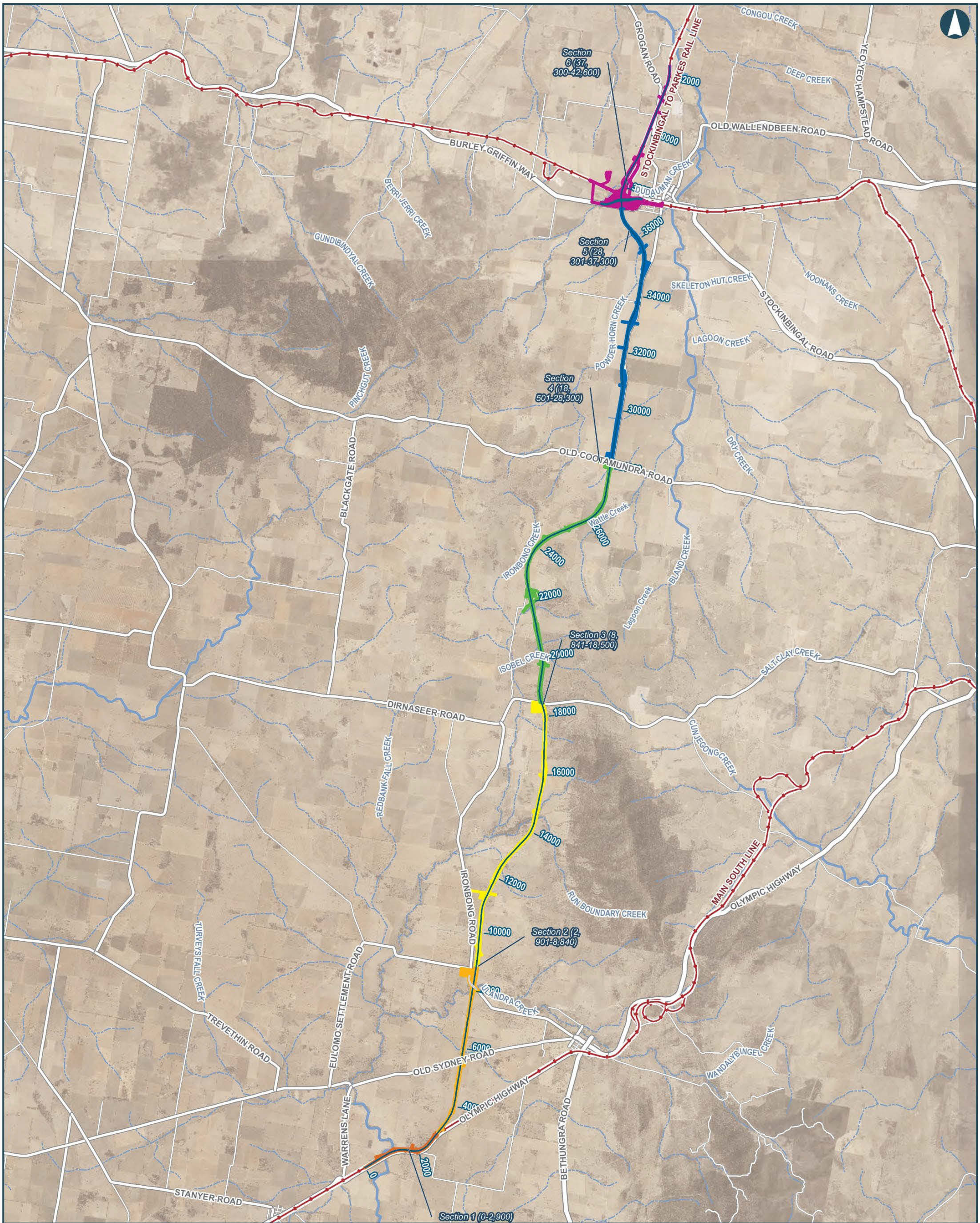
The alignment starts adjacent to the Olympic Highway in Illabo and continues approximately 40km north to Stockinbingal. The construction of the proposal will occur across six sections (1 to 6) within this alignment. Table 5.3 below details the proposed sections adopted in the construction of the alignment.

Table 5.3 Section locations by chainage

Construction section	Chainage
1	0 – 2,900
2	2,901 – 8,840
3	8,841 – 18,500
4	18,501 – 28,300
5	28,301 – 37,300
6	37,301 – 42,600

In addition to construction of the rail line, two roads are also proposed for realignment. Burley Griffin Way, in construction section 6, will undergo major realignment to use a new bridge to cross the proposed rail line. Within construction section 2, Ironbong Road will undergo a minor realignment around the proposed level crossing to improve sight lines and provide a safer crossing for vehicles.

The location of each section in relation to the overall proposal can be seen in Figure 5.1.



ILLABO TO STOCKINBINGAL 5.1 Construction section locations

0 1 2 3 4 5 Km

Coordinate System: GDA 1994 MGA Zone 55

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Date: 8/19/2021 Paper: A3
Author: IRDJV Scale: 1:120,000
Data Sources: ARTC, NSWSS, ESRI

Key features of the proposal
- Proposal site
- Ironbong Road realignment
- Burley Griffin Way Road realignment

Construction Section
- Section 1 (0-2,900)
- Section 2 (2,901-8,840)
- Section 3 (8,841-18,500)
- Section 4 (18,501-28,300)
- Section 5 (28,301-37,300)
- Section 6 (37,300-42,600)

Existing features
- Arterial road
- Sub-arterial road
- Local road
- Existing Rail
- Major Watercourse
- Minor Watercourse

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

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5.3.1.2 Project staging

Each section requires the following phases of construction:

- enabling works
- site establishment
- main construction works
- utility relocations and property adjustments
- earthworks and drainage
- track works
- road overbridges, under bridges and pavement works
- signalling, testing and commissioning
- finishing and landscaping.

An indicative construction program is shown in Figure 5.2.

Indicative stages	Chainage/element (refer to Figure 5.1)	Indicative duration (work days)	Indicative timing of works
Enabling works	Across proposal site	40	Mid-2024 (approximately 2 months)
Site establishment	Across proposal site	70	Mid-2024–late 2024 (approximately 3 months)
Main construction works—Section 1	0–2900	108	Mid-2024–early 2025 (approximately 5 months)
Main construction works—Section 2	2901–8840	109	Late-2024–early 2025 (approximately 5 months)
Main construction works—Section 3	8841–18500	157	Late-2024–mid 2025 (approximately 7 months)
Main construction works—Section 4	18501–28300	196	Late-2024–mid-2025 (approximately 9 months)
Main construction works—Section 5	28301–37300	171	Late 2024–mid-2025 (approximately 8 months)
Main construction works—Section 6	37300–42600	331	Late 2024–early-2026 (approximately 16 months)
Signalling, testing and commissioning	Across proposal site	130	Late 2025—mid-2026 (approximately 7 months)
Finishing works	Across proposal site	50	Mid-2026 (approximately 2 months)

Figure 5.2 Indicative construction program

5.3.1.3 Working hours

Standard program construction hours are proposed, every day from 6.00am to 6.00pm. These standard program construction hours are developed to accommodate the remote location of worksites and efficient use of the workforce and minimise disruption to commuters and freight operators using existing operational rail lines.

This results in construction works being undertaken outside of the Interim Construction Noise Guideline (DECC, 2009) defined standard hours from 7.00am to 6.00pm Mondays to Fridays, inclusive; 8.00am to 1.00pm Saturdays; and at no time on Sundays or public holidays.

Some works may also be undertaken outside the hours described above and during scheduled rail corridor possession periods. This would include, for example, the connection of the tracks at either end of each stage, and some finishing works. During possessions, works may need to be undertaken on a 24-hour basis, such as those identified below:

- connection of the new Illabo to Stockinbingal section to the Main South Line at Illabo
- tie-in to the existing Lake Cargelligo Line and Stockinbingal to Parkes Line at Stockinbingal
- construction of the realigned Burley Griffin Way.

5.3.2 Vehicle type and quantity

This section details the type and quantity of construction vehicles which are required during peak construction of the proposal. These have been divided into vehicles needed for plant and equipment, workforce, quarry deliveries, concrete deliveries, earthwork haulage and water tanker haulage.

5.3.2.1 Plant and equipment

A range of plant and equipment will be used during construction. The final equipment and plant requirements will be identified by the construction contractor. An indicative list of plant and equipment, including water tankers and haulage vehicles, that will be used by each crew is shown in Table 5.4. A crew will be contained to working on one construction section, with some sections undergoing construction simultaneously.

Table 5.4 Plant and equipment

Construction phase/plant and equipment	No. of heavy vehicles per crew
Establishment	
14G Grader	1
30T ADT	4
30T Excavator	1
Smooth Drum Roller	1
Padfoot Roller	1
Watercart	1
Phase Total	**9**
Utility relocations and property adjustments	
20T Excavator	1
30T Excavator	1
30T ADT	2
Franna	2
Road Crane (Varying Lift Capacity)	2
Positrack	1
Smooth Drum Roller	1
Phase Total	**10**

Construction phase/plant and equipment	No. of heavy vehicles per crew
Earthworks	
30T Excavators	1
30T ADT	3
40t ADT	3
627 Scrapers	4
14H Graders	2
D8 Dozers	1
D10 Dozers	1
Watercarts	4
Truck and Dogs **in haulage numbers*	*20**
Stabiliser	1
Spreader	1
825 Compactors	1
Smooth Drum Rollers	1
Pad Foot Rollers	1
Phase Total	**24** *(44 incl. haulage)*
Drainage	
20T Excavator	1
30t ADT	4
Water Carts	1
Smooth drum Roller	1
Padfoot Roller	1
Phase Total	**8**
Track works	
Front End Loaders	2
14t Hi-Rail Excavator with Octopus Attachment	1
5t Excavator	1
25t-30t ADT	3
14t Hydreema Dumpers	3
Drott or Ballast Box	1
Tamper	1
Regulator	1
Dynamic Track Stabiliser	1
Flashbutt Welder	2
Phase Total	**16**

Construction phase/plant and equipment	No. of heavy vehicles per crew
Road overbridges, under bridges and pavement works	
Piling Rigs	1
Concrete Pump Trucks	1
Concrete Trucks	5
Road Cranes (Varying Lift Capacity)	1
Frannas	1
Phase Total	**9**
Finishing and landscaping	
30t ADT	4
20T Excavator	1
5t Excavator	1
14M Grader	1
D8 Dozer	1
Hydro Seed Truck	1
Watercart	2
Phase Total	**11**
Crushing Crew	
30t ADT	2
20T Excavator	2
Jaw Crusher	1
Cone Crusher	1
D8 Dozer	1
980 Loader	1
Blast Hole Drill Rig	1
Water Cart	1
Phase Total	**10**

5.3.2.2 Workforce

The maximum workforce estimated to be required for construction of the proposal is around 425 (conservative allowance of 450 to allow for surge capacity). To assess the impact of the associated traffic of the workforce, the peak workforce requirement for a section, considering phases occurring in parallel, is assessed as a worst case scenario. It is assumed that earthworks and drainage, track works, road overbridges works and crushing work may be taking place concurrently on a single section.

The number of required workforce in each phase of construction for an individual construction section can be seen in Table 5.5.

Table 5.5 Workforce

Construction phase	Plant personnel (from Table 5.2)	Labour	Supervision	Traffic management	Engineering and PM	TOTAL
Establishment	9	Included in figures below				
Utility relocations and property adjustments	10	5	2	5	3	25
Earthworks & Drainage	32	10	6	6	4	58
Track works	16	20	2	6	4	48
Road overbridges, under bridges and pavement works	9	10	4	6	4	31
Crushing Crew	10	3	3	3	3	22
Finishing and landscaping	11	Included in figures above				

5.3.2.3 Quarry deliveries

It has been estimated that quarry vehicles will arrive at a construction site at a rate of 63 vehicles per day. This is based on importing 2,000 tonnes of material per day per crew. Fluctuations to this number will occur due to operational capacity of quarries, the distance of the quarry from the site, and the number of quarry haulage vehicles engaged at one time.

It is noted that, vehicles used for material delivery from quarries and other sources may also be subject to the permit conditions associated with the operation these sites where relevant.

5.3.2.4 Concrete deliveries

It has been estimated that concrete delivery trucks will arrive at the site at a rate of 45 vehicles per day. This is based on a pour rate of $40m^3$/hr.

5.3.2.5 Inter-section formation haulage

It has been estimated that haulage of formation material between construction sections may take place between every gate, using the designated haulage routes. This is assumed to be 72 vehicles per day.

5.3.2.6 Earthworks general fill haulage

Haulage of general fill earthworks will only be required between the access gates of section one and two, and section four and five. It is assumed that there will be 136 deliveries of material during peak construction in one day.

5.3.2.7 Water tankers

It has been estimated that water tankers may be required to enter and exit construction sites 18 times per day. This number may fluctuate based on the location of the water fill points.

5.3.2.8 Total daily vehicle trips

The estimated daily maximum number of vehicle two-way trips required in one section of the proposal during peak construction are shown in Table 5.6. These vehicle numbers are considered appropriate for the main construction works and are conservative for the enabling and finishing works. To ensure a conservative assessment, the expected peak traffic trips for the main construction works have been adopted for this assessment.

Table 5.6 Maximum daily vehicle movements

Vehicle type		2-way trips per day
Light vehicles	Cars and utilities	80
Heavy vehicles	Plant deliveries	3
	Quarry deliveries	63
	Concrete deliveries	45
	Inter-section formation haulage	72
	Earthworks general fill haulage	136
	Water tankers	18
	Total Vehicles	**417**

The following sections detail how peak hour vehicle trips for the proposal have been estimated.

5.3.3 Construction trip generation

This section uses the daily quantity of vehicles provided above to calculate trip generation at the busiest time during construction. The following assessment considers which vehicle movements are most likely to occur during the peak hours under a conservative approach.

5.3.3.1 Workforce light vehicles

The workforce size required during concurrent phases to one section is 159 personnel. To allow for partial car-pooling, it is assumed that each light vehicle will transport, on average, two personnel to the worksite, arriving in the AM peak hour and departing in the PM peak hour as shown in Table 5.7.

Table 5.7 Workforce light vehicle trips

Type of vehicle	AM	PM
Workforce light vehicles	80 (in)	80 (out)

5.3.3.2 Plant and equipment delivery

It is assumed that the plant vehicles will be transported individually to the site on a low loader articulated vehicle in one single instance. The plant vehicles will likely arrive as required across the duration of the earthworks and drainage phase of a section, which is between three and four months. However, to provide a conservative analysis, the total required plant vehicles will be assessed as arriving over the course of ten days, with arrivals occurring during peak hours. This gives an estimate per hour as shown in Table 5.8.

Table 5.8 Plant and equipment vehicle trips

Type of vehicle	AM	PM
Plant and equipment vehicles	3 in / 3 out (6 total)	3 in / 3 out (6 total)

5.3.3.3 Quarry deliveries

The number of likely quarry deliveries to a construction section in a day is shown in Table 5.6 as 63. It is assumed that the effective daily working time of quarry deliveries is nine hours and the resulting average heavy vehicle trips derived from this are shown in Table 5.9.

Table 5.9 Quarry delivery vehicle trips

Type of vehicles	AM	PM
Quarry delivery vehicles	7 in / 7 out (14 total)	7 in / 7 out (14 total)

5.3.3.4 Concrete deliveries

The number of concrete deliveries expected to a construction section in a day is shown in Table 5.6 as 45. It is assumed that the effective daily working time of concrete deliveries is nine hours and the resulting average heavy vehicle trips derived from this are shown in Table 5.10.

Table 5.10 Concrete delivery vehicle trips

Type of vehicles	AM	PM
Concrete delivery vehicles	5 in / 5 out (10 total)	5 in / 5 out (10 total)

5.3.3.5 Inter-section formation haulage

The number of inter-section formation haulage trips expected to a construction section access in a day is shown in Table 5.6 as 72. It is assumed that the effective work time for inter-sectional haulage is nine hours and the resulting average heavy vehicle trips derived from this are shown in Table 5.11.

Table 5.11 Inter-section formation haulage vehicle trips

Type of vehicles	AM	PM
Inter-section haulage vehicles	8 in / 8 out (16 total)	8 in / 8 out (16 total)

5.3.3.6 Earthworks general fill haulage

The number of earthworks haulage trips expected to a construction section access in a day is shown in Table 5.6 as 136. It is assumed that the effective work time for earthworks haulage is nine hours and the resulting average heavy vehicle trips derived from this are shown in Table 5.12.

Table 5.12 Earthworks haulage vehicle trips

Type of vehicles	AM	PM
Earthworks haulage vehicles	15 in / 15 out (30 total)	15 in / 15 out (30 total)

5.3.3.7 Water tankers

The number of water tanker trips likely through a construction section access in a day is shown in Table 5.6 as 18. It is assumed that the effective work time for water tankers is nine hours and the resulting average heavy vehicle trips derived from this are shown in Table 5.13.

Table 5.13 Water tanker trips

Type of vehicles	AM	PM
Water tankers	2 in / 2 out (4 total)	2 in / 2 out (4 total)

5.3.3.8 Total peak hour construction trips

The traffic generated during the busiest time of construction has been used to assess the potential impacts resulting from peak workforce and construction vehicle movements on the road network for each construction section of the project. In reality, it is unlikely that construction workers will arrive at the same time as construction vehicles, therefore this is considered to provide a robust assessment.

Table 5.14 shows the estimated maximum total number of light vehicle (workforce) trips and heavy vehicle (construction vehicles) trips required in the AM and PM peak hours at each construction section.

Table 5.14 AM and PM peak hour construction trips

Type of vehicles	AM	PM
Light	80	80
Heavy	80	80

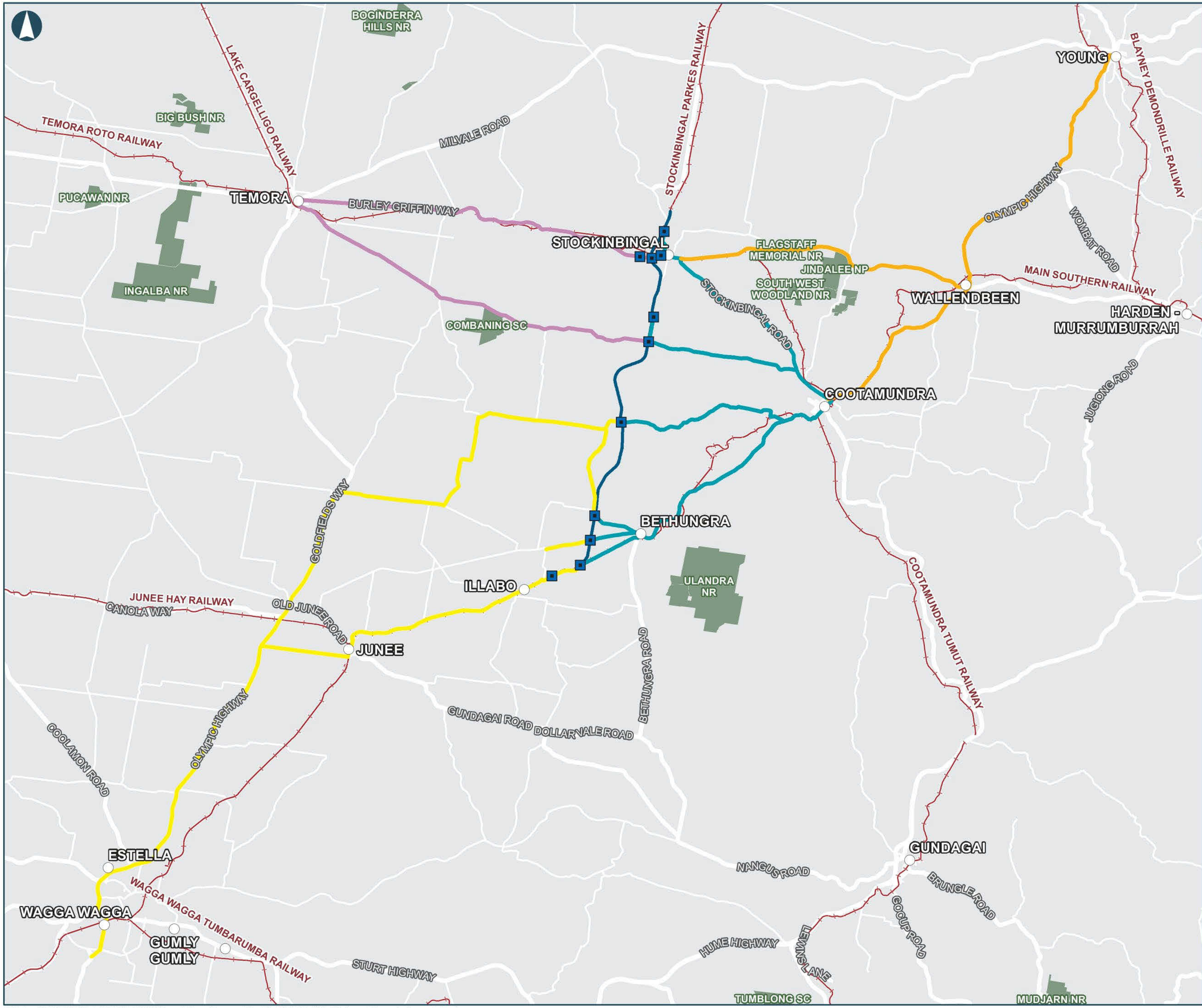
The light vehicle trips are assumed to be distributed to site accesses based on the workforce accommodation assumption set out in section 5.1. Heavy vehicles are assumed to be distributed dependent on their route, described in the next section.

5.3.4 Construction routes

5.3.4.1 Workforce, plant and equipment, and concrete truck routes

Figure 5.3 shows the assumed construction routes to the proposal site taken from the surrounding population centres of Temora, Young, Cootamundra and Wagga Wagga. This refers to workforce and construction vehicles, during the construction period. Routes from surrounding town centres are assumed to connect to the nearest construction site access locations, as detailed in section 5.3.6. As shown in Figure 5.3:

- two routes to the proposal site are proposed from Temora along the following roads:
  - Burley Griffin Way
  - Old Cootamundra Road
- two routes to the proposal site are proposed from Young, via Wallendbeen, along the following roads:
  - Olympic Highway/Burley Griffin Way
  - Olympic Highway/Old Cootamundra Road
- four routes to the proposal site are proposed from Cootamundra along the following roads:
  - Stockinbingal Road
  - Old Cootamundra Road
  - Dirnaseer Road
  - Olympic Highway
- two routes to the proposal construction site are proposed from Wagga Wagga along the following roads:
  - Olympic Highway/Old Sydney Road
  - Olympic Highway/Goldfields Way/Junee Reefs Road/Retreat Road and Dirnaseer Road.



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ILLABO TO STOCKINBINGAL

5.3 Assumed Construction Routes

- Access point
- Populated Places
- Proposal site
- Existing rail
- Sub-arterial road
- Arterial road
- Parks and reserves

Assumed Construction Route

- Route from Cootamundra
- Route from Temora
- Route from Wagga Wagga
- Route from Young

0 5 10 Km

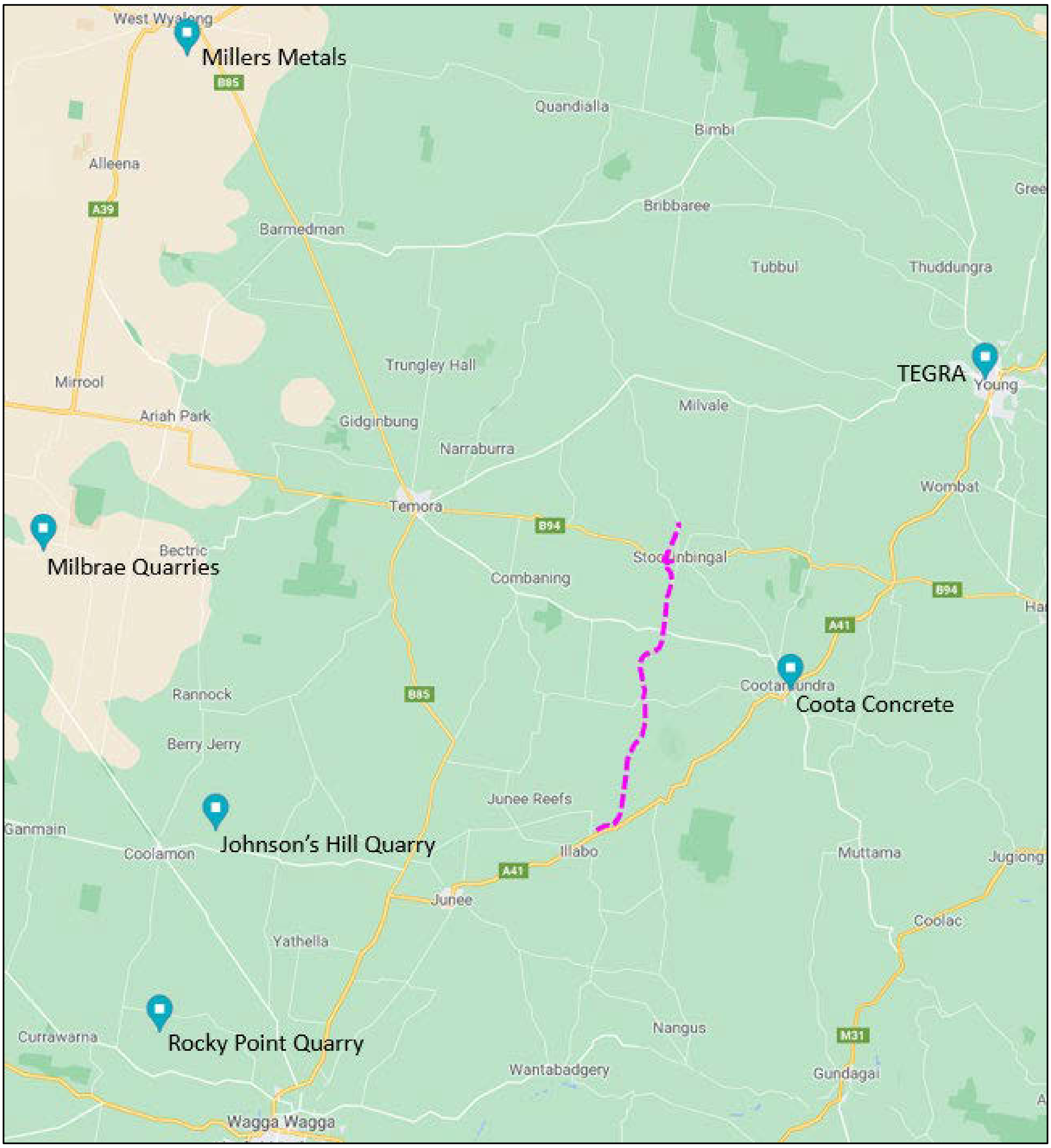
Coordinate System: GCS GDA 1994

Date: 8/18/2021
Paper: A3
Author: IRDJV
Scale: 1:375,000
Data Sources: ARTC, NSWSS, ESRI

5.3.4.2 Quarry material haulage routes

Where required, quarries will be used to source material for road pavement, structural fill, capping and ballast. Six quarries close to the proposal have been considered in designating haulage routes and associated haulage vehicles to the road network. The number of deliveries is based upon importing 2,000 tonnes per crew per day, and as a worst case, the resulting number of haulage vehicles have been applied two-ways to all roads that are on the quarry material haulage routes.

The quarries that have been considered in the assessment are shown in Figure 5.4. Additional quarries from the broader region may be sourced and utilised, however their associated routes have not been assessed. Considering the various locations of the six quarries assessed, additional quarries would be expected to require similar routes within the proximity of the proposal.



Source: *GoogleMaps*

Figure 5.4 Quarry sites around the proposal

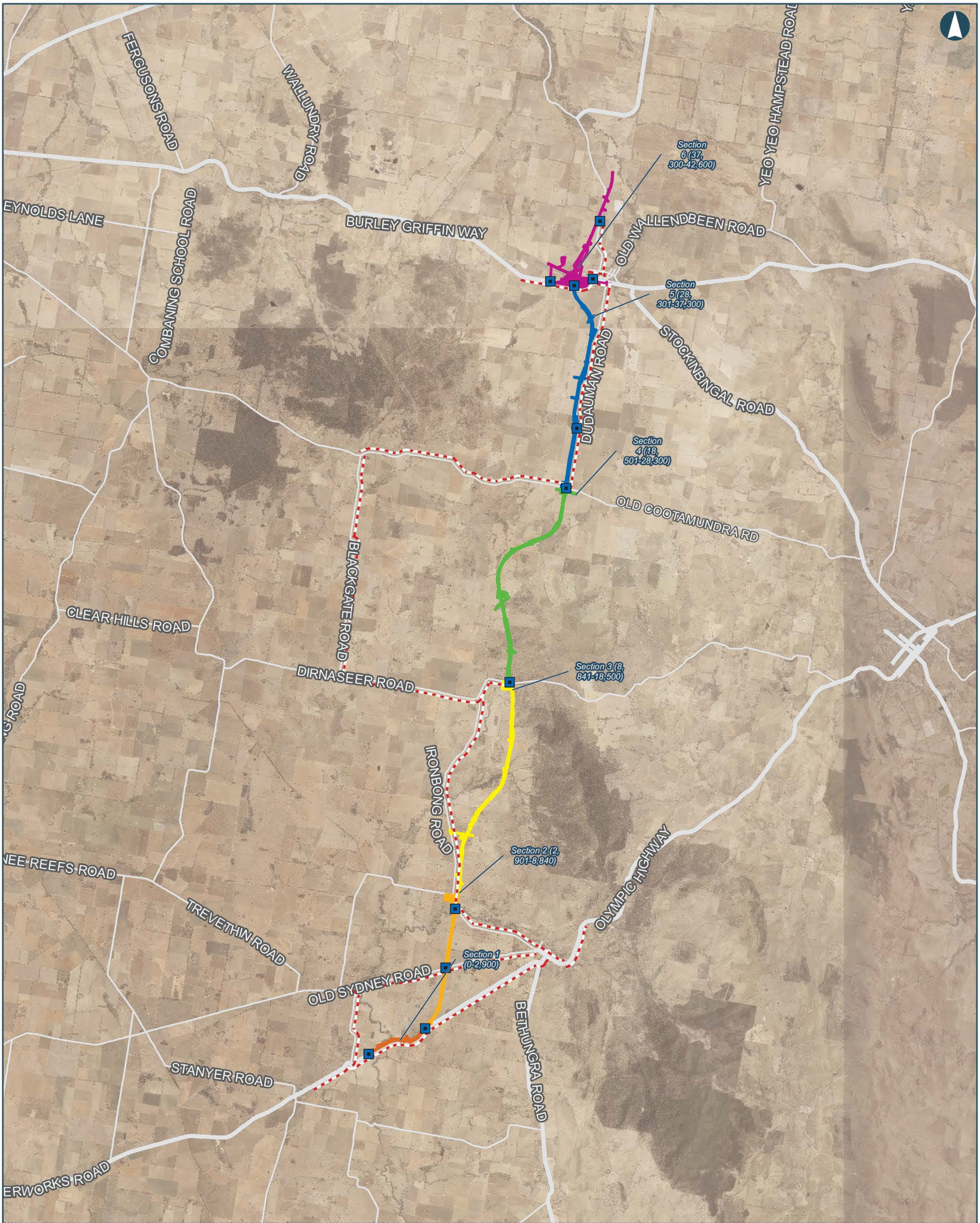
5.3.4.3 Inter-section formation haulage routes

Inter-section formation haulage routes are required when formation material is required to be moved from one construction section to another. The vehicle movements will be taking place outside of the proposal alignment on designated roads, as shown in Figure 5.5. Every construction site access gate will be used by the inter-section haulage vehicles.

5.3.4.4 Earthworks general fill haulage routes

In addition to formation haulage, earthworks general fill haulage will occur to move excavated material from one construction section to another. This haulage would only be required external to the proposal between gates one and two, and four and five. The vehicle movements will be taking place outside of the proposal alignment on designated roads, as shown in Figure 5.6. Vehicle movement volumes on these roads have been calculated by considering the purpose of the vehicle's trip. The volumes applied are based on the expected maximum haulage rate within a construction section.

The application of construction vehicles to the relevant links and intersections is shown in sections 5.3.5–5.3.6.



ILLABO TO STOCKINBINGAL 5.5 Inter-section formation haulage routes

0 2 4 6 Km

Coordinate System: GDA 1994 MGA Zone 55

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Author: IRDJV Scale: 1:150,000
Data Sources: ARTC, NSWSS, ESRI

Key features of
- Access point
- Haulage Route

Existing features
- Sub-arterial road
- Arterial road

Construction
- Section 1 (0-2,900)
- Section 2 (2,901-8,840)
- Section 3 (8,841-18,500)
- Section 4 (18,501-28,300)
- Section 5 (28,301-37,300)
- Section 6 (37,300-42,600)

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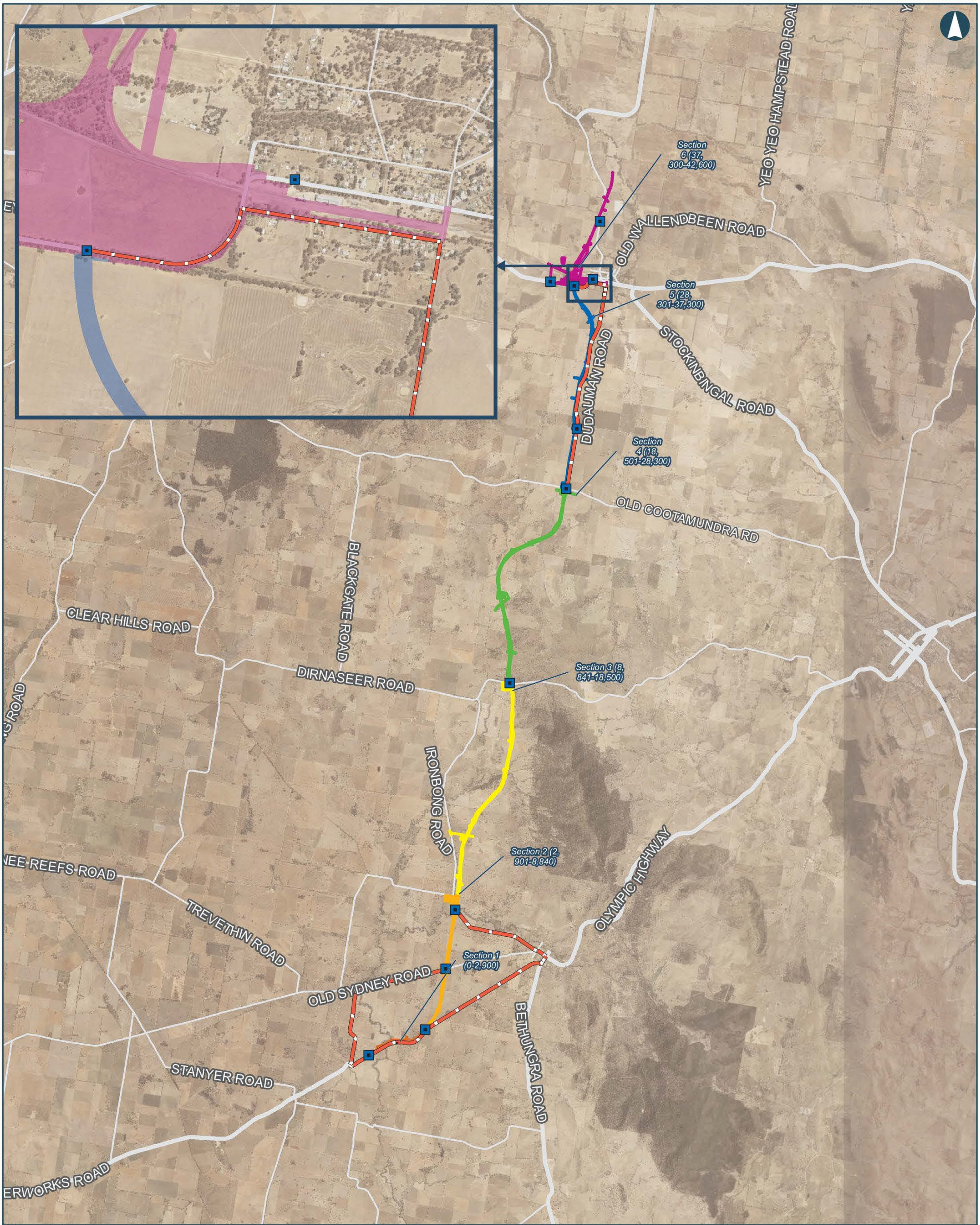

ILLABO TO STOCKINBINGAL 5.6 Earthworks general fill haulage routes

0 2 4 6 Km

Coordinate System: GDA 1994 MGA Zone 55

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Date: 8/18/2021
Author: IRDJV
Paper: A3
Scale: 1:13,524
Data Sources: ARTC, NSWSS, ESRI

Key features of proposal

- Access point
- Earthworks General Fill Haulage Route

Existing features

- Sub-arterial road
- Arterial road

Construction Section

- Section 1 (0-2,900)
- Section 2 (2,901-8,840)
- Section 3 (8,841-18,500)
- Section 4 (18,501-28,300)
- Section 5 (28,301-37,300)
- Section 6 (37,300-42,600)

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5.3.5 Construction link assessment

Based on the information provided in Table 3.3 and Table 3.4, the LOS of the roads used as routes to the alignment have been determined for the 2026 assessment year, with and without two-way peak hour construction vehicles. It is noted that a proportion of the total peak hour construction vehicles was applied to each road based on assumptions on trip generation and routes detailed in section 5.1, 5.3.3 and 5.3.4. The assessment year of 2026 has been adopted to ensure a conservative assessment. The results of the link assessments can be seen in Table 5.15.

Table 5.15 Construction link assessment (2026)

Road name	Background AADT two-way volumes	Peak hour volumes			Peak hour LOS	Peak hour construction vehicle volumes			Peak hour total vehicle volume with construction	Peak hour LOS with construction vehicles
		LV	HV	Total		LV	HV	Total		
Burley Griffin Way (east of Ellwood Street)	859	49	29	77	B	87	44	131	209	B
Burley Griffin Way (west of Temora Street)	1,101	67	32	99	B	72	44	116	215	B
Grogan Road	86	5	3	8	B	80	66	146	153	B
Hibernia Street	1,229	82	29	111	B	159	100	259	370	C
Troy Street*	1,258	84	32	113	B	159	130	289	402	C
Dudauman Road	86	5	3	8	B	80	96	176	183	B
Old Cootamundra Road	277	18	6	25	B	159	100	259	284	B
Dirnaseer Road (east of alignment)	69	5	1	6	B	87	44	131	138	B
Ironbong Road (east of alignment)	25	2	1	2	B	87	114	202	204	B
Old Sydney Road (east of alignment)	17	1	0	1	B	44	58	102	103	B
Olympic Highway (west of Bethungra)	1,774	126	34	160	B	87	114	202	361	C
Retreat Road	46	4	1	4	B	107	66	173	177	B
Junee Reefs Road	40	3	1	4	B	107	66	173	177	B
Goldfields Way	1,774	126	34	160	B	107	66	173	333	B
Stockinbingal Road	277	18	6	25	B	87	44	131	156	B

*Figures taking into consideration temporary closure of Hibernia Street and diversion onto Troy Street.

As shown in Table 5.15 all roads under assessment operate at LOS B during the 2026 peak hour without peak hour construction vehicles. Most roads experience no change to the existing LOS as a result of the peak hour construction vehicles, remaining at LOS B. Hibernia Street, Troy Street and Olympic Highway (west of Bethungra) decline in LOS with the addition of construction vehicles, but remain at a satisfactory performance level, LOS C.

There is a significant increase in vehicular traffic on many of the roads involved in construction of the proposal. Given the very low hourly volumes in the 2026 base case, only small levels of construction activity will increase road traffic by greater than 5 per cent. Due to the scope and scale of the proposal some roads see a much greater increase than 5 per cent. It should be noted that each road has capacity to accommodate additional traffic at the scale of this proposal. This is demonstrated in section 5.4 and 5.4.2. However, to monitor the impact of the increase in heavy vehicles using the road network on pavement conditions, road dilapidation assessments should be conducted prior to commencement and at completion of construction. Upgrades to pavements on construction routes should also be undertaken prior to construction, as deemed to be required.

5.3.6 Construction intersection assessment approach

5.3.6.1 Assessment scenarios

All intersections under assessment have been modelled during the construction period with the peak period construction vehicles identified in Table 5.14. Existing intersections have also been assessed with background peak hour volumes, without the peak period construction vehicles, to provide a base assessment where applicable. As noted in section 5.1.

As explained in section 5.1, the background traffic volumes used in the assessment are 2025 for the construction route intersections and 2024 for the construction access intersection.

The scenarios assessed are listed below:

- background traffic AM peak
- background traffic AM peak + construction vehicles
- background traffic PM peak
- background traffic PM peak + construction vehicles.

SIDRA outputs for all intersections and scenarios under assessment are provided in Appendix C.

5.3.6.2 Traffic volume calculations and assumptions

Due to the absence of intersection traffic surveys and complete traffic counts for links, various methods have been used to estimate a worst case traffic loading scenario for each assessed intersection. To achieve this the origins and destinations of different vehicle types have been assessed individually and the volumes calculated in Table 5.7 to Table 5.13 have been applied to roads where most appropriate. The methodology used in these calculations is:

- Background traffic – Link volumes applied to each movement of the intersection.
- Construction light vehicles – Assumed to approach the intersection 55 per cent from the east and 45 per cent from the west (or north and south where appropriate) as per section 5.1. It is assumed that each car will transport an average of two workers. All vehicles undertake one movement in the AM peak period and perform the reverse movement during the PM peak period.
- Plant and equipment deliveries – Assumed to originate equally from either direction when intersection is near the proposal, so full loading applied to all approaches. When intersection is not near the proposal, assumed to arrive from one direction, therefore applying 50 per cent loading to each relevant approach. Assumed to arrive and leave once in a peak period.
- Quarry deliveries – Applied to the road if on a quarry route, as per section 5.3.4, to move continuously throughout the day.
- Concrete deliveries – Assumed to originate equally from either direction when intersection is near the proposal, so full loading applied to all approaches. When intersection is not near the proposal, assumed to arrive from one direction, therefore applying 50 per cent loading to each relevant approach. Assumed to move continuously throughout the day.

- Inter-section formation material haulage – Applied to the road if on the haulage route, as per Figure 5.5. Assumed to move continuously throughout the day from every site access gate. For the purposes of the assessment, it is assumed that a maximum of two fleets of inter-section haulage may be in operation during a peak period.
- Earthworks general fill haulage – Applied to the road if on the earthworks haulage route and connects site access gates between sections one and two, or sections four and five. Assumed to move continuously throughout the day.
- Water tankers – Applied to all haulage route roads from all directions. Assumed to move continuously throughout the day.

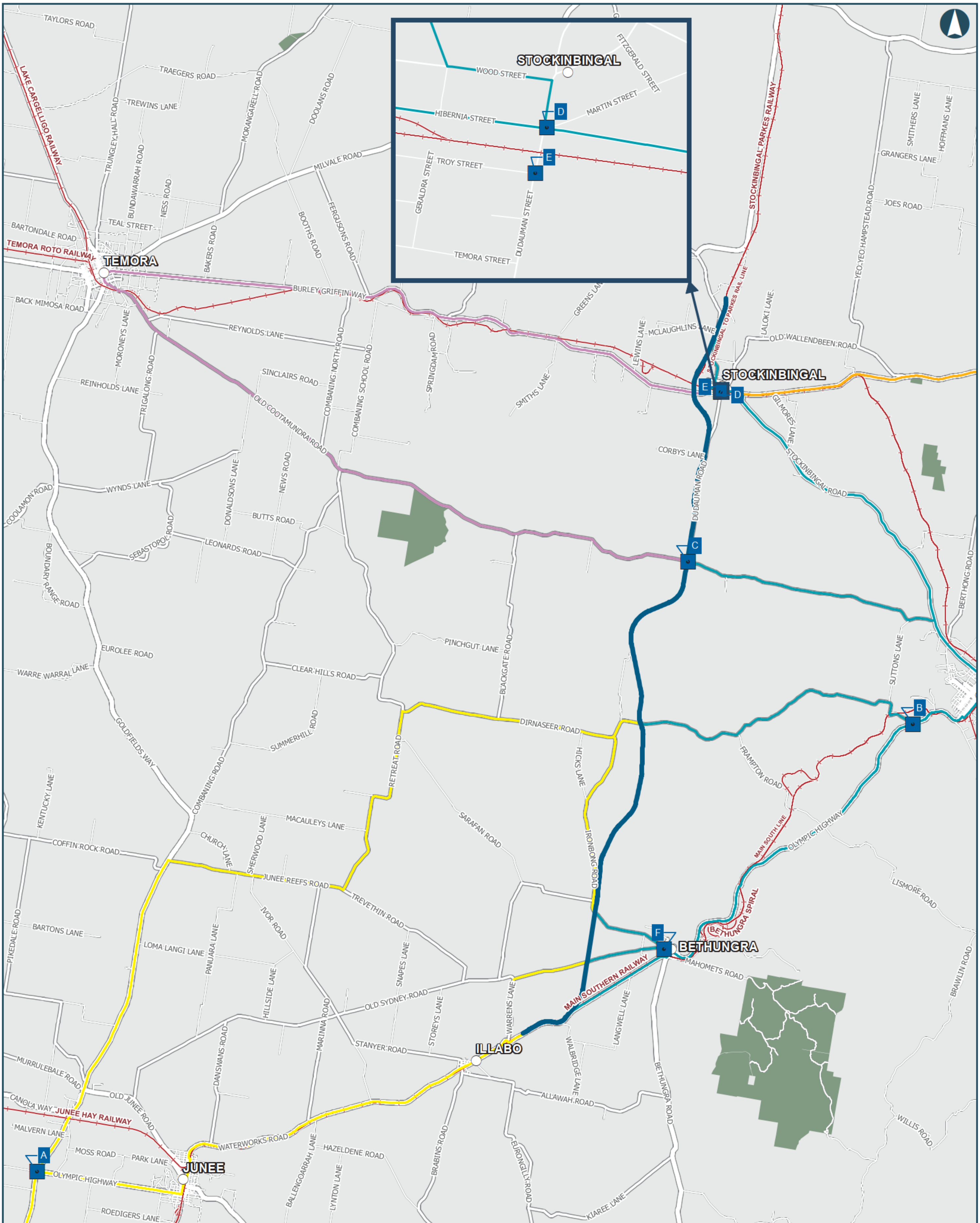
5.3.6.3 Construction route intersections

A total of 15 key construction route intersections were compared and those found to have higher volumes of traffic based on connecting link road results, were further assessed in SIDRA 8.0. Six intersections along the construction routes have therefore been identified for analysis to assess the impact construction traffic will have on the operation of the intersection.

The intersections on the construction routes likely to be most impacted from workforce and construction vehicles are listed below:

A) Olympic Highway/Goldfields Way
B) Olympic Highway/Dirnaseer Road
C) Old Cootamundra Road/Dudauman Road
D) Hibernia Street/Dudauman Street
E) Troy Street/Dudauman Street
F) Olympic Highway/Baylis Street.

The locations of these intersections are shown in Figure 5.7.



ILLABO TO STOCKINBINGAL 5.7 Construction route intersections

0 1 2 3 4 5 Km

Coordinate System: GDA 1994 MGA Zone 55

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Author: IRDJV Scale: 1:180,000
Data Sources: ARTC, NSWSS, ESRI

- Proposal site
- Route from Cootamundra
- Route from Temora
- Route from Wagga Wagga
- Route from Young
- Road Intersections
- Existing rail
- Arterial road
- Sub-arterial road
- Local road
- Parks and reserves

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5.3.6.4 Staging overlap at intersections

It is noted that construction of different sections will overlap during periods of the proposal schedule (as per Figure 5.2). As shown in Figure 5.7, construction route intersection A forms part of the route to access construction sections 1, 2, 3 and 4. To account for the likelihood of simultaneous construction of sections, construction traffic at intersection A has been calculated as follows:

- Light vehicles, plant and equipment delivery vehicles, and concrete delivery vehicles have been doubled for those using Olympic Highway between Goldfields Way and Junee for construction of Sections 1 and 2.
- Light vehicles, plant and equipment delivery vehicles, and concrete delivery vehicles have been tripled for those using Goldfields Way for construction of Sections 2, 3 and 4.

As shown in Figure 5.7, construction route intersection B forms part of the route to access construction sections 1, 2, 3 and 4. To account for the likelihood of simultaneous construction of sections, construction traffic at intersection B has been calculated as follows:

- Light vehicles, plant and equipment delivery vehicles, and concrete delivery vehicles have been doubled for those using Dirnaseer Road between Olympic Highway and the alignment for construction of Sections 3 and 4.
- Light vehicles, plant and equipment delivery vehicles, and concrete delivery vehicles have been tripled for those using Olympic Highway for construction of Sections 1, 2 and 3.

As shown in Figure 5.7, construction route intersection C forms part of the route to access construction sections 4 and 5. To account for the likelihood of simultaneous construction of sections, construction traffic at intersection C has been calculated as follows:

- Light vehicles, plant and equipment delivery vehicles, and concrete delivery vehicles have been doubled for those using Old Cootamundra Road for construction of Sections 4 and 5.

As shown in Figure 5.7, construction route intersection F forms part of the route to access construction sections 1, 2 and 3. To account for the likelihood of simultaneous construction of sections, construction traffic at intersection F has been calculated as follows:

- Light vehicles, plant and equipment delivery vehicles, and concrete delivery vehicles using Baylis Street to access Ironbong Road have been doubled to account for those accessing construction Sections 2 and 3.
- Light vehicles, plant and equipment delivery vehicles, and concrete delivery vehicles using Baylis Street to access Old Sydney Road are added to the above to account for those accessing construction Section 2.
- Light vehicles, plant and equipment delivery vehicles, and concrete delivery vehicles using Olympic Highway (south) have been doubled to account for those accessing construction Sections 1 and 2.
- All inter-section formation haulage and water haulage vehicle movements between Olympic Highway (south) and Baylis Street that use Ironbong Road and Old Sydney Road have been doubled to account for those accessing construction Sections 2 and 3.
- Earthworks haulage vehicles between Olympic Highway (south) and Baylis Street that use Ironbong Road have been added to the above to account for those accessing construction Section 2.

Given the location of other construction route and access intersections it is not anticipated that there will be any other overlap in construction vehicles traversing intersections D or E at the same time.

5.3.6.5 Construction access intersections

There are 11 proposed access points to the alignment during construction. Table 5.16 lists the location of each access point, based on the proposal chainage, and which construction section they provide access to.

Table 5.16 Construction access intersection locations

Access No.	Access location (road)	Access location (chainage)	Extent of proposal site accessed	Construction sections accessed
1	Olympic Highway (south)	0	0 – 0.750km	1
2	Olympic Highway (north)	2,750	0.750 – 5.500km	1 & 2
3	Old Sydney Road	5,500	0.750 – 7.940km	1 & 2
4	Ironbong Road	8,150	7.940 – 14.400km	2 & 3
5	Dirnaseer Road	18,500	14.400 – 28.250km	3 & 4
6	Old Cootamundra Road	28,250	18.500 – 30.850km	4 & 5
7	Dudauman Road	30,850	28.300 – 37.300km	5
8	Burley Griffin Way (east)	37,300	30.850 – 42.600km	5 & 6
9	Burley Griffin Way (west)	37,300 (1km west of alignment)	Rail maintenance access road (RMAR) on existing alignment west of Stockinbingal	6
10	Hibernia Street	37,750 (0.8km east of alignment)	RMAR on existing alignment in Stockinbingal	6
11	Grogan Road	40,250	37.300 – 42.600km	6

Access 9 and Access 10 are not on the proposal alignment, however they provide access to the proposal near Stockinbingal via existing public and private roads. This is detailed further in section 5.4.2.

Figure 5.8 shows the location of the proposed construction access intersections in relation to the proposal.

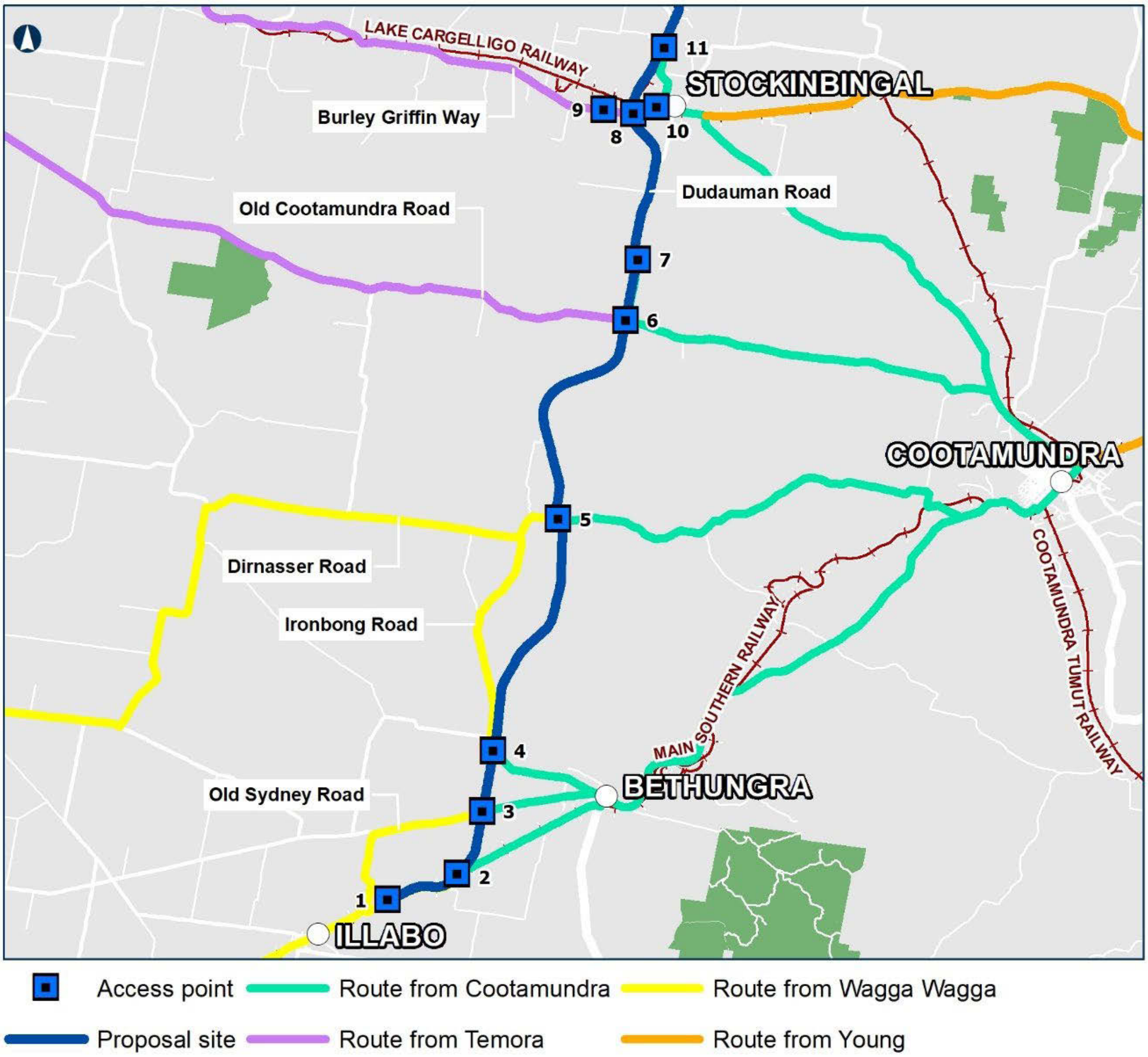


Figure 5.8 Construction access intersections

5.4 Construction traffic impacts

This section presents the impact of the calculated construction volumes on the transport network.

5.4.1 Construction route intersections results

The construction route intersections discussed in section 5.3.6 have been analysed in SIDRA 8.0 with the results presented in this section. All construction route intersections are existing intersections.

5.4.1.1 Intersection A – Olympic Highway/Goldfields Way

Figure 5.9 shows the layout of the Olympic Highway/Goldfields Way intersection as modelled in SIDRA 8.0.

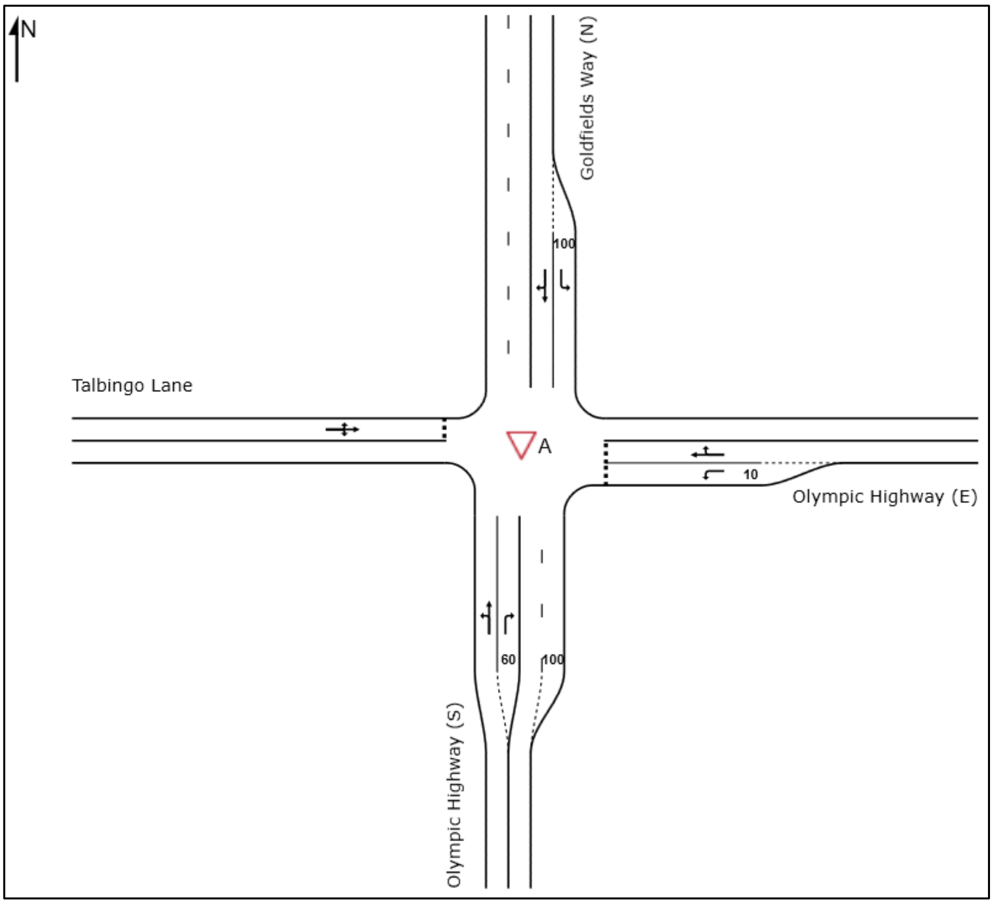


Figure 5.9 Olympic Highway/Goldfields Way – SIDRA layout

Table 5.17 to Table 5.20 show the SIDRA 8.0 results for the Olympic Highway/Goldfields Way intersection for the scenarios under assessment.

Table 5.17 Olympic Highway/Goldfields Way – AM peak

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Olympic Highway (S)	0.079	3.4	A	2.6
Olympic Highway (E)	0.160	8.0	A	5.3
Goldfields Way (N)	0.052	2.9	A	0.1
Talbingo Lane (W)	0.004	7.3	A	0.1

Table 5.18 Olympic Highway/Goldfields Way – AM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Olympic Highway (S)	0.219	3.9	A	8.7
Olympic Highway (E)	0.717	25.1	B	41.3
Goldfields Way (N)	0.109	2.9	A	0.1
Talbingo Lane (W)	0.008	12.3	A	0.2

Table 5.19 Olympic Highway/Goldfields Way – PM peak

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Olympic Highway (S)	0.079	3.4	A	2.6
Olympic Highway (E)	0.160	8.0	A	5.3
Goldfields Way (N)	0.052	2.9	A	0.1
Talbingo Lane (W)	0.004	7.3	A	0.1

Table 5.20 Olympic Highway/Goldfields Way – PM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Olympic Highway (S)	0.198	4.5	A	8.1
Olympic Highway (E)	0.645	19.9	B	34.8
Goldfields Way (N)	0.140	2.5	A	0.1
Talbingo Lane (W)	0.008	12.0	A	0.2

Table 5.17 to Table 5.20 show that satisfactory levels of service are maintained on all approaches to this intersection. For all but the Olympic Highway eastern approach, the LOS remains the same as the baseline case, without construction traffic. With the addition of the construction traffic, the eastern approach declines to a LOS B with a queue length of up to 41m. The is sufficient space to accommodate queues of this length on the eastern approach without impacting the next intersection, and the overall intersection performance is considered satisfactory.

5.4.1.2 Intersection B – Olympic Highway/Dirnaseer Road

Figure 5.10 shows the layout of the Olympic Highway/Dirnaseer Road intersection as modelled in SIDRA 8.0.

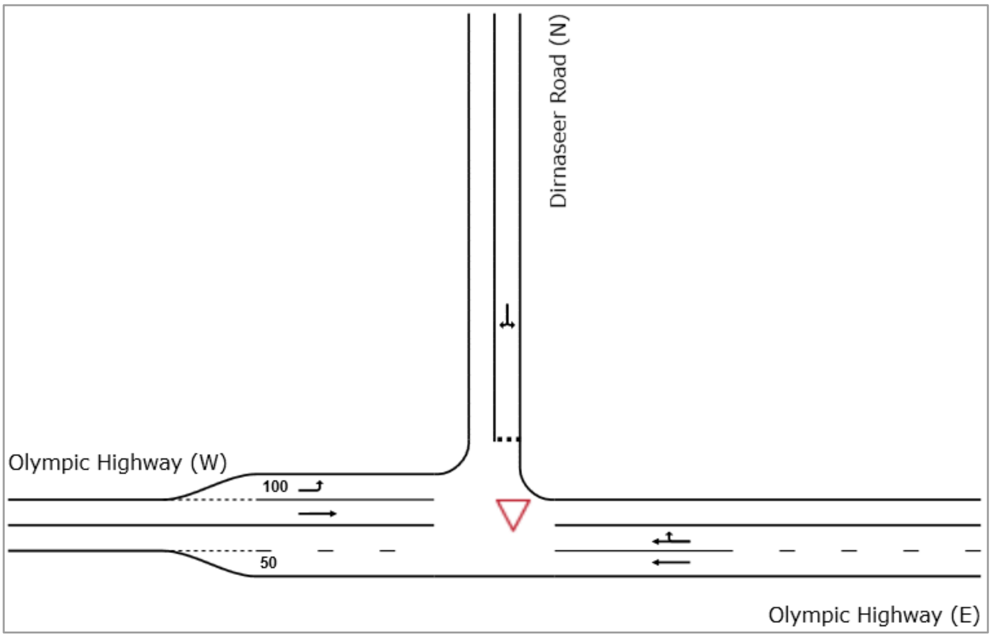


Figure 5.10 Olympic Highway/Dirnaseer Road – SIDRA layout

Table 5.21 to Table 5.24 show the SIDRA 8.0 results for the Olympic Highway/Dirnaseer Road intersection for the scenarios under assessment.

Table 5.21 Olympic Highway/Dirnaseer Road – AM peak

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Olympic Highway (W)	0.049	0.2	A	0.0
Olympic Highway (E)	0.040	0.2	A	0.2
Dirnaseer Road (N)	0.006	6.2	A	0.2

Table 5.22 Olympic Highway/Dirnaseer Road – AM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Olympic Highway (W)	0.108	0.1	A	0.0
Olympic Highway (E)	0.249	2.8	A	11.2
Dirnaseer Road (N)	0.080	8.7	A	3.5

Table 5.23 Olympic Highway/Dirnaseer Road – PM peak

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Olympic Highway (W)	0.049	0.2	A	0.0
Olympic Highway (E)	0.040	0.2	A	0.2
Dirnaseer Road (N)	0.006	6.2	A	0.2

Table 5.24 Olympic Highway/Dirnaseer Road – PM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Olympic Highway (W)	0.179	0.1	A	0.0
Olympic Highway (E)	0.152	3.7	A	8.6
Dirnaseer Road (N)	0.190	8.4	A	6.5

Table 5.21 to Table 5.24 show that acceptable levels of service are maintained on all approaches to this intersection with no change to the LOS with the addition of construction traffic.

5.4.1.3 Intersection C – Old Cootamundra Road/Dudauman Road

Figure 5.11 shows the layout of the Old Cootamundra Road/Dudauman Road intersection as modelled in SIDRA 8.0.

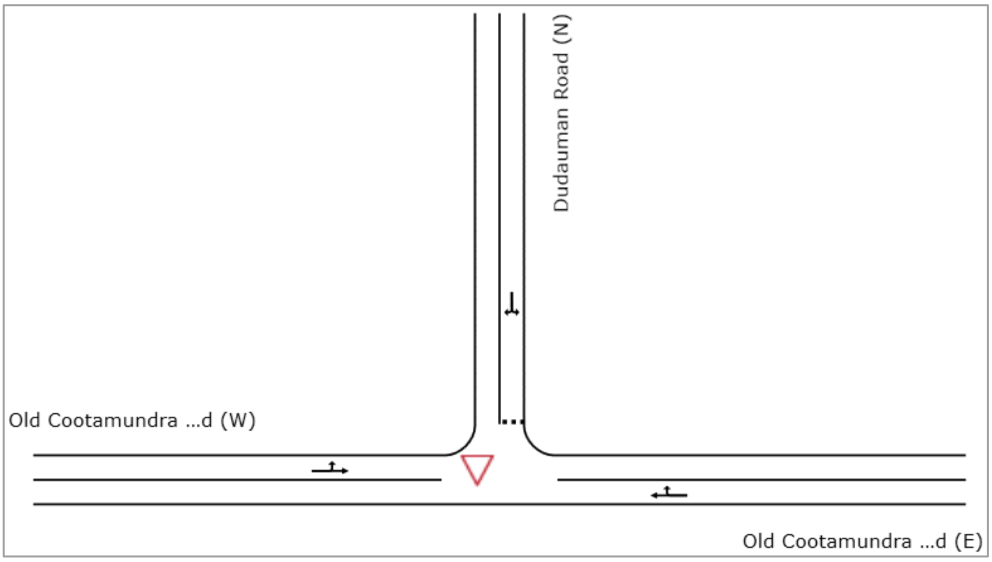


Figure 5.11 Old Cootamundra Road/Dudauman Road intersection – SIDRA layout

Table 5.25 to Table 5.28 show the SIDRA 8.0 results for the Old Cootamundra Road/Dudauman Road intersection for the scenarios under assessment.

Table 5.25 Old Cootamundra Road/Dudauman Road – AM peak

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Dudauman Road (N)	0.007	5.9	A	0.2
Old Cootamundra Road (E)	0.010	1.5	A	0.2
Old Cootamundra Road (W)	0.010	1.5	A	0.0

Table 5.26 Old Cootamundra Road/Dudauman Road – AM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Dudauman Road (N)	0.248	10.2	A	11.9
Old Cootamundra Road (E)	0.130	4.4	A	6.3
Old Cootamundra Road (W)	0.162	4.0	A	0.0

Table 5.27 Old Cootamundra Road/Dudauman Road – PM peak

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Dudauman Road (N)	0.007	5.9	A	0.2
Old Cootamundra Road (E)	0.010	1.5	A	0.2
Old Cootamundra Road (W)	0.010	1.5	A	0.0

Table 5.28 Old Cootamundra Road/Dudauman Road – PM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Dudauman Road (N)	0.271	8.8	A	12.1
Old Cootamundra Road (E)	0.105	3.5	A	4.9
Old Cootamundra Road (W)	0.158	3.9	A	0.0

Table 5.25 to Table 5.28 show that acceptable levels of service are maintained on all approaches to this intersection with no change to the LOS with the addition of construction traffic.

5.4.1.4 Intersection D – Hibernia Street/Dudauman Street

Figure 5.12 shows the layout of the Hibernia Street/Dudauman Street intersection as modelled in SIDRA 8.0.

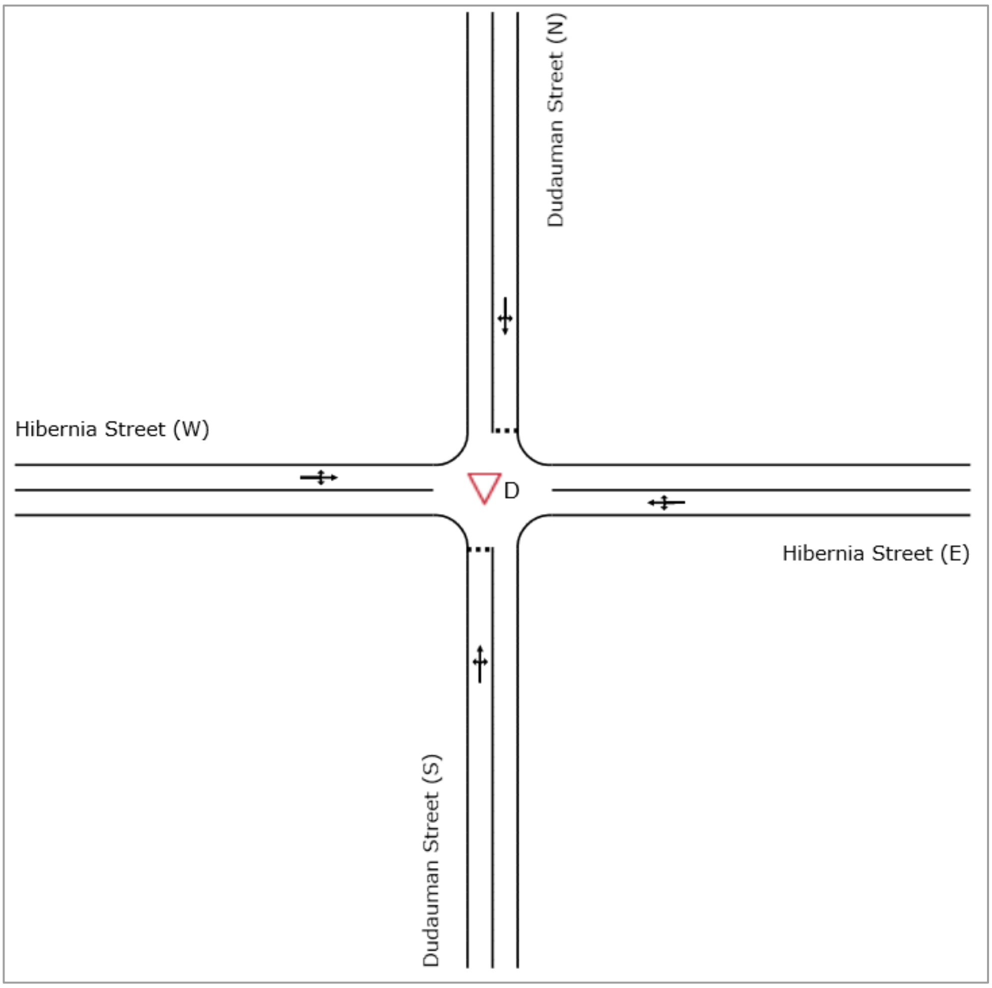


Figure 5.12 Hibernia Street/Dudauman Street – SIDRA layout

The construction scenario for this intersection takes into consideration temporary road closures and detours as a result of the realignment of Burley Griffin Way and construction site Access 10 on Hibernia Street. During the construction period there will be more turning movements at this intersection as well as increased traffic flow on the south approach of Dudauman Street. Figure 5.13 shows the different routes that will operate through this intersection during construction. The diversion along Troy Street is expected to be in place for 15 days.

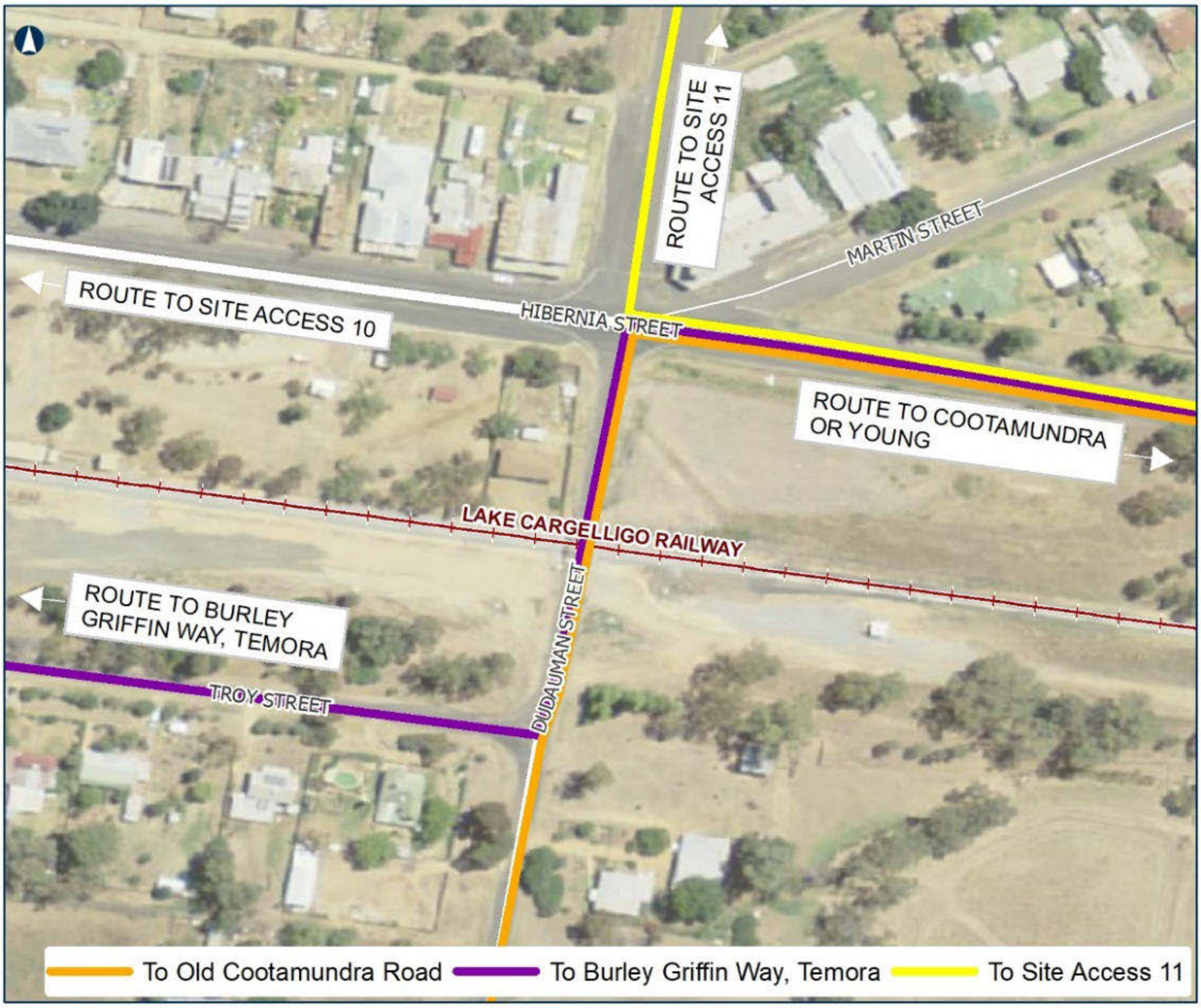


Figure 5.13 Stockinbingal route diversion

Table 5.29 to Table 5.32 show the SIDRA 8.0 results for Hibernia Street/Dudauman Street intersection for the scenarios under assessment.

Table 5.29 Hibernia Street/Dudauman Street – AM peak

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Hibernia Street (W)	0.040	0.8	A	0.3
Hibernia Street (E)	0.040	0.8	A	0.3
Dudauman Street (N)	0.012	5.9	A	0.4
Dudauman Street (S)	0.012	5.9	A	0.4

Table 5.30 Hibernia Street/Dudauman Street – AM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Hibernia Street (W)	0.120	7.1	A	7.6
Hibernia Street (E)	0.229	4.7	A	7.1
Dudauman Street (N)	0.241	11.2	A	11.5
Dudauman Street (S)	0.503	13.9	A	36.0

Table 5.31 Hibernia Street/Dudauman Street – PM peak

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Hibernia Street (W)	0.040	0.8	A	0.3
Hibernia Street (E)	0.040	0.8	A	0.3
Dudauman Street (N)	0.012	5.9	A	0.4
Dudauman Street (S)	0.012	5.9	A	0.4

Table 5.32 Hibernia Street/Dudauman Street – PM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Hibernia Street (W)	0.138	4.4	A	7.4
Hibernia Street (E)	0.132	5.4	A	4.7
Dudauman Street (N)	0.235	8.3	A	10.4
Dudauman Street (S)	0.597	14.2	A	46.6

Due to the closure of the route along Hibernia Street/Burley Griffin Way between Geraldra Street and Troy Street, traffic is diverted onto Dudauman Street and Troy Street. Table 5.29 to Table 5.32 show that despite this, acceptable levels of service are maintained on all approaches to this intersection with no change to the LOS with the addition of construction traffic.

The detour does increase turning movements at the intersection and results in an increase in queue lengths, particularly on the southern approach. A level crossing is located on Dudauman Street approximately 60m south of the intersection but, as can be seen in Table 5.30 and Table 5.32, queuing is not expected to extend as far as this level crossing. Although it is not an issue found in the results of this analysis, the risk of vehicles queuing across the Dudauman Street level crossing should be considered and managed within the Construction Environmental Management Plan (CEMP).

5.4.1.5 Intersection E – Troy Street/Dudauman Street

Figure 5.14 shows the layout of the Troy Street/Dudauman Street intersection as modelled in SIDRA 8.0.

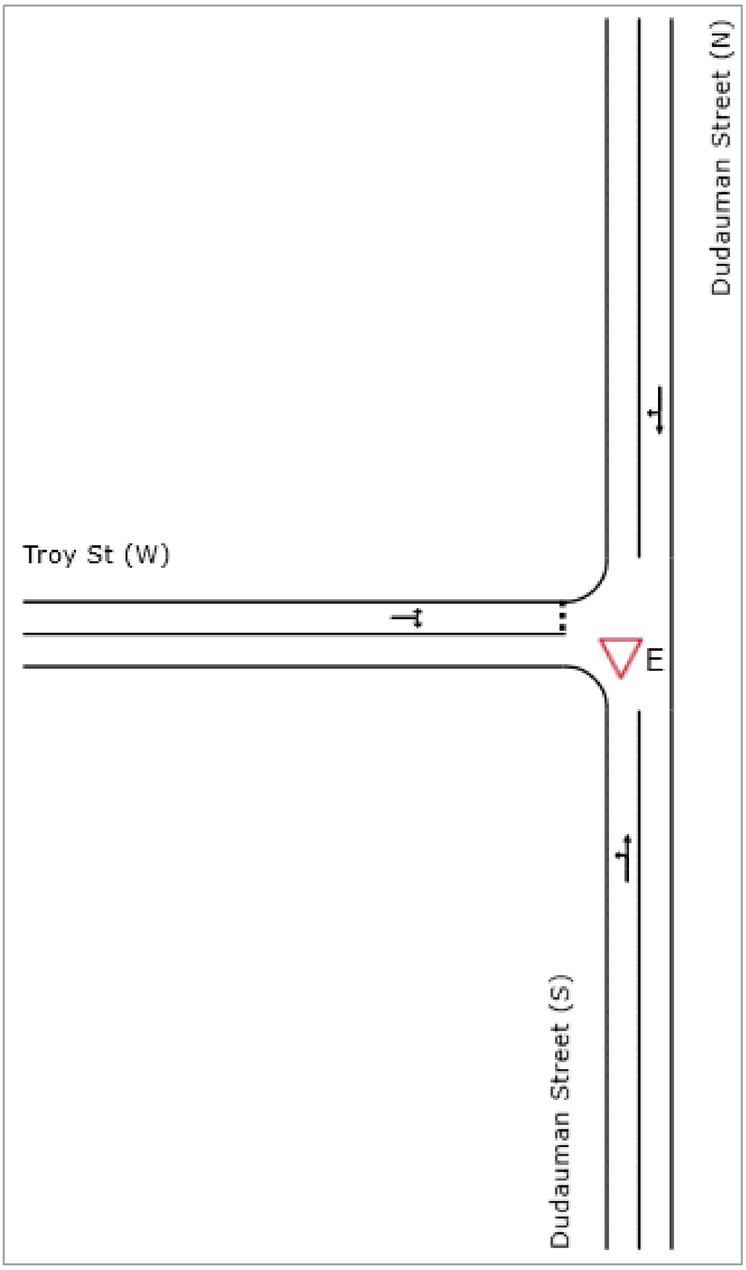


Figure 5.14 Troy Street/Dudauman Street – SIDRA layout

The construction scenario for this intersection takes into consideration temporary road closures and detours as a result of the realignment of Burley Griffin Way and construction site Access 10 on Hibernia Street. During the construction period there will be more turning movements at this intersection as well as increased traffic flow on the north approach of Dudauman Street. Figure 5.13 above shows the different routes that will operate through this intersection during construction. The diversion along Troy Street is expected to be in place for 15 days.

Table 5.33 to Table 5.36 show the SIDRA 8.0 results for Troy Street/Dudauman Street intersection for the scenarios under assessment.

Table 5.33 Troy Street/Dudauman Street – AM peak

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Troy Street (W)	0.007	5.8	A	0.2
Dudauman Street (N)	0.003	1.1	A	0.0
Dudauman Street (S)	0.003	1.1	A	0.0

Table 5.34 Troy Street/Dudauman Street – AM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Troy Street (W)	0.422	12.0	A	27.3
Dudauman Street (N)	0.264	5.7	A	14.3
Dudauman Street (S)	0.156	3.9	A	0.0

Table 5.35 Troy Street/Dudauman Street – PM peak

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Troy Street (W)	0.007	5.8	A	0.2
Dudauman Street (N)	0.003	1.1	A	0.0
Dudauman Street (S)	0.003	1.1	A	0.0

Table 5.36 Troy Street/Dudauman Street – PM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Troy Street (W)	0.435	10.1	A	27.8
Dudauman Street (N)	0.203	6.0	A	11.9
Dudauman Street (S)	0.169	3.6	A	0.0

Although the amount of traffic using this intersection has increased considerably with the closure of Hibernia Street all movements record acceptable levels of DOS, delay, LOS and queuing. Noting that a level crossing exists about 60m north of the intersection, the results indicate that no queuing on the northern approach is expected to extend as far as this.

5.4.1.6 Intersection F – Olympic Highway/Baylis Street

Figure 5.15 shows the layout of the Olympic Highway/Baylis Street intersection as modelled in SIDRA 8.0.

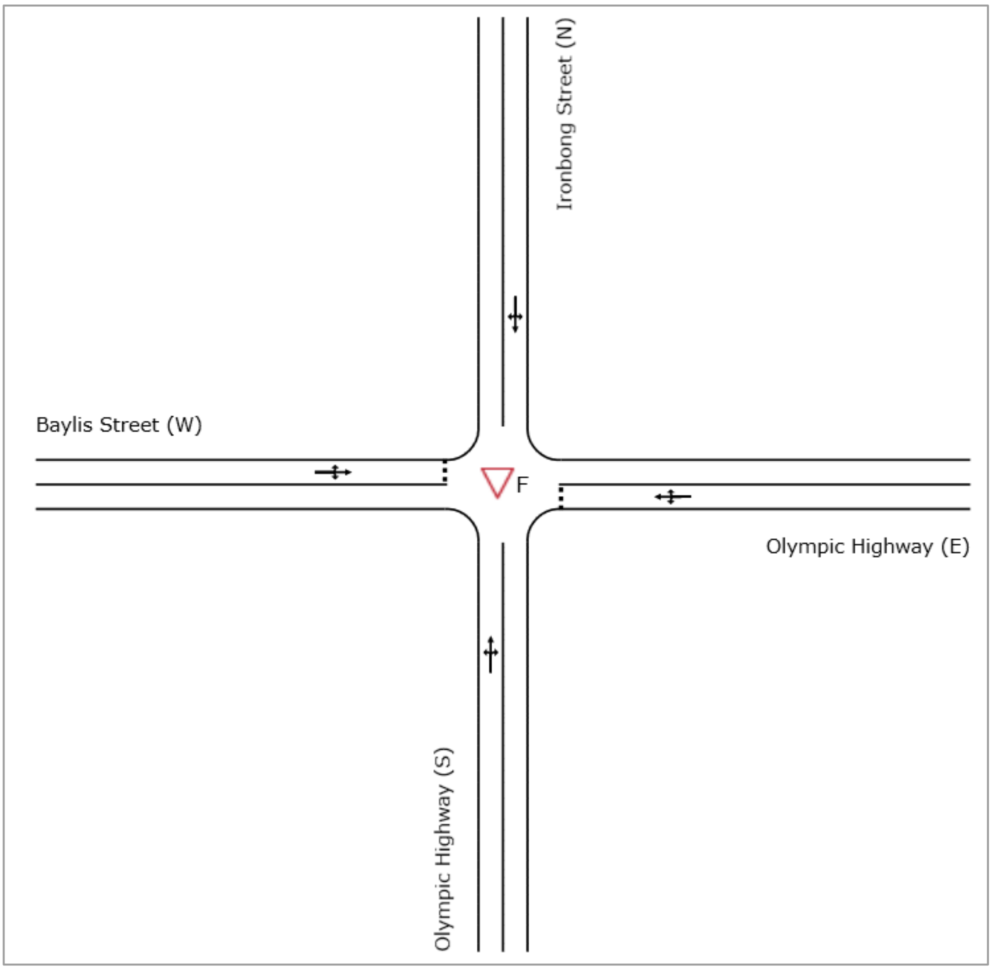


Figure 5.15 Olympic Highway/Baylis Street – SIDRA layout

The major flow of traffic through this intersection under a normal operational scenario is between the south and east approaches along Olympic Highway. During the construction period, construction traffic will use Baylis Street to connect to both Ironbong Road and Old Sydney Road, increasing the usage of this intersection considerably.

Table 5.37 to Table 5.40 show the SIDRA 8.0 results for Hibernia Street/Dudauman Street intersection for the scenarios under assessment.

Table 5.37 Olympic Highway/Baylis Street – AM peak

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Olympic Highway (S)	0.053	5.6	A	2.1
Olympic Highway (E)	0.059	5.8	A	2.0
Ironbong Street (N)	0.002	3.7	A	0.0
Baylis Street (W)	0.003	5.4	A	0.1

Table 5.38 Olympic Highway/Baylis Street – AM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Olympic Highway (S)	0.213	6.4	A	9.8
Olympic Highway (E)	0.398	7.1	A	18.0
Ironbong Street (N)	0.002	4.2	A	0.1
Baylis Street (W)	0.851	43.9	D	99.8

Table 5.39 Olympic Highway/Baylis Street – PM peak

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Olympic Highway (S)	0.053	5.6	A	2.1
Olympic Highway (E)	0.059	5.8	A	2.0
Ironbong Street (N)	0.002	3.7	A	0.0
Baylis Street (W)	0.003	5.4	A	0.1

Table 5.40 Olympic Highway/Baylis Street – PM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Olympic Highway (S)	0.254	6.1	A	12.9
Olympic Highway (E)	0.274	8.5	A	12.7
Ironbong Street (N)	0.002	4.2	A	0.1
Baylis Street (W)	0.828	29.9	C	96.5

The results in Table 5.37 to Table 5.40 show the conditions at the west approach deteriorate from LOS A to LOS D in the AM peak hour period and LOS C in the PM peak hour period. The western approach in the AM peak period is only marginally LOS D (an average delay of 43 seconds is the boundary of LOS C to D). The vast majority of vehicles using this western approach are construction vehicles and very few non-construction traffic vehicles will be impacted. Additionally, the queue length can be accommodated comfortably on the western approach on Baylis Street, without interference with the next intersection.

The delay experienced at this intersection is on the minor road, not Olympic Highway so therefore it will not impede the major thoroughfare. All other approaches remain at LOS A with the additional construction traffic. The intersection will continue to operate within capacity and is therefore assessed as operating satisfactorily.

It should also be noted that the construction traffic trip generation approach is very conservative and represents an expected absolute worst-case for vehicle volumes. It is therefore anticipated that for the considerable majority of the construction period these levels of congestion will not eventuate.

5.4.1.7 Construction route intersection assessment summary

As shown in Table 5.17 to Table 5.40 all approaches on the intersections under assessment operate with very low levels of DOS and delay and most operate at a LOS A in both the AM and PM peaks. With the addition of a worst-case scenario for construction traffic to each intersection, all approaches remain operational at a satisfactory level.

The level of service decreased to LOS B at Dudauman Street (intersection with Hibernia Street) and Olympic Highway (east approach to Goldfields Way intersection). At Baylis Street (minor approach to Olympic Highway intersection in Bethungra) decreased to LOS D in the AM peak and LOS C in the PM peak.

Although it is not an issue found in the results of this analysis, at the Hibernia Street/Dudauman Street intersection the risk of vehicles queuing across the Dudauman Street level crossing should be considered by traffic control engaged at this site whilst the Troy Street diversion is in place.

5.4.2 Construction access intersections results

The proposed construction access intersections, as discussed in section 5.3.6.5, have been analysed in SIDRA 8.0 with the results presented in this section.

5.4.2.1 Access 1 – Olympic Highway (south)

Figure 5.16 shows the indicative location of Access 1 on Olympic Highway. Figure 5.17 shows the layout of Access 1 as modelled in SIDRA 8.0. The access arrangement to the RMAR (which runs along the northern side of the existing rail line) for this access point is under review and would be confirmed following exhibition of the EIS. Options that would be considered include establishment of a temporary level crossing to facilitate access from Olympic Highway to the south, or access from the north of the rail line via Warrens Lane.

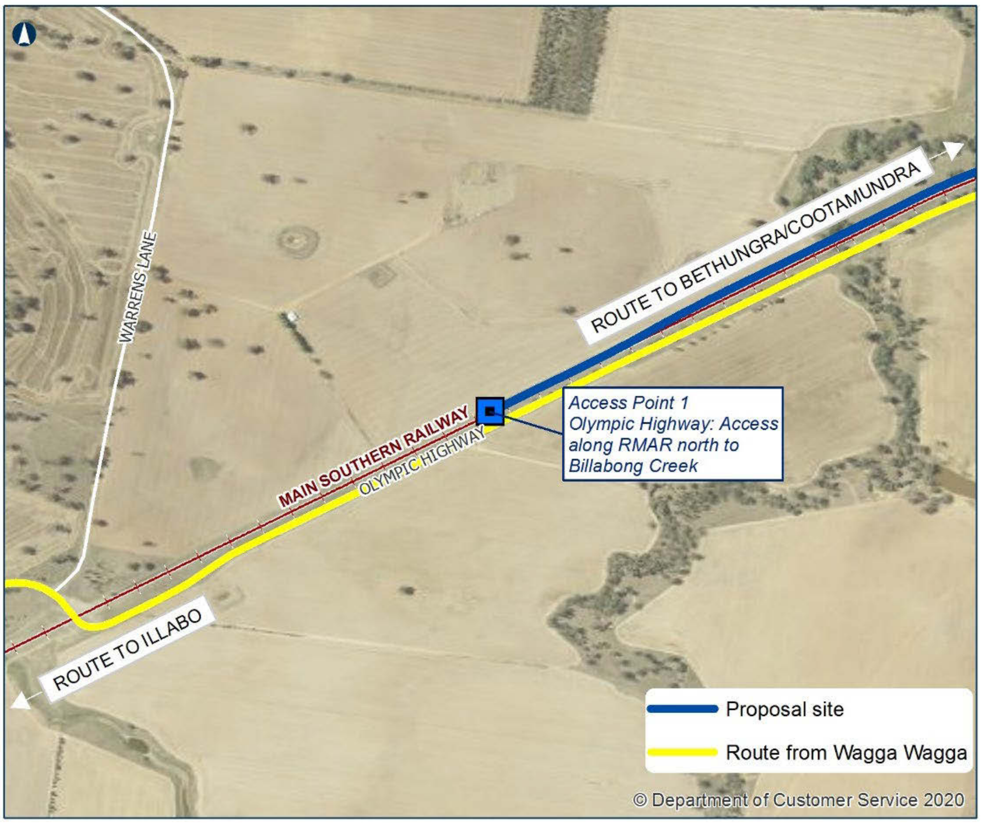


Figure 5.16 Access 1 location - Olympic Highway (south)

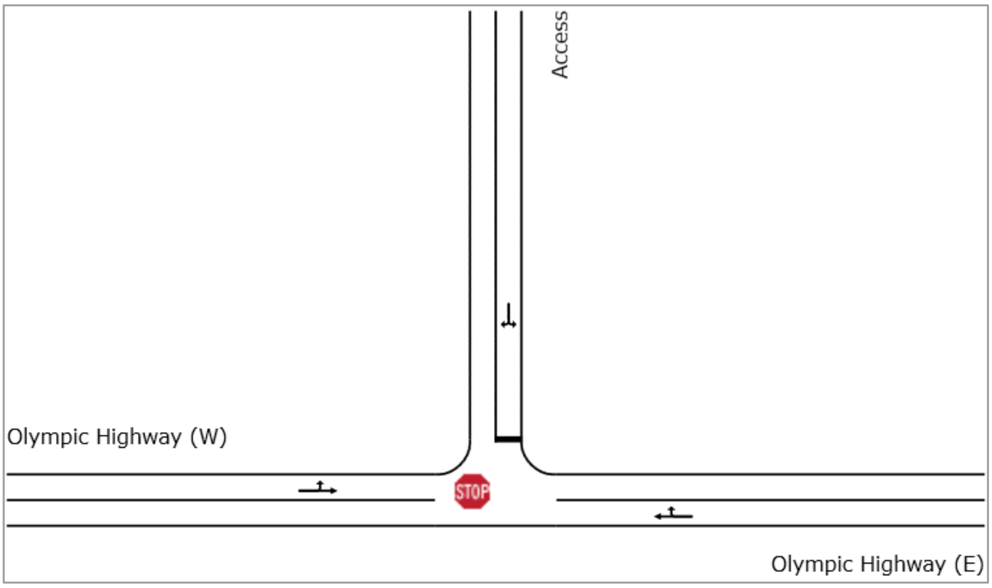


Figure 5.17 Access 1 - SIDRA layout

Table 5.41 and Table 5.42 show the SIDRA 8.0 results for Access 1 for the scenarios under assessment.

Table 5.41 Access 1 SIDRA results – AM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Access (N)	0.068	12.0	A	3.1
Olympic Highway (W)	0.089	2.5	A	0.0
Olympic Highway (E)	0.103	3.2	A	3.8

Table 5.42 Access 1 SIDRA results – PM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Access (N)	0.138	10.2	A	4.8
Olympic Highway (W)	0.069	2.0	A	0.0
Olympic Highway (E)	0.076	2.4	A	2.1

As shown in Table 5.41 and Table 5.42, all approaches operate satisfactorily in relation to DOS, delay, LOS and queuing.

5.4.2.2 Access 2 – Olympic Highway (north)

Access 2 utilises an existing public road and level crossing over the existing Main Southern Rail Line. Figure 5.18 shows the indicative location of Access 2 on Olympic Highway. Figure 5.19 shows the layout of Access 2 as modelled in SIDRA 8.0. It is a design assumption that treatments will be put in place to mitigate the risk of short-stacking at this access, including signage and vehicle turn restrictions.

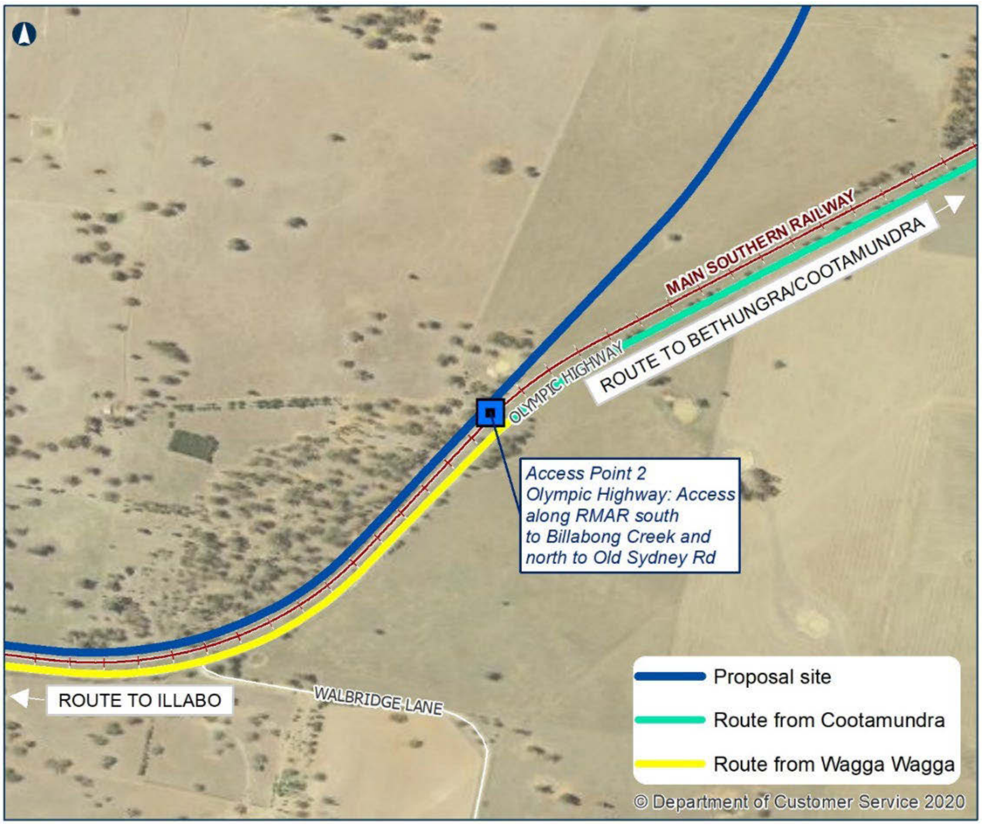


Figure 5.18 Access 2 location – Olympic Highway (north)

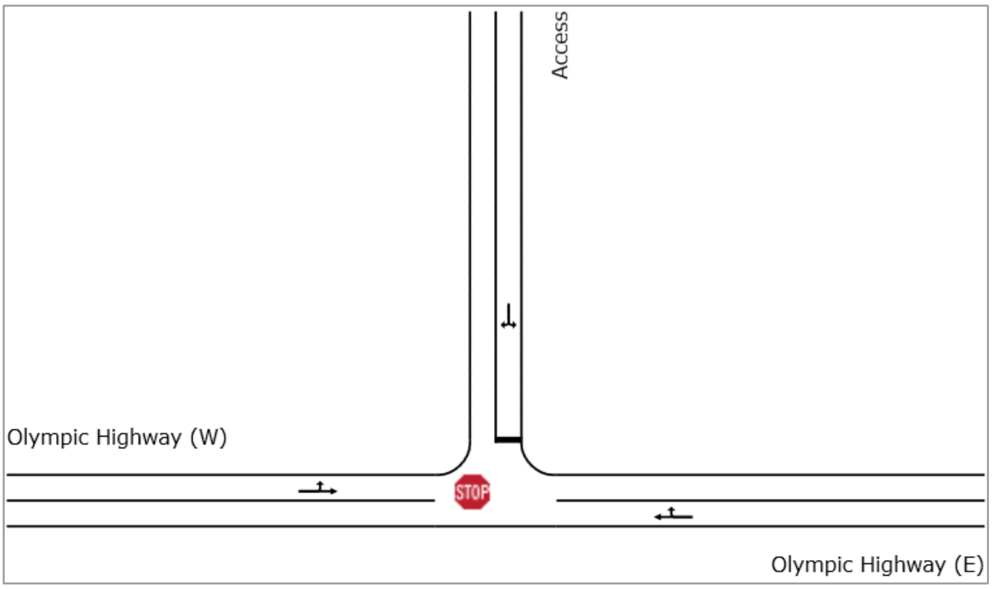


Figure 5.19 Access 2 – SIDRA layout

Table 5.43 and Table 5.44 show the SIDRA 8.0 results for Access 2 for the scenarios under assessment.

Table 5.43 Access 2 SIDRA results – AM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Access (N)	0.068	12.0	A	3.1
Olympic Highway (W)	0.089	2.5	A	0.0
Olympic Highway (E)	0.103	3.2	A	3.8

Table 5.44 Access 2 SIDRA results – PM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Access (N)	0.138	10.2	A	4.8
Olympic Highway (W)	0.069	2.0	A	0.0
Olympic Highway (E)	0.076	2.4	A	2.1

As shown in Table 5.43 and Table 5.44, all approaches operate satisfactorily in relation to DOS, delay, LOS and queuing.

5.4.2.3 Access 3 – Old Sydney Road

Figure 5.20 shows the indicative location of Access 3 on Old Sydney Road. Consultation with construction site plans has indicated that there is more space available in the area south of Old Sydney Road. For this reason, it has been assumed that all light vehicles will park on the south side via the south access road. Figure 5.21 shows the layout of Access 3 as modelled in SIDRA 8.0.

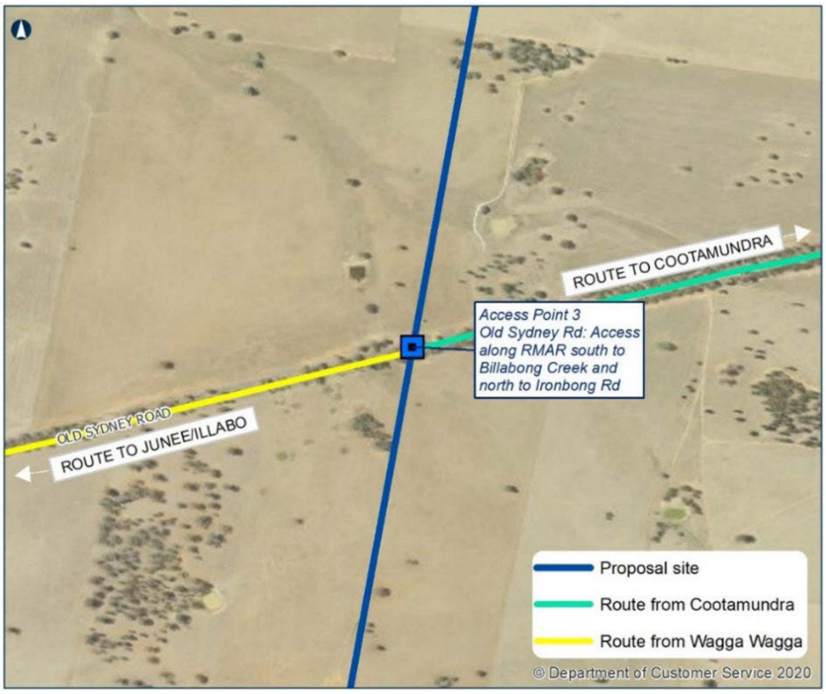


Figure 5.20 Access 3 location - Old Sydney Road

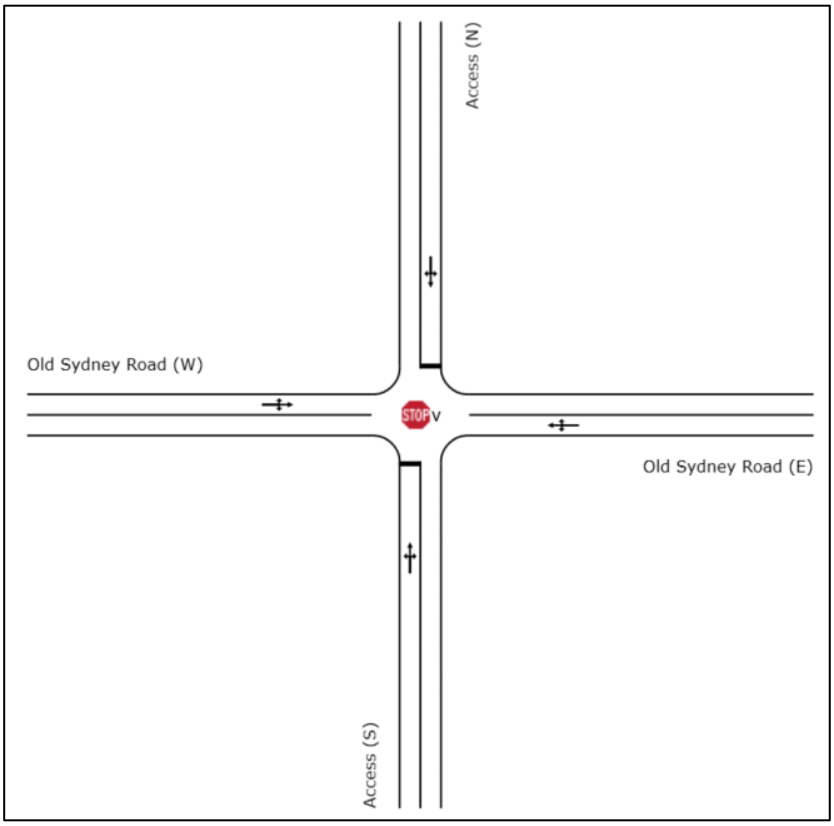


Figure 5.21 Access 3 - SIDRA layout

Table 5.45 and Table 5.46 show the SIDRA 8.0 results for Access 3 for the scenarios under assessment.

Table 5.45 Access 3 SIDRA results – AM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Access (S)	0.032	10.5	A	1.4
Access (N)	0.031	10.4	A	1.4
Old Sydney Road (E)	0.048	5.8	A	1.0
Old Sydney Road (W)	0.040	6.0	A	1.7

Table 5.46 Access 3 SIDRA results – PM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Access (S)	0.104	8.8	A	3.3
Access (N)	0.031	10.4	A	1.4
Old Sydney Road (E)	0.020	6.0	A	1.0
Old Sydney Road (W)	0.020	6.0	A	1.0

As shown in Table 5.45 and Table 5.46, all approaches operate satisfactorily in relation to DOS, delay, LOS and queuing. If light vehicle parking was to occur on the northern side of Old Sydney Road, it would not be expected to significantly alter these results.

5.4.2.4 Access 4 – Ironbong Road

Figure 5.22 shows the indicative location of Access 4 on Ironbong Road. Consultation with construction site plans has indicated that there is more space available within the area north of Ironbong Road. For this reason, it has been assumed that all light vehicles will park on the north side via the north access road. Figure 5.23 shows the layout of Access 4 as modelled in SIDRA 8.0.

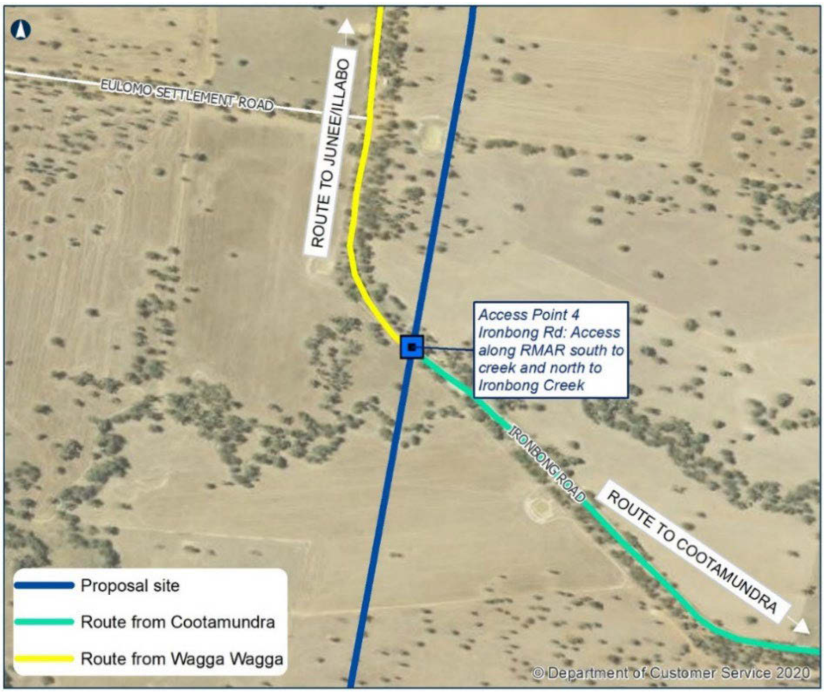


Figure 5.22 Access 4 location – Ironbong Road

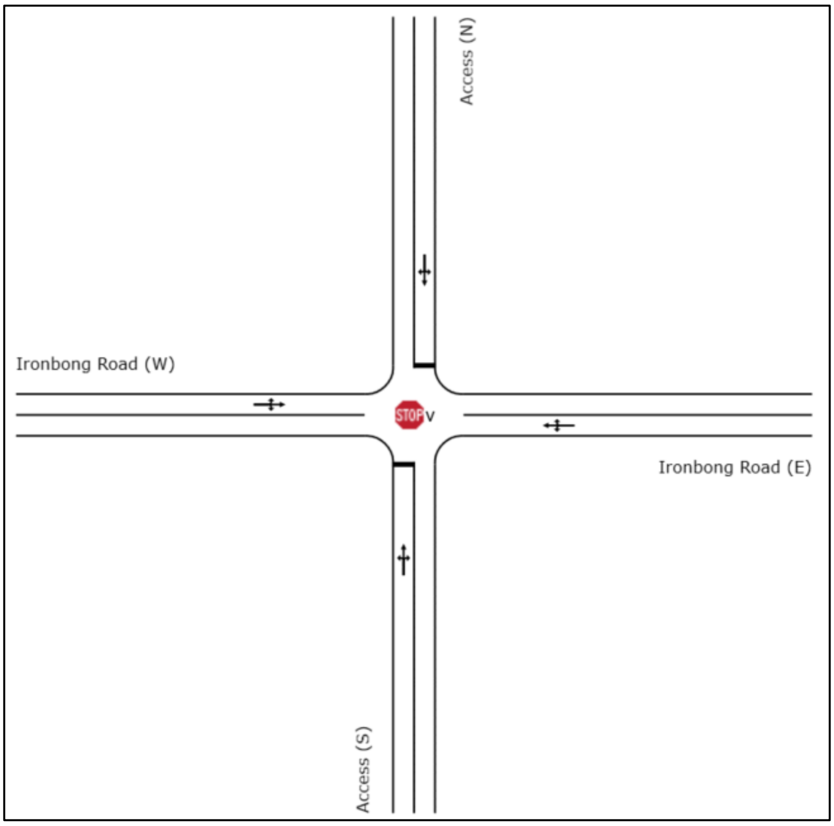


Figure 5.23 Access 4 – SIDRA layout

Table 5.47 and Table 5.48 show the SIDRA 8.0 results for Access 4 for the scenarios under assessment.

Table 5.47 Access 4 SIDRA results – AM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Access (S)	0.033	10.6	A	1.5
Access (N)	0.029	10.3	A	1.4
Ironbong Road (E)	0.051	6.0	A	2.1
Ironbong Road (W)	0.035	5.7	A	0.5

Table 5.48 Access 4 SIDRA results – PM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Access (S)	0.033	10.6	A	1.5
Access (N)	0.099	8.8	A	3.2
Ironbong Road (E)	0.027	6.0	A	1.3
Ironbong Road (W)	0.013	6.0	A	0.6

As shown in Table 5.47 and Table 5.48, all approaches operate satisfactorily in relation to DOS, delay, LOS and queuing. If light vehicle parking was to occur on the southern side of Ironbong Road, it would not be expected to significantly alter these results.

5.4.2.5 Access 5 – Dirnaseer Road

Figure 5.24 shows the indicative location of Access 5 on Dirnaseer Road. Consultation with construction site plans has indicated that there is more space available within the area south of Dirnaseer Road. For this reason, it has been assumed that all light vehicles will park on the south side via the south access road. Figure 5.25 shows the layout of Access 5 as modelled in SIDRA 8.0.

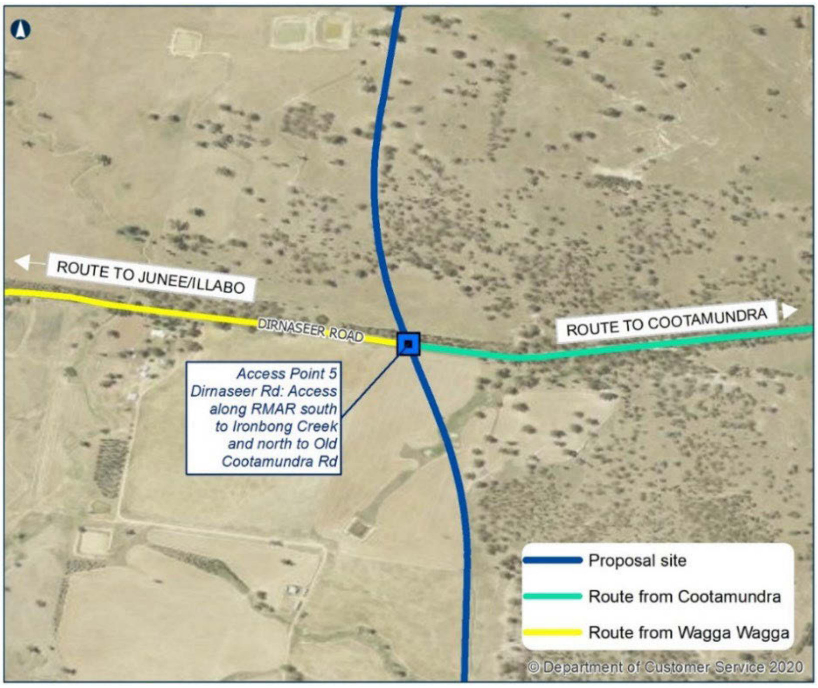


Figure 5.24 Access 5 location – Dirnaseer Road

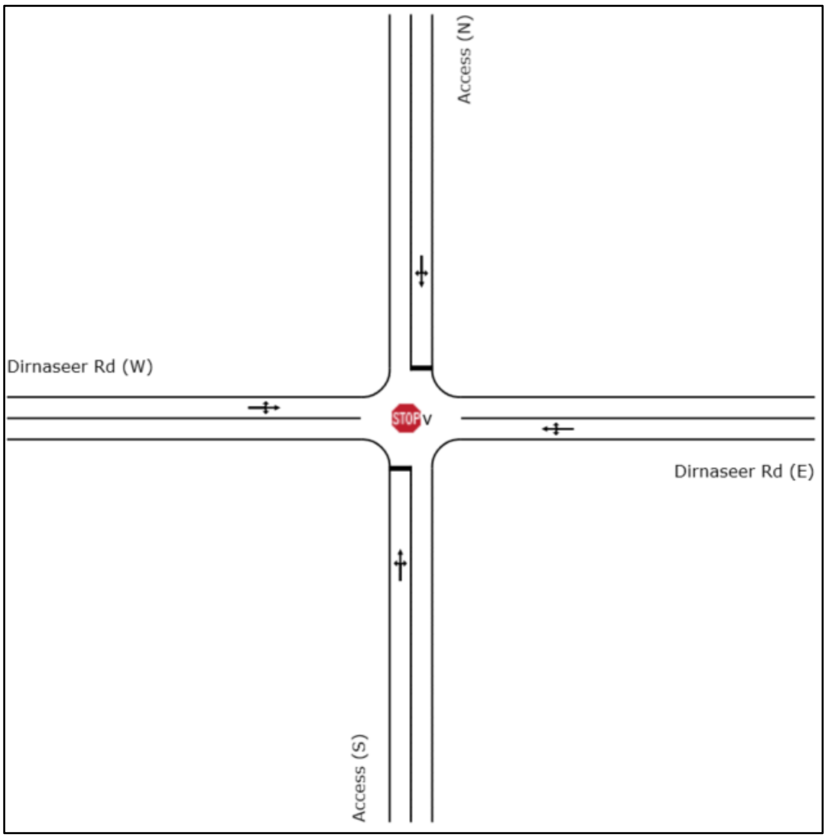


Figure 5.25 Access 5 – SIDRA layout

Table 5.49 and Table 5.50 show the SIDRA 8.0 results for Access 5 for the scenarios under assessment.

Table 5.49 Access 5 SIDRA results – AM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Access (S)	0.018	10.2	A	0.8
Access (N)	0.021	10.3	A	0.9
Dirnaseer Road (E)	0.035	5.4	A	0.4
Dirnaseer Road (W)	0.039	5.7	A	1.6

Table 5.50 Access 5 SIDRA results – PM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Access (S)	0.091	8.4	A	2.7
Access (N)	0.021	10.3	A	0.9
Dirnaseer Road (E)	0.010	5.2	A	0.4
Dirnaseer Road (W)	0.019	5.7	A	0.9

As shown in Table 5.49 and Table 5.50, all approaches operate satisfactorily in relation to DOS, delay, LOS and queuing. If light vehicle parking was to occur on the northern side of Dirnaseer Road, it would not be expected to significantly alter these results.

5.4.2.6 Access 6 – Old Cootamundra Road

Figure 5.26 shows the indicative location of Access 6 on Old Cootamundra Road. Consultation with construction site plans has indicated that there is more space available within the area south of Old Cootamundra Road. For this reason, it has been assumed that all light vehicles will park on the south side via the south access road. Figure 5.27 shows the layout of Access 6 as modelled in SIDRA 8.0.

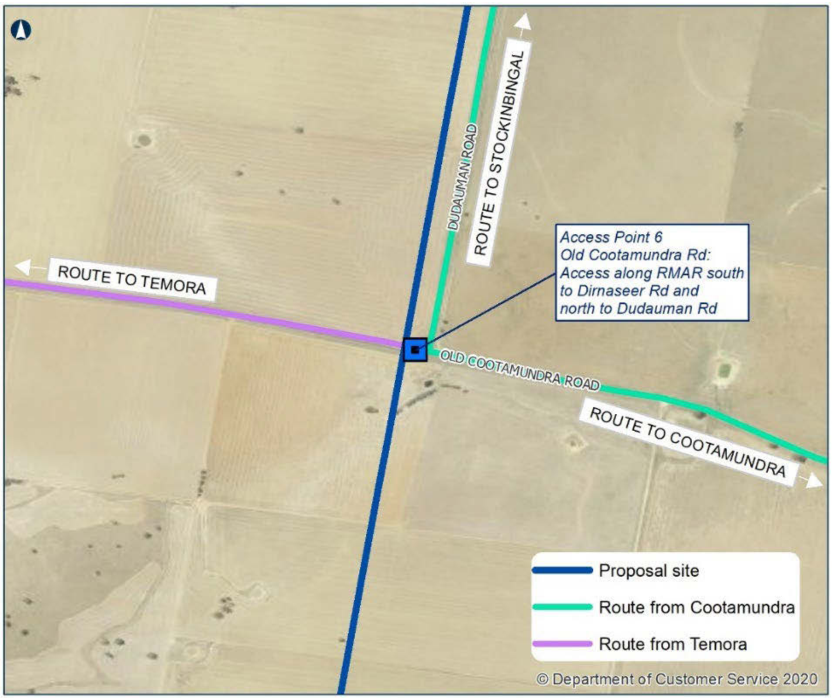


Figure 5.26 Access 6 location - Old Cootamundra Road

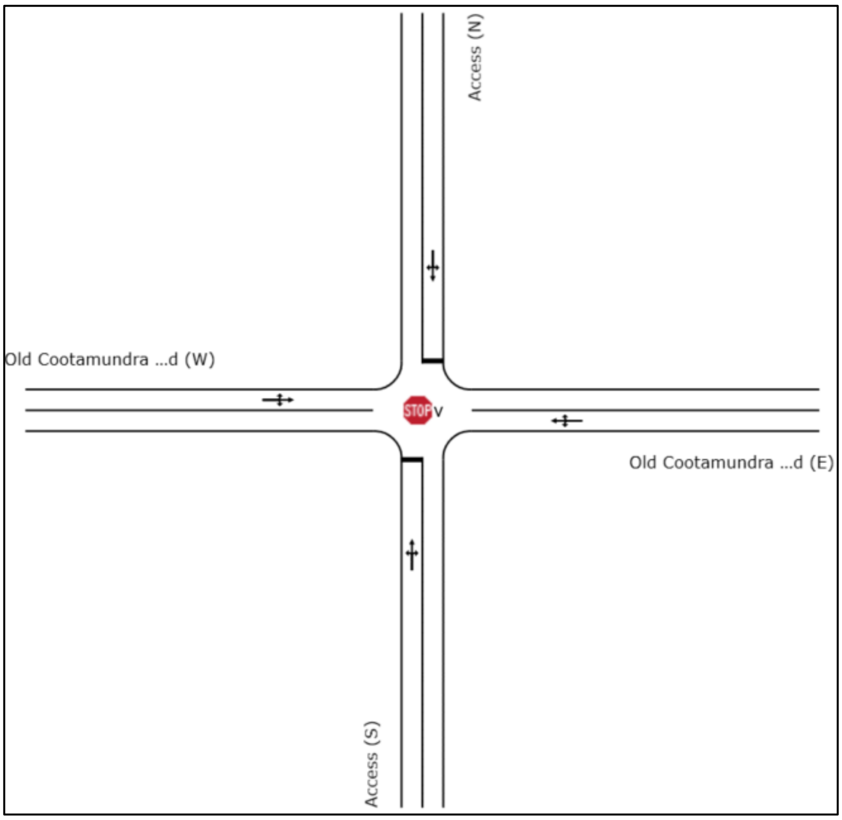


Figure 5.27 Access 6 – SIDRA layout

Table 5.51 and Table 5.52 show the SIDRA 8.0 results for Access 6 for the scenarios under assessment.

Table 5.51 Access 6 SIDRA results – AM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Access (S)	0.037	11.0	A	1.6
Access (N)	0.028	10.4	A	1.3
Old Cootamundra (E)	0.062	5.2	A	1.5
Old Cootamundra (W)	0.041	5.0	A	1.6

Table 5.52 Access 6 SIDRA results – PM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Access (S)	0.109	8.9	A	3.4
Access (N)	0.030	10.4	A	1.4
Old Cootamundra (E)	0.035	5.1	A	1.5
Old Cootamundra (W)	0.021	4.3	A	0.7

As shown in Table 5.51 and Table 5.52, all approaches operate satisfactorily in relation to DOS, delay, LOS and queuing. If light vehicle parking was to occur on the northern side of Old Cootamundra Road, it would not be expected to significantly alter these results.

5.4.2.7 Access 7 – Dudauman Road

Figure 5.28 shows the indicative location of Access 7 on Dudauman Road. Figure 5.29 shows the layout of Access 7 as modelled in SIDRA 8.0.

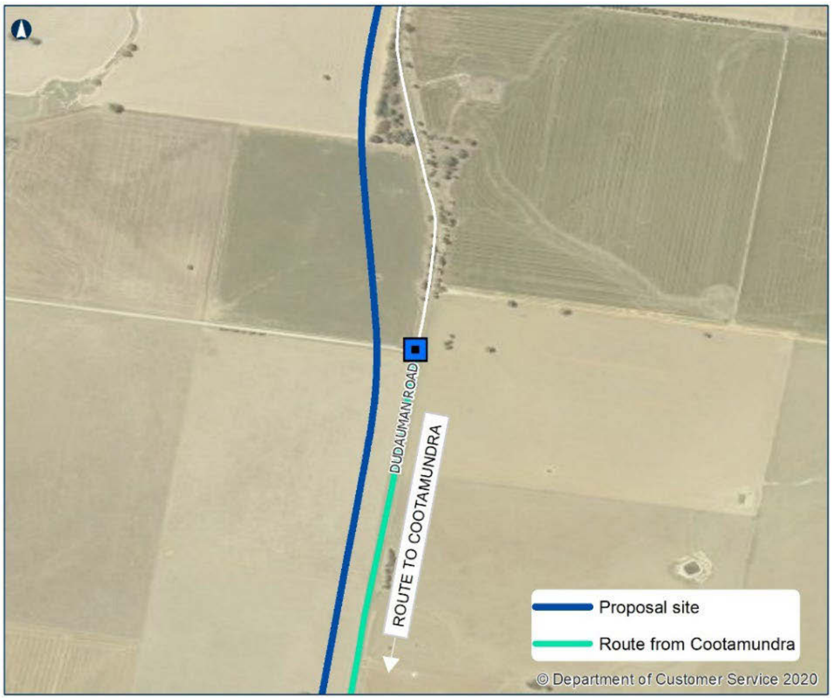


Figure 5.28 Access 7 location - Dudauman Road

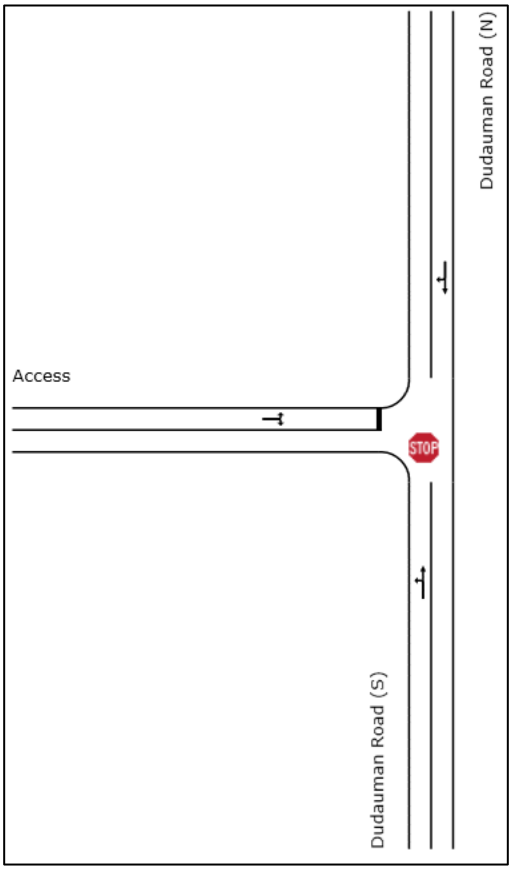


Figure 5.29 Access 7 – SIDRA layout

Table 5.53 and Table 5.54 show the SIDRA 8.0 results for Access 7 for the scenarios under assessment.

Table 5.53 Access 7 SIDRA results – AM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Access (W)	0.059	10.5	A	2.7
Dudauman Road (S)	0.055	5.7	A	0.0
Dudauman Road (N)	0.038	5.7	A	1.5

Table 5.54 Access 7 SIDRA results – PM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Access (W)	0.123	9.3	A	4.2
Dudauman Road (S)	0.030	5.7	A	0.0
Dudauman Road (N)	0.016	5.5	A	0.8

As shown in Table 5.53 and Table 5.54, all approaches operate satisfactorily in relation to DOS, delay, LOS and queuing.

5.4.2.8 Access 8 – Burley Griffin Way (east)

Figure 5.30 shows the indicative location of Access 8 on Burley Griffin Way (east). Consultation with construction site plans has indicated that there is more space available within the area north of Burley Griffin Way. For this reason, it has been assumed that all light vehicles will park on the north side via the north access road. Figure 5.31 shows the layout of Access 8 as modelled in SIDRA 8.0.

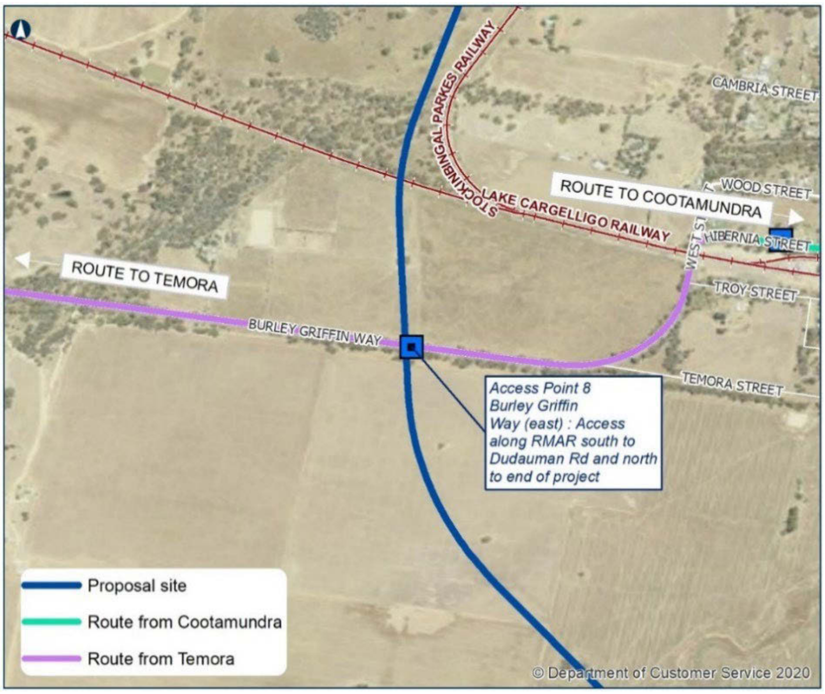


Figure 5.30 Access 8 location - Burley Griffin Way

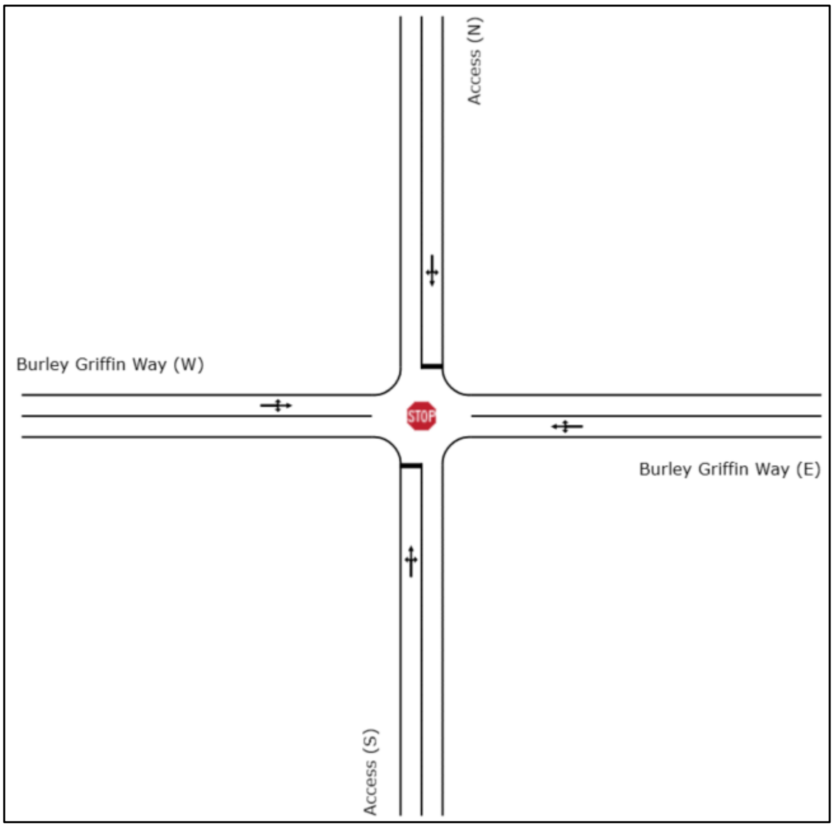


Figure 5.31 Access 8 – SIDRA Layout

Table 5.55 and Table 5.56 show the SIDRA 8.0 results for Access 8 for the scenarios under assessment.

Table 5.55 Access 8 SIDRA results – AM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Access (S)	0.040	12.0	A	1.8
Access (N)	0.034	11.3	A	1.6
Burley Griffin Way (E)	0.087	4.1	A	3.4
Burley Griffin Way (W)	0.068	3.2	A	0.8

Table 5.56 Access 8 SIDRA results – PM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Access (S)	0.040	12.0	A	1.7
Access (N)	0.110	9.3	A	3.5
Burley Griffin Way (E)	0.063	3.5	A	1.8
Burley Griffin Way (W)	0.047	2.2	A	0.8

As shown in Table 5.55 and Table 5.56, all approaches operate satisfactorily in relation to DOS, delay, LOS and queuing. If light vehicle parking was to occur on the southern side of Burley Griffin Way, it would not be expected to significantly alter these results.

5.4.2.9 Access 9 – Burley Griffin Way (west)

Figure 5.32 shows the indicative location of Access 9 on Burley Griffin Way (west). Figure 5.33 shows the layout of Access 9 as modelled in SIDRA 8.0.

Figure 5.32 Access 9 location - Burley Griffin Way

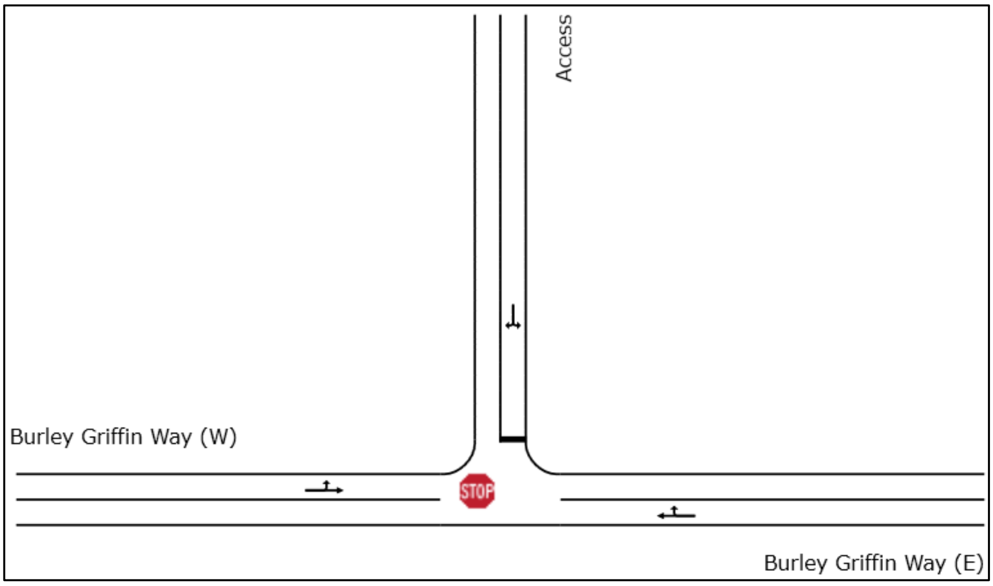


Figure 5.33 Access 9 - SIDRA Layout

Table 5.57 and Table 5.58 show the SIDRA 8.0 results for Access 9 for the scenarios under assessment.

Table 5.57 Access 9 SIDRA results – AM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Access (N)	0.037	11.0	A	1.7
Burley Griffin Way (W)	0.061	2.7	A	0.0
Burley Griffin Way (E)	0.080	3.6	A	3.2

Table 5.58 Access 9 SIDRA results – PM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Access (N)	0.107	9.3	A	3.5
Burley Griffin Way (W)	0.040	1.5	A	0.0
Burley Griffin Way (E)	0.054	2.8	A	1.8

As shown in Table 5.57 and Table 5.58, all approaches operate satisfactorily in relation to DOS, delay, LOS and queuing.

5.4.2.10 Access 10 – Hibernia Street

Figure 5.34 shows the indicative location of Access 10 on Hibernia Street.

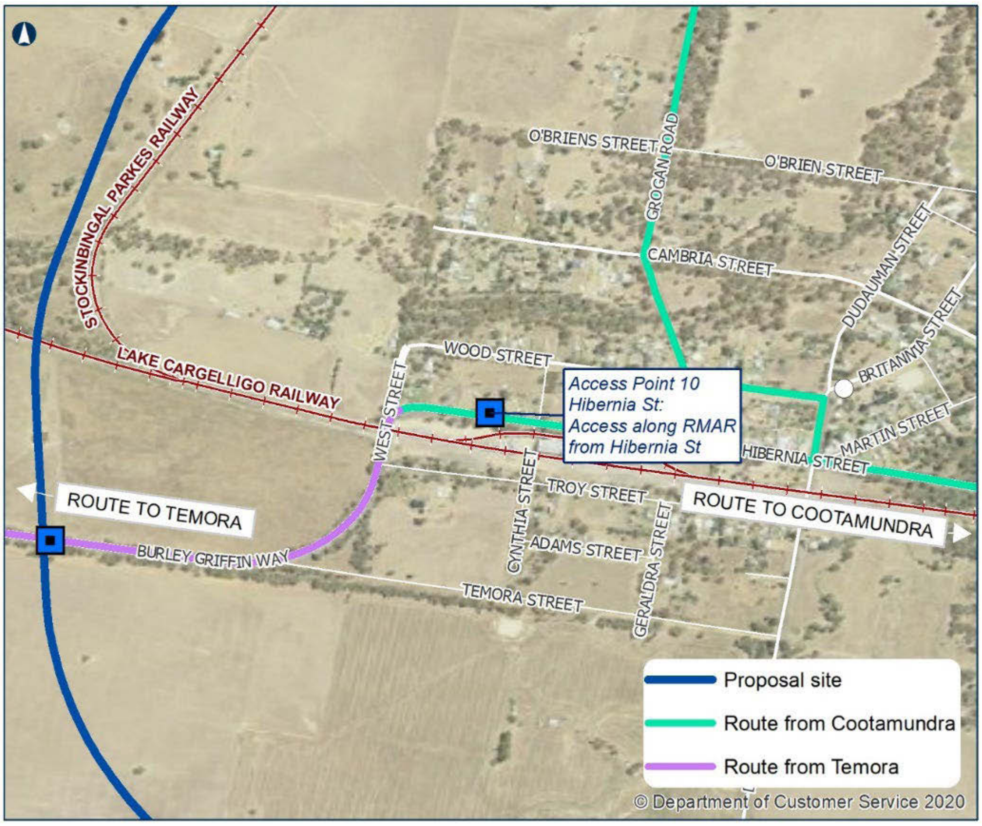


Figure 5.34 Access 10 location – Hibernia Street

The site access will be on Hibernia Street with construction traffic moving straight through onto site without any turning movements. Due to this access being positioned away from an intersection, no SIDRA model is required at this location.

5.4.2.11 Access 11 – Grogan Road

Figure 5.35 shows the indicative location of Access 11 on Grogan Road. Figure 5.36 shows the layout of Access 11 as modelled in SIDRA 8.0.

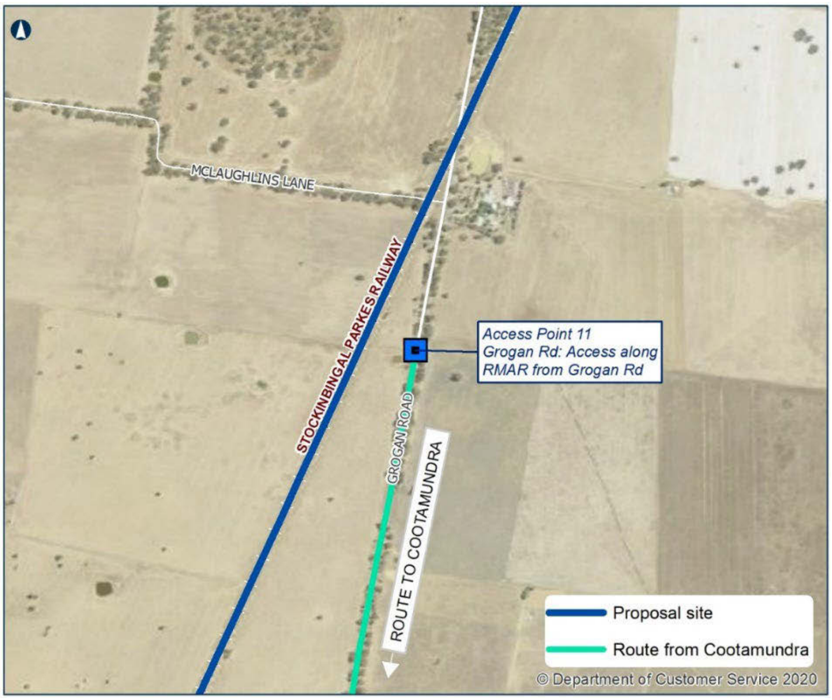


Figure 5.35 Access 11 location – Grogan Road

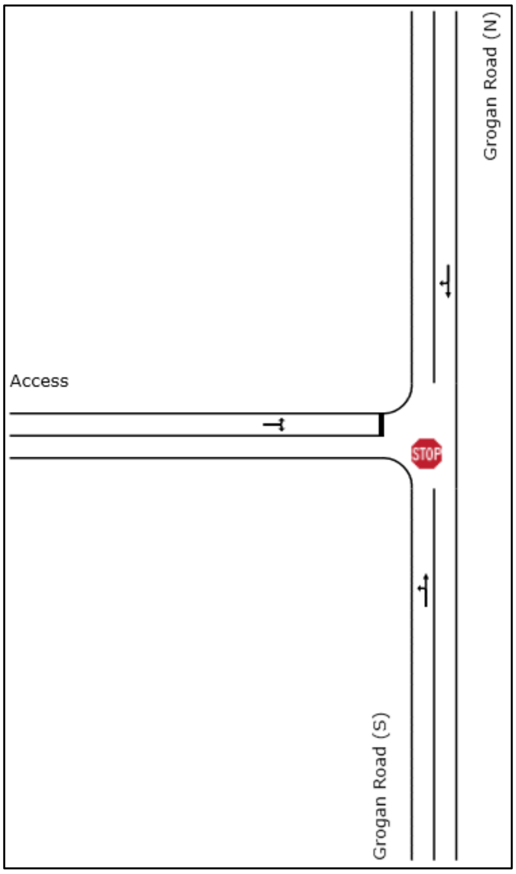


Figure 5.36 Access 11 – SIDRA Layout

Table 5.59 and Table 5.60 show the SIDRA 8.0 results for Access 11 for the scenarios under assessment.

Table 5.59 Access 11 SIDRA results – AM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Access (W)	0.038	10.1	A	1.6
Grogan Road (N)	0.003	1.2	A	0.0
Grogan Road (S)	0.072	5.6	A	0.0

Table 5.60 Access 11 SIDRA results – PM peak + construction vehicles

Approach	DOS	Average delay (s)	LOS	95th % queue length (m)
Access (W)	0.111	8.6	A	3.2
Grogan Road (N)	0.003	1.1	A	0.0
Grogan Road (S)	0.027	5.7	A	0.0

As shown in Table 5.59 and Table 5.60 all approaches operate satisfactorily in relation to DOS, delay, LOS and queuing.

5.4.2.12 Access intersection assessment summary

As per Table 5.41 to Table 5.60 all approaches on the public road network and access approaches have a satisfactory DOS and delay during the AM and PM peak 2024 + construction vehicles scenarios and operate at LOS A.

5.4.3 Rail network

The proposal would require use of planned possession periods, which are scheduled as part of the existing operation of the rail lines. No further impacts to passenger trains or other services would occur under this scenario. Consultation with ARTC (as operators of the existing rail lines at Illabo and Stockinbingal) has identified that there are two 60 hour possessions a year, one in March and one in September. During possessions, works may need to be carried out on a 24 hour basis.

5.4.3.1 Southern connection

The work required for the southern connection is planned for the standard possession scheduled in March 2025, subject to detailed planning and design development.

The majority of the southern connection scope can be completed under Track Work Authority protection arrangements (or work in corridor). The major possession requirements will be for turnout installation.

5.4.3.2 Northern connection

The work required for the northern connection is planned for the standard possession scheduled in March 2026.

An indicative five stage approach has been developed to connect to the existing Lake Cargelligo Line and Stockinbingal to Parkes line, as well as the realignment of Burley Griffin Way highway. The possession is required to install new infrastructure at connection points and to complete tie-in works.

5.4.4 Public and active transport networks

Construction of section 6 will have a direct impact on the public transport services that are currently offered from Stockinbingal. The current bus service uses Hibernia Street as the route through Stockinbingal with the bus stop located about 80 meters west of Dudauman Street. During construction a diversion will be in place that will require the bus route to divert through Troy Street to reconnect with Burley Griffin Way (see Figure 5.13) The time delay as a result of this diversion is negligible, as shown in section 5.4.8. Relocation of the bus stop will be required during the temporary closure of Hibernia Street during construction.

Construction traffic will have a noticeable presence on the road network during construction and the increase in delays at intersections (as per section 5.4) may slow the bus service down slightly.

There are no formal active transport links in the area and therefore the construction of the proposal will have no impact on this mode.

5.4.5 Road safety

This study has primarily considered the operation and capacity of the road network rather than the appropriateness of use of certain roads by construction vehicles. The suitability of routes have not been assessed with respect to road safety or pavement condition/width to cater for the predicted traffic volumes. A separate risk assessment and Road Safety Audit (RSA) will be required to be undertaken by the contractor prior to commencement of construction activities on site and the safety of all road users should be taken into account. A safe system approach should also be adopted to minimise harm caused to road users through use of appropriate road design features and speeds.

Additionally, given that local roads will be used by haulage vehicles during construction, a Road Dilapidation Report should be prepared before the commencement of use by such vehicles and it is recommended to regularly assess the roads for damage during construction.

Assessment of the crash data in section 4.5 has revealed where incidents have occurred along construction routes. Table 5.61 shows these locations as well as presents where increased risk from expected turning movements is likely.

Table 5.61 Crash locations on construction routes

Crash location	No. of and severity of crash	Construction route impacted	Turning movements required
Goldfields Way, south of Old Junee Road	1 x fatal	Between site access 4 and 5 Wagga Wagga Potential quarry delivery routes	No
Olympic Highway in Junee LGA	14 x serious	Between site access 1-3 and Wagga Wagga Potential quarry delivery routes	No
Olympic Highway near Warrens Lane	2 x moderate	Between site access 3 and Wagga Wagga Potential quarry delivery routes	Yes
Olympic Highway in Wagga Wagga LGA	7 x serious 7 x moderate 5 x minor	Between site access 1-5 and Wagga Wagga Potential quarry delivery routes	No
Burley Griffin Way in Temora	2 x moderate	Between site access 8-10 and Temora Potential quarry delivery routes	No
Burley Griffin Way between Temora and Stockinbingal	2 x fatal 4 x serious 5 moderate 1 x minor	Between site access 8-10 and Temora Potential quarry delivery routes	No

Crash location	No. of and severity of crash	Construction route impacted	Turning movements required
Temora St in Cootamundra	2 x serious 3 x moderate	Between site access 6-11 and Cootamundra Between site access 6 and 7 and Young Potential quarry delivery routes	No
Olympic Highway between Cootamundra and Burley Griffin Way	4 x serious 4 x moderate [a] 1 x minor	Between site access 6-11 and Cootamundra Between site access 6 and 7 and Young Potential quarry delivery routes	No [a] Yes – 1 crash at intersection with Burley Griffin Way
Olympic Highway between Cootamundra and Bethungra	2 x fatal 6 x serious 6 x moderate 2 x minor	Between site access 1-5 and Cootamundra Potential quarry delivery routes	No
Old Cootamundra Road between Stockinbingal Road and the proposal	2 x serious 1 x moderate [b]	Between site access 6 and 7 and Cootamundra or Young Potential quarry delivery routes	No [b] Yes – 1 crash at intersection with Suttons Lane
Hibernia Street, Stockinbingal	1 x serious 2 x minor	Between site access 8-11 and Cootamundra or Young Potential quarry delivery routes	No
Burley Griffin Way between Stockinbingal and Olympic Highway	3 x serious 3 x moderate 1 x minor	Between site access 8-11 and Young	No
Olympic Highway between Young and Burley Griffin Way	3 x serious 14 x moderate 2 x minor	Between site access 6-11 and Young	No

The crash data shows that of the incidents which have occurred on the planned construction routes, very few are located where turning movements are planned.

The CEMP would consider areas in which crashes have been identified along the proposed construction routes and provide additional safety management measures as required. Given the scale of the proposal and its proximity to the public road network, mitigations should be included to minimise driver distractions, such as visual blockers.

The CEMP would also assess and manage risks at construction accesses and level crossings, particularly where increased vehicle flow is anticipated as a result of traffic diversions, such as at the Dudauman Street level crossing. The CEMP would include mitigation to manage potential short-stacking, or other road safety issues.

5.4.6 Parking

As discussed in section 5.3.3, parking for construction workers will be provided off-street within the designated footprint of each lay-down area and therefore will not impact on existing parking facilities.

Hibernia Street in Stockinbingal (which has on-street parking facilities) is expected to be used as a construction access route. The change in function of Hibernia Street will likely reduce the amount of on-street parking available in Stockinbingal.

5.4.7 Travelling stock reserves and livestock highways

The proposal does not cross or directly impact any TSRs.

A livestock highway utilises the same roads as three of the proposed construction routes to the proposal site as shown in Figure 4.4, namely along the roads:

- Olympic Highway
- Goldfields Road
- Old Cootamundra Road
- Dudauman Road
- Grogan Road.

The construction vehicle movements could pose additional risks for the transport of livestock along these routes as a result of construction traffic volumes on these roads and associated intersections.

The proposal will cross the livestock highway at Old Cootamundra Road. This is a proposed grade separation with a road underbridge, and is planned for construction over a six day period. Two lane access is planned to be maintained during this construction period, apart from during the Super T landing, which will require up to a two hour closure and one lane alternate flow for the remainder of the day.

Local Land Services would be notified of increased heavy vehicle movements along the livestock highways during the construction phase and periods of changed traffic operations to mitigate against impacts. Construction staff would also be informed of the location of the livestock highway.

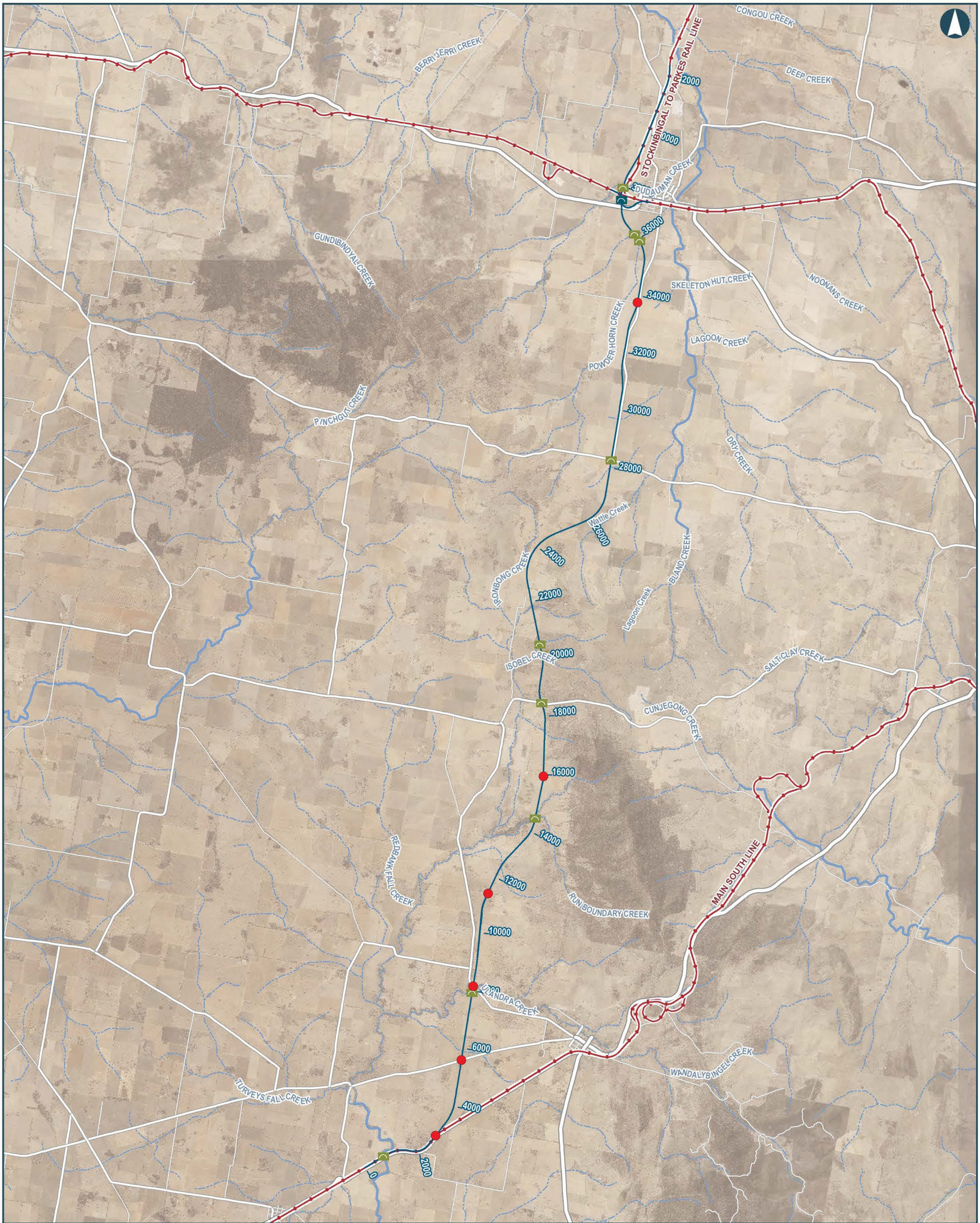
5.4.8 Diversions

A number of level crossings and bridges are proposed on, under and over the road network, along the length of the proposal as shown in Figure 5.37.

The construction of the proposed level crossing and bridges shown in Figure 5.37 may require temporary road closures. Table 5.62 details the planned duration and management approaches for key roads impacted by the construction works. It is generally expected that side-tracking during construction works will be implemented to maintain vehicle flow through the construction site, with this being managed under a Traffic Management Plan. However, should this not be possible, temporary diversionary routes have been identified to mitigate any potential road closures.

Table 5.62 does not include the proposed level crossing on Corbys Lane. Corbys Lane is part of the public road network but only connects to the wider public road network via its intersection with Dudauman Road. As such a diversionary route to and from Corbys Lane cannot be provided during the construction of a level crossing (and the subsequent road closure) as no other connections to the public road network are available. Consultation will be undertaken during detailed design with landowners off Corbys Lane and emergency services, regarding any subsequent temporary access measures that are to be provided for residents and emergency vehicles.

For other minor roads and private roads, consultation will be undertaken with landowners during detailed design regarding construction on their land or access roads, and any subsequent temporary diversionary routes they may have to undertake.



ILLABO TO STOCKINBINGAL 5.37 Public road/rail crossings

0 1 2 3 4 5 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 8/18/2021 Paper: A3
Author: IRDJV Scale: 1:120,000
Data Sources: ARTC, NSWSS, ESRI

Key features of the proposal
- Proposal site
- Public level crossing

Bridges
- Overbridge
- Underbridge

Existing features
- Arterial road
- Sub-arterial road
- Local road
- Existing Rail
- Major Watercourse
- Minor Watercourse

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The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

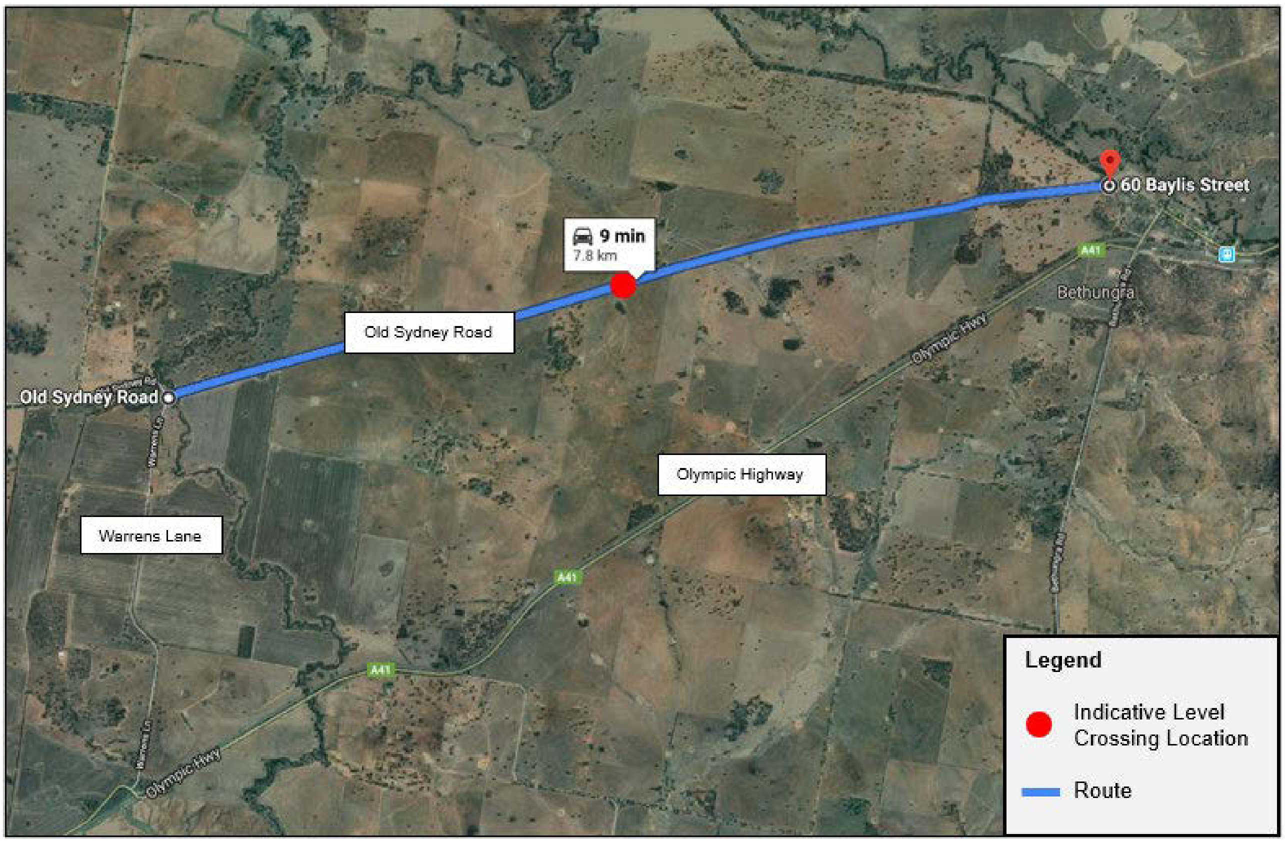
Table 5.62 Location of road works and planned management approach

Chainage	Road	Planned duration of works	Planned management approach
5,588	Old Sydney Road	20 days	1 lane alternate flow
8,152	Ironbong Road	48 days	Various stages of side-tracking arrangements in place throughout with short stoppages expected (<15 mins)
18,470	Dirnaseer Road	4 days	Two lane access maintained apart from during Super T landing which will require 1-2 hour closure and 1 lane alternate flow for the remainder of the day
28,263	Old Cootamundra Road	6 days	Two lane access maintained apart from during Super T landing which will require 1-2 hour closure and 1 lane alternate flow for the remainder of the day
37,539	Burley Griffin Way	15 days	Diversion in place for 15 days. Short stoppages (<15 mins) to open diversions and connections onto the realigned road 1 lane alternate flow arrangement to construct tie-in at western end of diversion

The following sub-sections detail proposed temporary diversionary routes at the locations on the road network given in Table 5.62. Google Maps has been used to determine existing routes (between two points at which diversions could take place) and the shortest viable diversionary routes. Google Maps also provides the travel times for these routes. Where road closures are required on approved B-double routes, diversion of B-doubles vehicles to other approved B-double routes has been undertaken.

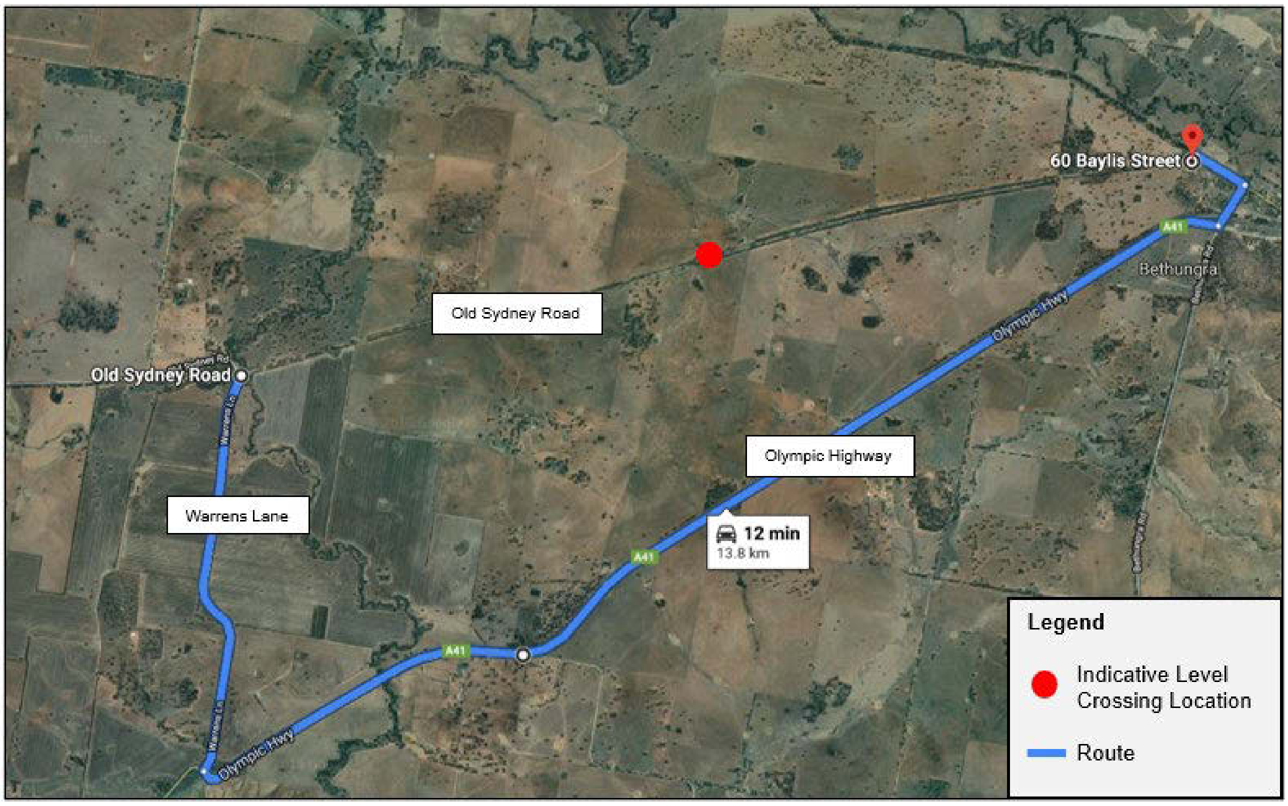
5.4.8.1 Old Sydney Road

Figure 5.38 and Figure 5.39 show the existing route and diversionary route (with their associated travel times), respectively.



Source: GoogleMaps

Figure 5.38 Old Sydney Road – existing route and travel time



Source: GoogleMaps

Figure 5.39 Old Sydney Road – diversionary route and travel time

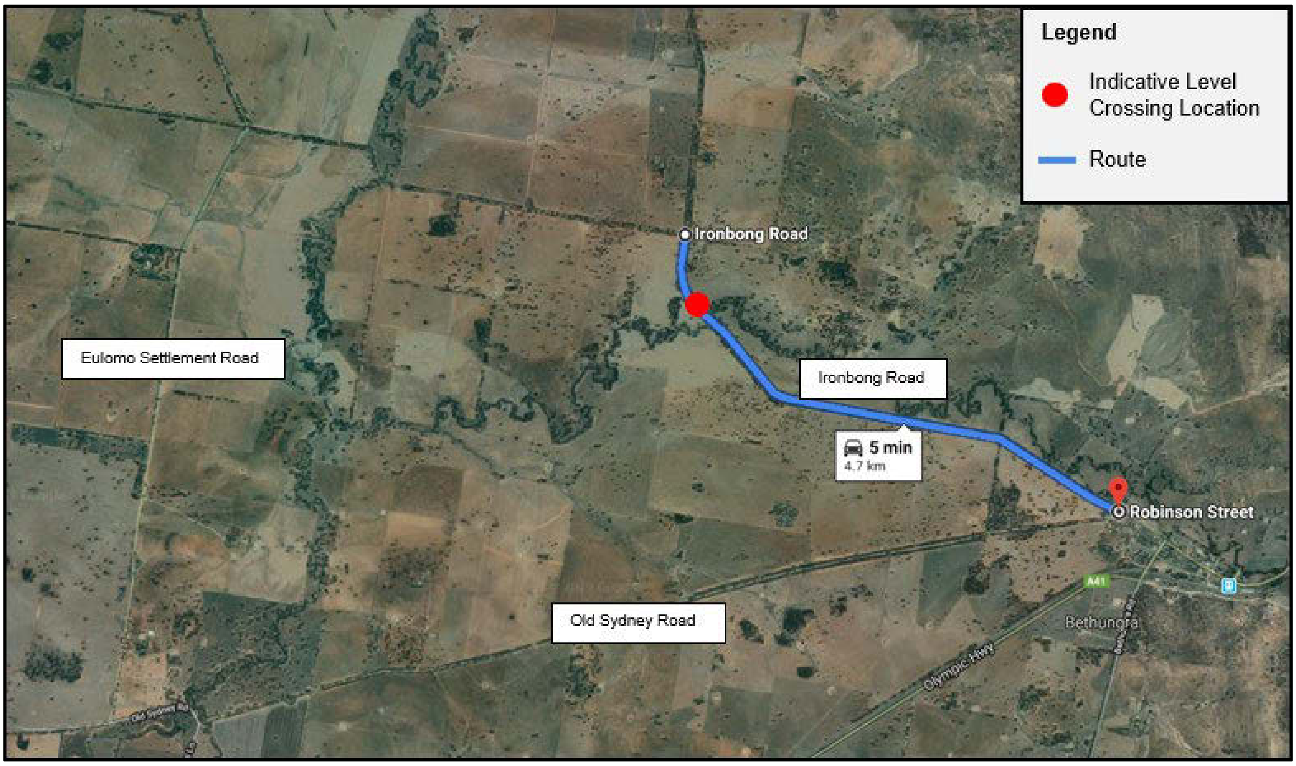
As can be seen in Table 5.63 travel time increases by approximately three minutes as a result of the diversionary route on Old Sydney Road. Only low volumes of additional traffic are expected to be generated on the diversion route as a result of construction so the impact on the detour roads and intersections are likely to be negligible.

Table 5.63 Old Sydney Road – travel times

Road	Existing travel time	Diversion travel time	Increased travel time
Old Sydney Road	9 mins	12 mins	3 mins

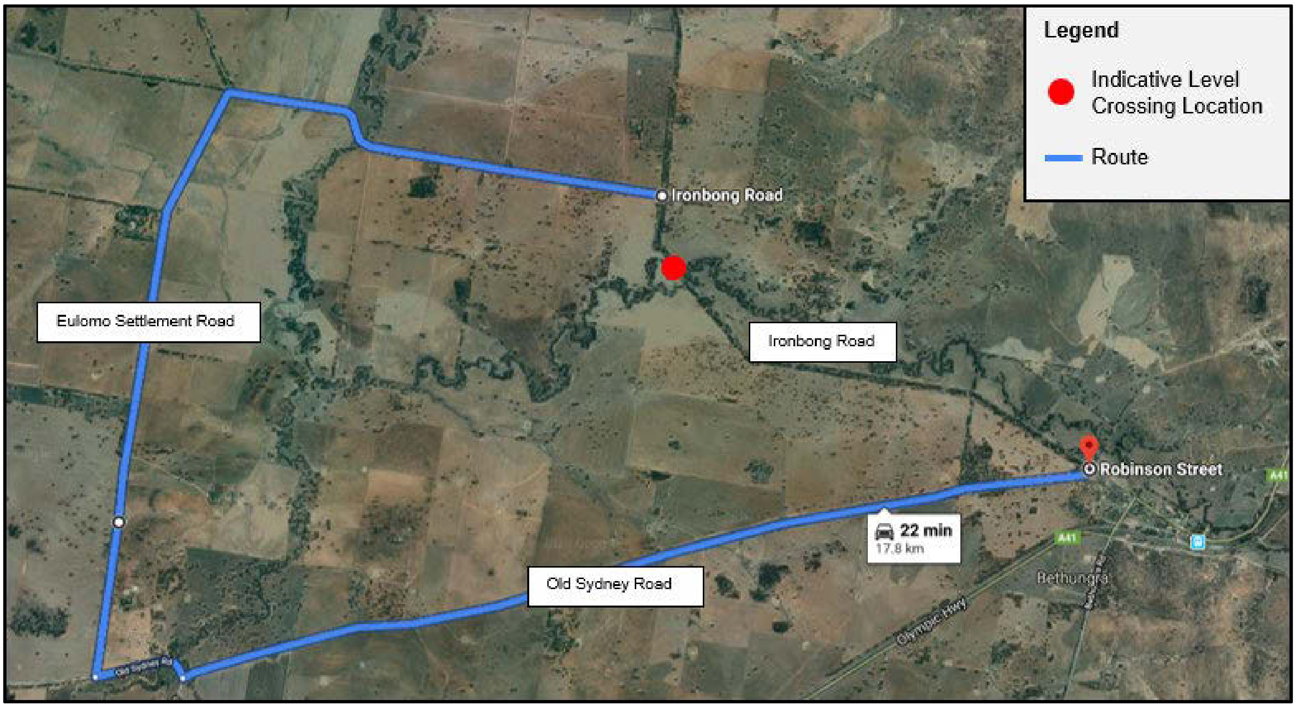
5.4.8.2 Ironbong Road

Figure 5.40 and Figure 5.41 show the existing route and diversionary route (with their associated travel times), respectively.



Source: *GoogleMaps*

Figure 5.40 Ironbong Road – existing route and travel time



Source: *GoogleMaps*

Figure 5.41 Ironbong Road – diversionary route and travel time

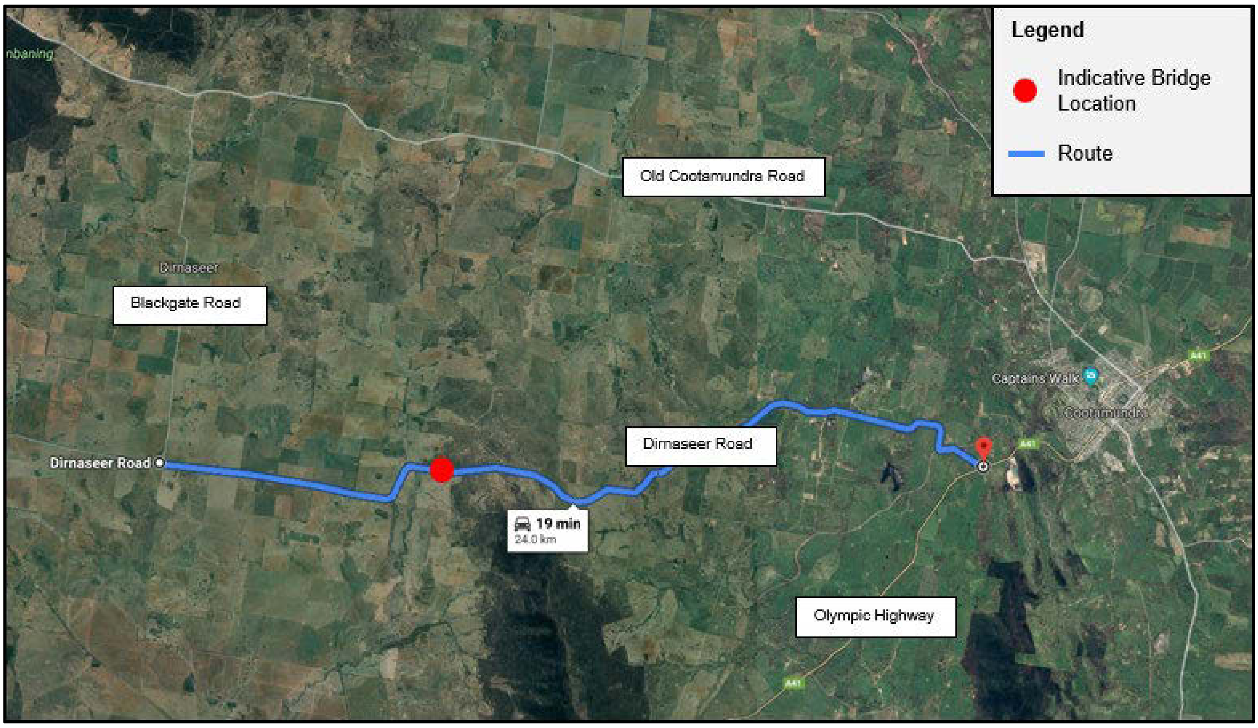
As can be seen in Table 5.64 travel time increases by approximately 17 minutes as a result of the diversionary route on Ironbong Road. Only low volumes of additional traffic are expected to be generated on the diversion route as a result of construction so the impact on the detour roads and intersections are likely to be negligible.

Table 5.64 Ironbong Road – travel times

Road	Existing travel time	Diversion travel time	Increased travel time
Ironbong Road	5 mins	22 mins	17 mins

5.4.8.3 Dirnaseer Road

Figure 5.42 and Figure 5.43 show the existing route and diversionary route (with their associated travel times), respectively.



Source: *GoogleMaps*

Figure 5.42 Dirnaseer Road – existing route and travel time

Source: *GoogleMaps*

Figure 5.43 Dirnaseer Road – diversionary route and travel time

As can be seen in Table 5.65 travel time increases by approximately 12 minutes as a result of the diversionary route on Dirnaseer Road. Only low volumes of additional traffic are expected to be generated on the diversion route as a result of construction so the impact on the detour roads and intersections are likely to be negligible.

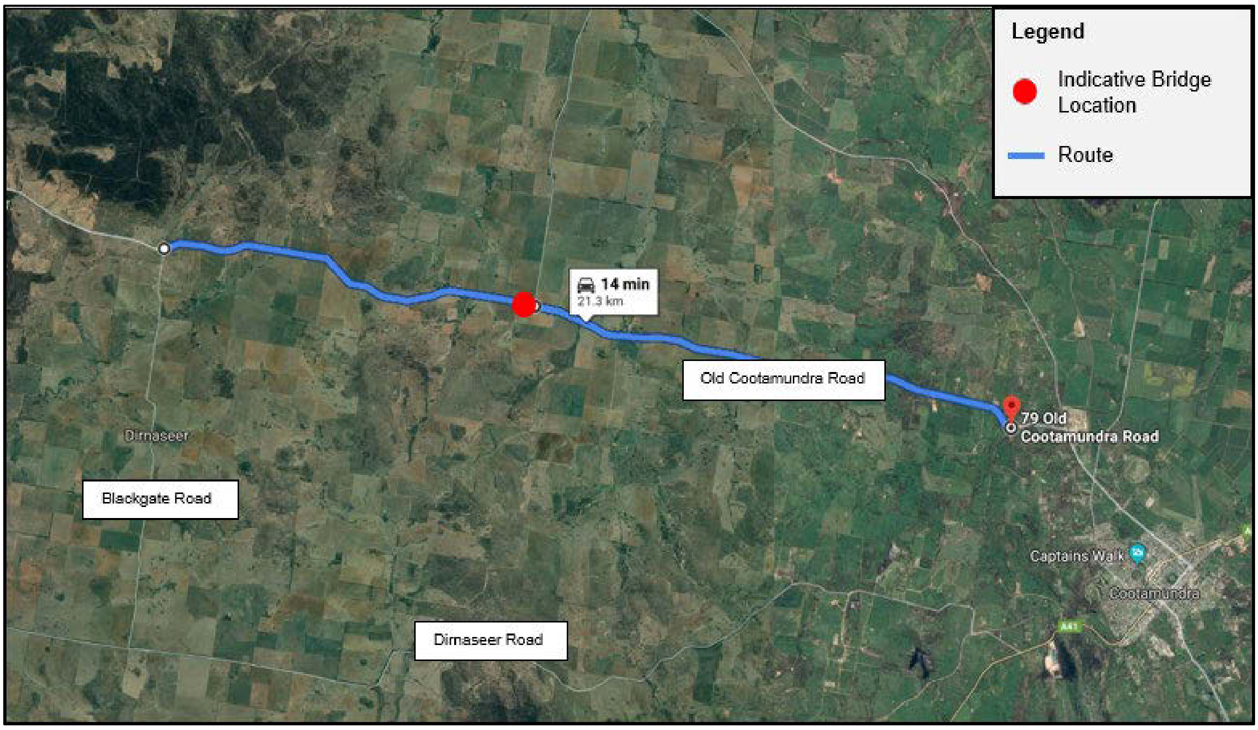
Table 5.65 Dirnaseer Road – travel times

Road	Existing travel time	Diversion travel time	Increased travel time
Dirnaseer Road	19 mins	31 mins	12 mins

Dirnaseer Road is an approved B-double route for approximately 15 km east of its intersection with the Olympic Highway as shown in Figure 4.3. The end of the approved B-double route in this location is approximately 2.5km east of the proposed bridge location. As such diversionary routes for B-doubles are not required in this location.

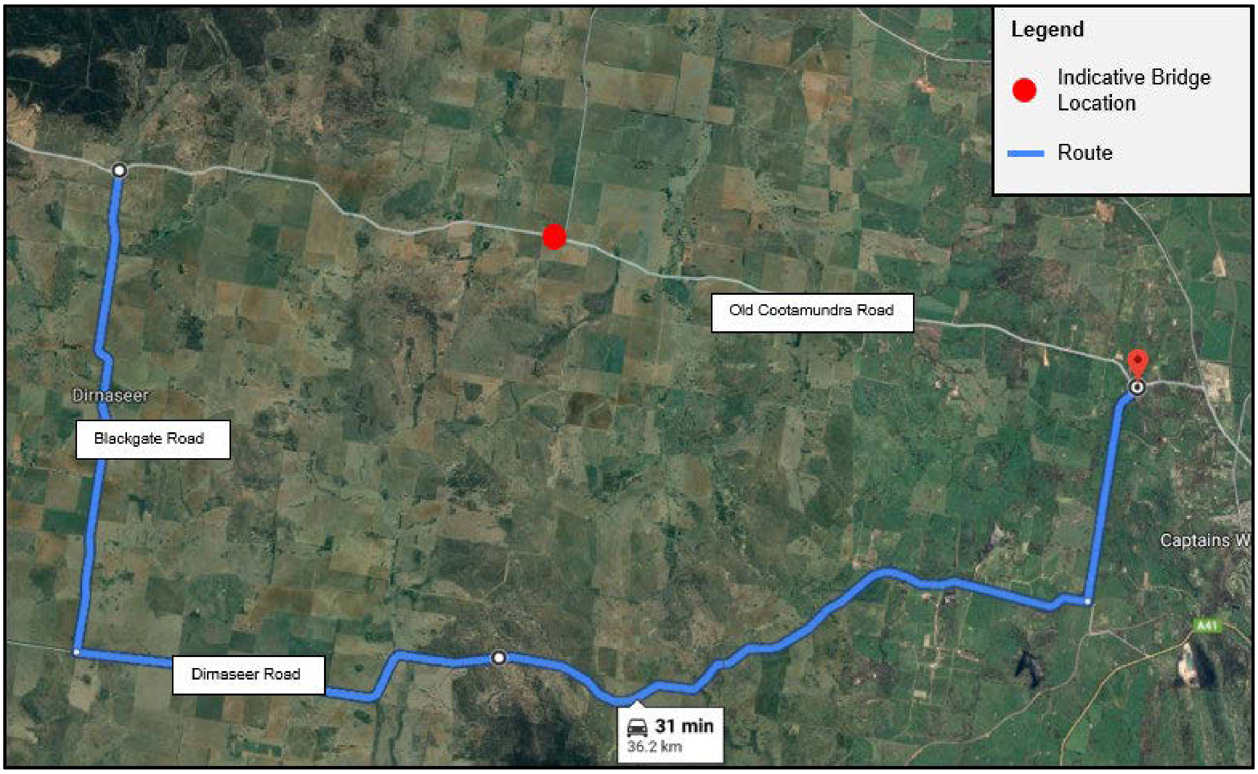
5.4.8.4 Old Cootamundra Road

Figure 5.44 and Figure 5.45 show the existing route and diversionary route (with their associated travel times), respectively.



Source: GoogleMaps

Figure 5.44 Old Cootamundra Road – existing route and travel time



Source: GoogleMaps

Figure 5.45 Old Cootamundra Road – diversionary route and travel time

As can be seen in Table 5.66 travel time increases by approximately 17 minutes as a result of the diversionary route on Old Cootamundra Road. Only low volumes of additional traffic are expected to be generated on the diversion route as a result of construction so the impact on the detour roads and intersections are likely to be negligible.

Table 5.66 Old Cootamundra Road – travel times

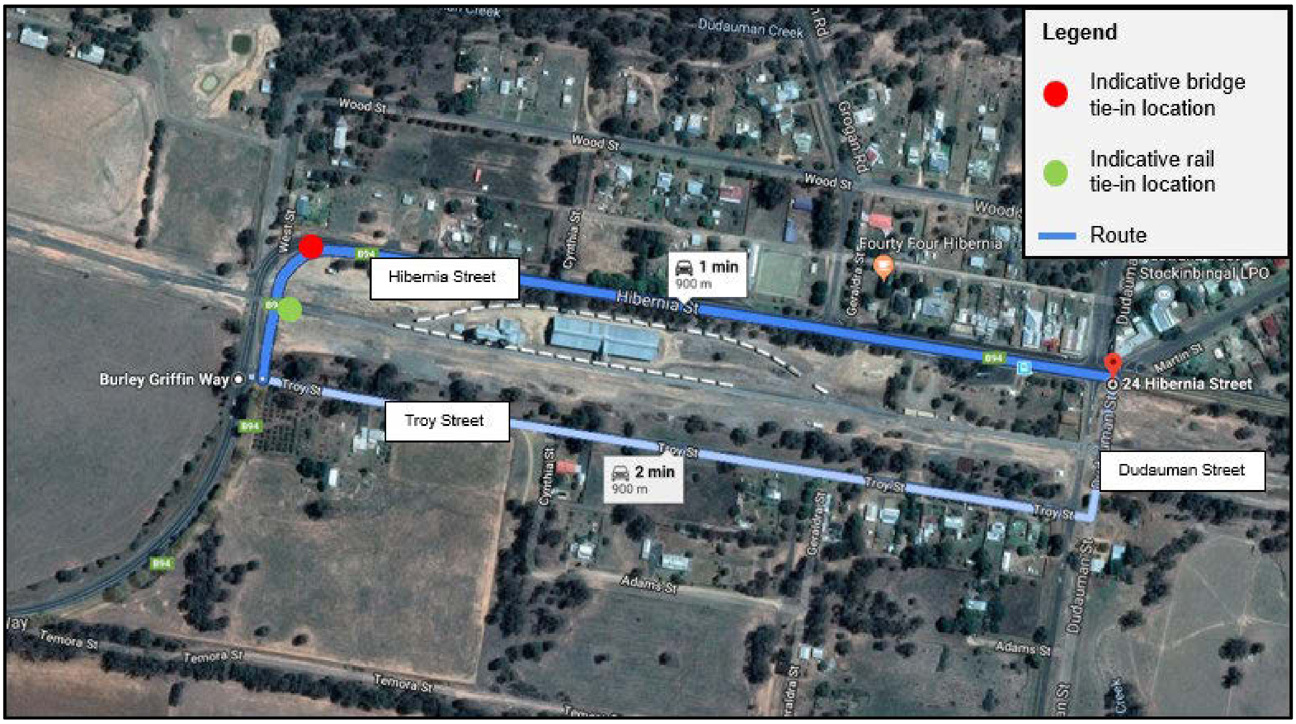
Road	Existing travel time	Diversion travel time	Increased travel time
Old Cootamundra	14 mins	31 mins	17 mins

Old Cootamundra Road is an approved B-double route for approximately 22km east of Temora as shown in Figure 4.3. The end of the approved B-double route in this location is approximately 11km west of the proposed bridge location. As such diversionary routes for B-doubles are not required in this location.

5.4.8.5 Hibernia Street

Figure 5.46 shows the existing route and diversionary route (with their associated travel times).

A tie-in to the existing rail network south of Hibernia Street is also proposed as part of the proposal. The construction of the rail tie-in would warrant use of the same diversionary route proposed for the construction of the bridge tie-in.



Source: *GoogleMaps*

Figure 5.46 Hibernia Street – existing and diversionary, routes and travel times

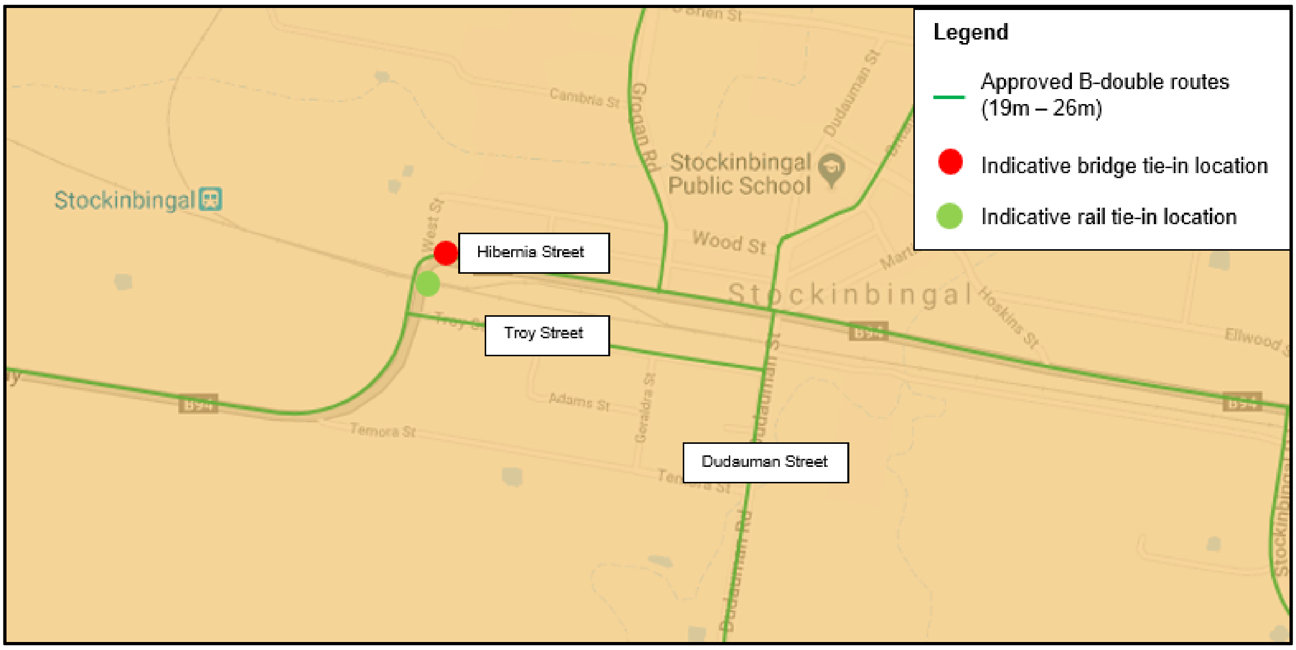
As can be seen in Table 5.67 travel time increases by approximately one minute as a result of the diversionary route on Hibernia Street. The impact of these diversions has been considered in the intersection assessments for Hibernia Street/Dudauman Street and Troy Street/Dudauman Street, given in section 5.4.2.

Table 5.67 Hibernia Street – travel times

Road	Existing travel time	Diversion travel time	Increased travel time
Hibernia Street	1 min	2 mins	1 min

Hibernia Street is an approved B-double route as shown in Figure 4.3. The B-double route traverses the locations where the bridge and rail line are proposed to tie in with the existing road and rail network respectively. As such a diversionary route suitable for B-doubles is required in this location.

Figure 5.47 below shows that Dudauman Street and Troy Street are approved B-double routes. As such the diversionary route proposed in Figure 5.46 is also appropriate for B-double vehicles. It should be noted that it is assumed that as part of the realignment works, upgrades to pavement and widening will occur at Troy Street to accommodate the additional traffic.



Source: https://www.rms.nsw.gov.au/business-industry/heavy-vehicles/maps/restricted-access-vehicles-map/map/index.html

Figure 5.47 Approved B-double routes, Troy Street and Dudauman Street

5.5 Operation

As discussed in section 1.2.2, subject to approval of the proposal, operation is estimated to commence in late 2026.

5.5.1 Road network

Low volumes of maintenance and repair vehicles may be required along the proposal during operation on an ad-hoc basis. However, given the presumed low volume and occasional nature of these trips, their impact on the road network is considered negligible and has only been assessed qualitatively in this report.

The proposal will allow freight which is currently being transported on the road network to commence use of the rail line. With the number of freight trains expected to increase from an average of six trains per day (both directions) in late 2026 to about 11 trains per day (both directions) in 2040. The number of road freight heavy vehicles is expected to decrease. This will improve traffic conditions around the proposal as well as the greater road network.

During operation, the bridges proposed over the road network allow for uninterrupted traffic flow on the roads which they are positioned over and as such impacts to these roads from the bridges do no not require assessment.

Vehicle delay may be experienced at level crossings during operation, as discussed in section 5.5.3.

5.5.2 Road realignments

5.5.2.1 Burley Griffin Way

The new Burley Griffin Way road bridge over the proposed rail alignment has introduced the requirement for some roads to close or change function. The roads directly impacted by this realignment are:

- Burley Griffin Way (existing road corridor)/Hibernia Street; and
- Troy Street.

The layout of the realignment is illustrated in Figure 5.48.

The proposed Burley Griffin Way cross-sectional design width is 14.4m (including a 0.5m median, 3.5m lane, 2.5m shoulder, and 1.2m verge), which was confirmed following consultation with TfNSW.

The existing alignment of Burley Griffin Way, from Hibernia Street to Dudauman Creek, will undergo several changes as a result of the new overpass. The small section between Hibernia Street and Troy Street will be closed and removed to allow for the overpass ramp and realignment of the Lake Cargelligo Railway line out of Stockinbingal. The future treatment of the remaining section of Burley Griffin Way from Troy Street to Dudauman Creek will be determined following consultation with TfNSW and Cootamundra-Gundagai Council. The outcome of the future treatment of Burley Griffin Way will determine the future intersection with Temora Street, located parallel to the south of Troy Street.

Troy Street will no longer intersect with Burley Griffin Way and as such will become a no through road.

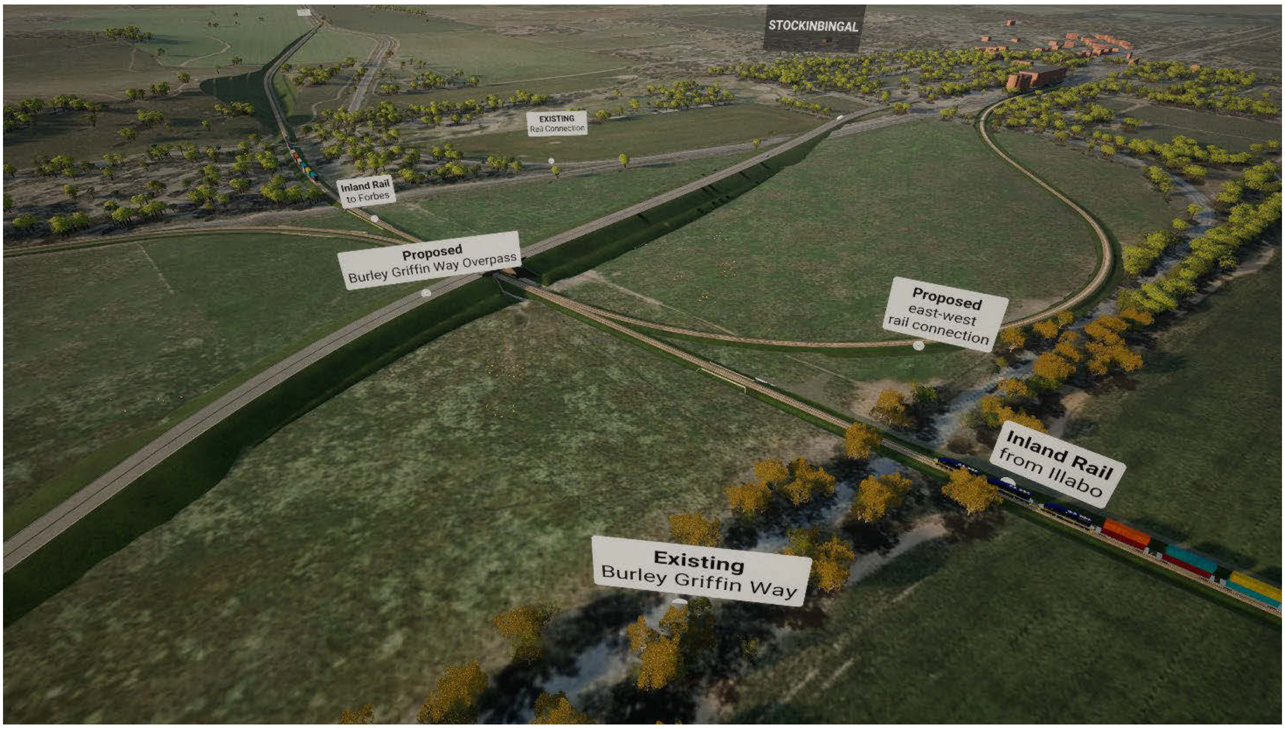


Figure 5.48 Proposed realignment to Burley Griffin Way

Due to Troy Street becoming a no-through road, residents of this street will experience minor increases to journey time when travelling to or from the west, as Troy Street will no longer have direct access to Burley Griffin Way.

There are potential safety and operational benefits to the realignment of Burley Griffin Way, including:

- the removal of vehicle interaction at the Troy Street intersection, which the realignment would bypass
- the removal of vehicle interaction with the existing level crossing on Burley Griffin Way, which will be replaced with a road over rail (bridge) grade separation to the west of the existing level crossing.

5.5.2.2 Ironbong Road

It is proposed to make alignment adjustments to Ironbong Road adjacent to the proposed level crossing. The requirement of the realignment is due to poor sight lines and to create a safer level crossing for road vehicles. The realignment of Ironbong Road will create safer driving conditions for road users.

The proposed realignment of Ironbong Road is illustrated in Figure 5.49.

INLAND RAIL EIS TEMPLATE 5.49 Proposed realignment to Ironbong Road

0 50 100 Meters

Coordinate System: GDA 1994 MGA Zone 55

Date: 8/18/2021 Paper: A3
Author: IR GIS Scale: 1:3,219
Data Sources: LPI, IRDJV, ARTC

- Public level crossing
- 40950 Chainage (distance in metres from southern limit of the proposal)
- Proposal Site

Key features of proposal

- New track/track upgrade
- Road realignment
- Road embankment
- Earthworks

Existing features

- Sub-arterial road
- Arterial and sub-arterial roads
- Minor watercourse

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

5.5.3 Level crossings

There are nine locations where the proposal interfaces with the public road network as shown in Table 5.68, with both grade separation and level crossings proposed to manage this interaction.

Table 5.68 Summary of public road-rail interfaces along the proposal alignment

Road type	Number of interfaces
State-controlled	1 (Burley Griffin Way)
Local Council	6
Department of Crown Lands	2

The Construction of New Level Crossings Policy (TfNSW, 2014) notes that building new level crossings is to be avoided wherever possible, and all other options, including grade separation and use of existing level crossings, should be explored before a new crossing is proposed. Reducing the overall number of level crossings will deliver a reduction in level crossing safety risk across the network.

Therefore, a methodical process of review was undertaken to determine the appropriate treatment at public road-rail interfaces, in consultation with potentially impacted landowners and relevant stakeholders, including road authorities, Department of Crown Lands and Transport for NSW.

For interfaces between the alignment and private access roads and farm tracks, a detailed desktop review of the potential road rail interfaces for each landowner through GIS data and cadastral information was undertaken. This process was used to identify existing access roads and farm tracks and potential treatments, including identifying those that would be suitable for potential closure or consolidation.

As part of this process a review of each site was undertaken to assess the constraints and compliance with engineering standards. The review focussed on the initial assessment for each crossing location to confirm the treatments proposed at each site and to ensure property access is maintained for all landowners.

Considerations in the review process included:

- the need for access points to cross the rail corridor
- adequate clearance for agricultural equipment and stock
- safety concerns from interactions of trains, vehicle and other users including ensuring adequate sight distances
- traffic impacts to the surrounding road network
- property impacts associated with land fragmentation and access.

The process for identifying and assessing feasible options for public road interfaces broadly involved the following main steps:

- identifying opportunities for grade separation
- determining locations where provision of a level crossing would not be practicable and where road closures or realignments are likely to be required
- determining the preferred type of level crossings treatments (i.e. active or passive).

The different treatment options are described in more detail below.

5.5.3.1 Grade separation treatment option

Grade separation comprises the rail line crossing under or over a road such that there is no requirement for road traffic to enter the rail corridor, e.g. with a bridge or underpass. It is the preferred option from a road safety perspective and rail-road interfaces would generally be automatically grade separated in the following four instances:

- rail-road crossings with four rail tracks
- rail-road crossings of freeways and highways of four or more lanes (including both current and committed future plans)
- where grade separation is the logical option for topographical or engineering reasons
- where rail-road interfaces have high-risk safety issues, e.g. collision of vehicle and trains.

5.5.3.2 Level crossing treatment option

The acceptability of a level crossing as a treatment option is determined primarily through use of the Australian Level Crossing Assessment Model (ALCAM) assessment (detailed further in section 5.5.3.4 below), and in consultation with the relevant road authority. As well as where grade separations are automatically considered, as described above, level crossings are not considered to be suitable in the following circumstances:

- where there are height differences between the road and rail
- where there is a crossing loops or siding.

In locations where the proposal has determined that a level crossing is the preferred solution, further assessment has been undertaken to determine the most suitable form of level crossing control, active or passive:

- passive controls– have static warning signs (e.g. stop or give way signs) that are visible on approach which provides an unchanging warning to the road user whether or not a train is approaching the crossing
- active controls – flashing lights and signage with boom barriers for motorists, and automated gates for pedestrians. These devices are activated prior to and during the passage of a train through the level crossing.

5.5.3.3 Road modification treatment option

In addition to the establishment of grade separation or a level crossing at road-rail interfaces, road modifications have been considered. Modifications fundamentally comprise:

- road realignment in conjunction with a level crossing to improve sight lines and improve road safety
- road closure
- road diversion to an alternative crossing location (generally involving consolidation of more than one road to a single crossing point) – generally considered where road closure is required.

Road closures are generally only considered in the following circumstances:

- where a safe crossing cannot be provided at that location
- where there are low traffic volumes (such that a grade separated solution could not be reasonably justified)
- where alternative access (through diversion to an alternative crossing) is available or reasonably achievable
- the impact on road users (associated with increased travel time) is considered low.

5.5.3.4 ALCAM assessment tool

A key component in evaluating the preferred treatment option is the Australian Level Crossing Assessment Model (ALCAM). The ALCAM is an assessment tool used to identify key potential risks at existing and proposed level crossings and to assist in the prioritisation of crossings for upgrades. It is central to ARTC's approach to the consideration of level crossings. The risk model is used to support a decision-making process for both road and pedestrian level crossings to help determine the need for treatment or type of treatment. The ALCAM assessment model is currently applied to all crossings in Australia and in New Zealand.

The ALCAM tool can be used to:

- highlight where specific risks or design deficiencies exist
- quantify the expected consequences of an accident
- quantify the probability of an accident
- compare the relative risk between crossings within a region or jurisdiction
- model the effectiveness of treatments to address these risks.

Although it is a comprehensive tool for the assessment of level crossing hazards, The ALCAM model cannot be applied in isolation and does not preclude the need for sound engineering judgement. Any risk assessment and treatment also needs to consider other factors, including:

- collision and near-collision history
- engineering experience (both rail and road)
- local knowledge of driver or pedestrian behaviour
- social and economic assessment
- standards and international best practice.

Assessments as per the methodology detailed in Appendix A, which includes ALCAM assessment, have been carried out for all level crossings. Consistent with the other Inland Rail Environment Impact Statements, ALCAM assessment results are not included in this technical report.

5.5.3.5 Evaluation of preferred treatment option

During the design development of the proposal each road-rail interface was assessed. As well as addressing locations where the proposal introduced a new road-rail interface on the road network, the assessment evaluated existing level crossings and considered the local topography, existing road geometry and adjacent infrastructure and evaluated sight lines for safe approaches and earthwork requirements.

Further information regarding the methodology undertaken to determine the preferred level crossing treatments is provided in Appendix A and Chapter 6 (Alternatives and proposal options) of the EIS.

5.5.3.6 Level crossings

Level crossings are proposed as the preferred treatment option for six public road-rail interfaces, detailed in Table 5.69. Level crossings have been designed in accordance with Austroads Guide to Road Design and consultation with Transport for NSW would be undertaken as part of detailed design to ensure that the design complies with Transport for NSW policies relating to level crossings. ARTC has also consulted with Transport for NSW and local councils as part of the level crossing design process to-date.

Table 5.69 Public Level crossings

Road name	Road type	Chainage	Design considerations	Proposed solution
Unnamed Road	Department of Crown Lands	2,789	Treatments to mitigate the short-stacking risk between the proposed level crossing treatment and the Olympic Highway, including signage and vehicle turn restrictions on Olympic Highway. High-risk crossing identified by the ALCAM assessment due to the risk associated with the length of a triple track crossing and poor sight lines warranting active control level crossing treatment. Grade separation considered unnecessary due to very low traffic volumes. ARTC are pursuing closure of this level crossing.	Level crossing with active control
Old Sydney Road	Council (Local) road	5,588	Local, relatively flat topography and low traffic volumes deemed a passive control level crossing as confirmed by an ALCAM assessment.	Level crossing with passive control
Ironbong Road	Council (Local) road	8,152	The key ALCAM criteria identifying Ironbong Road as an active crossing as the preferred treatment (in preference to a passive level crossing) are poor sighting angles and high vehicle speeds. To enhance safety further, Ironbong Road would be realigned as part of the proposal. The realignment was proposed to satisfy horizontal and vertical geometry constraints for high vehicle speeds and is considered further in section 5.5.2.2.	Level crossing with active control and road realignment
Unnamed road	Department of Crown Lands	11,390	High safety risks due to poor sighting distances from the rail geometry, location of the crossing loop on the east and maintenance siding configuration.	Level crossing with active control
Unnamed road	Council (Local) road	15,934	Local, relatively flat topography and low vehicle usage deemed a passive control level crossing as confirmed by an ALCAM assessment.	Level crossing with passive control
Corbys Lane	Council (Local) road	33,769	Local, relatively flat topography and low vehicle usage deemed a passive control level crossing as confirmed by an ALCAM assessment.	Level crossing with passive control

5.5.3.7 Short-stacking

Some railway crossings are prone to vehicles stopping on the railway tracks due to the short distance between the level crossing and a nearby intersection or gate. This is known as “short-stacking”.

Operational short-stacking has been considered for all level crossings using design vehicles based on approved routes, approved areas and route exceptions. In the majority of cases these are 26m B-double routes. All level crossings have sufficient stacking distance to accommodate 36.5m vehicles, excluding the existing crown road level crossing at chainage 2,789. This level crossing accommodates a maximum design vehicle length of 19m. It should be noted that ARTC are pursuing closure of this level crossing.

There are no new level crossings adjacent to classified roads between Illabo and Stockinbingal.

5.5.3.8 Level crossing delay assessment results

As discussed in section 1.2.2, the Illabo to Stockinbingal proposal is expected to have an average daily demand of up six trains per day (both directions) in late 2026, increasing to about 11 trains per day (both directions) in 2040. The number of trains per hour in actual operation would not likely exceed more than one train per hour. For the following calculations, it is assumed that the number of trains per hour at each level crossing will be consistent from late 2026 through to 2040.

The key traffic impact of the proposal will be impacts on travel time as a result of train activity at level crossings. Potential train speeds and their corresponding level crossing closure times are presented in Table 5.70 for the expected train length of 1.8km.

Table 5.70 Level crossing delays per train

Train speed (km/h)	Pre train warning time (seconds)	Train travel time (seconds)	Post train wait time (seconds)	Total time of crossing closure under active control (seconds)
80	45	81	5	131
90	45	72	5	112
100	45	65	5	115
110	45	59	5	109
115	45	57	5	107

The location of new public level crossings along the proposal and their expected delay to vehicles is provided in Table 5.71, based on a 1.8km train length. The table also provides peak hour traffic volumes for the roads on which level crossings are proposed, which have been extrapolated using the 0.5 per cent compounding annual growth rate discussed in section 4.2.2, to determine:

- future background traffic volumes in the first year of operation (2027)
- future background traffic volumes for the 10-year design horizon (2037).

Future traffic volumes for 'unnamed' roads, on which level crossings are proposed to be located, have been assumed as one vehicle during the peak hour. This assumption has been made due to the low peak hour volumes on the named roads on which level crossings are proposed to be located and the very low density of dwellings off unnamed roads around the proposal.

Table 5.71 Public Level crossings, 2027 and 2037 peak hour vehicle delay

Level crossing	Chainage	Road	Proposed treatment	2027 peak hour traffic volume	2037 peak hour traffic volume	Trains per hour (2027 & 2037)	Max. expected delay (secs)
PR2800	2,789	Unnamed Road	Active control	1	1	1	131
PU5600	5,588	Old Sydney Road	Passive control	2	2	1	131
PU8160	8,152	Ironbong Road	Active control	2	2	1	131
PU11390	11,390	Unnamed road	Active control	1	1	1	131
PU15950	15,934	Unnamed road	Passive control	1	1	1	131
PU33780	33,769	Corbys Lane	Passive control	3	3	1	131

A delay of up to 131 seconds between one and three vehicles in 2027 and 2037, occurring once in a peak hour, is considered negligible. The assessment of potential delays to vehicles crossing the rail alignment in these locations is conservative as it details a worst case scenario. Due to the low numbers of crossing vehicles and scheduled trains, it is likely that most crossing vehicles would encounter no delay.

5.5.4 Rail network

At the completion of the proposal it is expected that freight rail services will resume along all lines which were previously used prior to construction. With the introduction of the proposal, the network will have greater capacity and train frequency is expected to increase in future years.

Passenger rail services will continue at the completion of the proposal with no long term impacts on the service delivery expected.

5.5.5 Public and active transport networks

At the completion of the proposal it is expected that the Stockinbingal Coach Stop would resume operation on Hibernia Street at its original location. The bus route would see minor improvements, with the new bridge proposed at Burley Griffin Way removing interactions with the existing level crossing.

At the completion of the proposal there will be no change to existing active transport links. There is no pedestrian or cycling infrastructure in place on Hibernia Street, Burley Griffin Way in Stockinbingal or on the Olympic Highway through Illabo. Pedestrians or cyclists will be delayed at level crossings if use coincides with a passing train. As per section 5.5.3.7, the maximum delay is estimated to be approximately 131 seconds. Aside from this delay, the operation of the proposal will not impact active transport users.

5.5.6 Parking

Where the Burley Griffin Way bridge replaces the existing Burley Griffin Way carriageway, roadside parking will no longer be available within this section of the road. Otherwise, no changes to the existing parking allocation are expected in the long term as a result of the proposal.

5.5.7 Travelling stock reserves and livestock highways

The proposal site does not directly impact any TSRs.

The livestock highway identified in section 4.2.4 will remain operational with no long term impact as a result of the proposal. The livestock highway will cross the proposal in two locations: the existing crossing at the Stockinbingal-Parkes Line on Grogan Road and at Old Cootamundra Road (chainage 28,263 m), which is intended to be grade separated with a road underbridge.

5.6 Cumulative impacts

Potential cumulative impacts from the two adjacent Inland Rail projects and other developments are summarised in Table 5.72. This considers their indicative timeframe (as known at the time writing).

Chapter 26 (Cumulative and residual impacts) of the EIS includes mitigation and management measures for the potential cumulative impacts identified.

Table 5.72 Major developments with potential for cumulative impacts with the proposal

Project	Distance from the proposal site	Project details	Status and indicative timing	Potential cumulative impacts
Inland Rail – Albury to Illabo	Adjacent to south end of proposal site	Enhancement of 185km of existing rail corridor from VIC/NSW border to Illabo.	Subject to planning approval, construction is planned to commence in late-2023 and will be completed early-2026.	Based on the location of the project and proposed scope, the following cumulative impacts may occur: • increased vehicles and traffic in the regional area during construction • use of the identified construction routes to the proposal, by vehicles relating to the A2I or S2P proposals is not anticipated. There may be potential overlap with routes on the northern and southern construction routes, with the adjacent Inland Rail sections and will be further investigated as the respective projects develop. No cumulative traffic would be generated during operation.
Inland Rail – Stockinbingal to Parkes	Adjacent to north end of proposal site	Enhancement of 173km of existing rail corridor.	Subject to planning approval, construction is expected to commence in mid 2023 and be completed late 2024.	The project includes replacing the Lachlan River rail bridge, vertical clearance work (track lowering) at the Wyndham Avenue bridge over the rail track in Forbes, the new Daroobalgie crossing loop, and horizontal clearances. The closest S2P site is located at Milvale Yard (within horizontal clearances), about 40km north of the proposal. Whilst some additional impacts to traffic may occur from increased vehicles and traffic in the regional area during construction, due to the location of the S2P project this is not anticipated to result in significant cumulative impacts to haul roads utilised by the proposal. No cumulative traffic would be generated during operation.
Illabo Solar	4km south	Development of an 80MW solar farm with energy storage and associated infrastructure.	The project is currently in process of preparation of the EIS (and as such does not formally require consideration). The construction phase of the proposal would take between 12 and 24 months. However, no construction start date has been provided.	There may be cumulative impacts if construction of this project overlaps with the proposal. Whilst some additional impacts to traffic may occur from increased vehicles and traffic in the regional area during construction, this is not anticipated to result in significant cumulative impacts to haul roads utilised by the proposal. Timing of this project will be further investigated when more information is available.

Project	Distance from the proposal site	Project details	Status and indicative timing	Potential cumulative impacts
Cootamundra Solar Farm	15km east	Development of a 5MW solar farm with a Battery Energy Storage Facility (BESS) and associated infrastructure	Environmental assessment of the project is currently being completed. No published timeframe for construction at the time of writing.	There may be cumulative impacts if construction of this project overlaps with the proposal. Whilst some additional impacts to traffic may occur from increased vehicles and traffic in the regional area during construction, this is not anticipated to result in significant cumulative impacts to haul roads utilised by the proposal. Timing of this project will be further investigated when more information is available.
Humelink	60km south-east	Development of a new 500kV transmission line which will connect Wagga Wagga, Bannaby and Maragle.	Environmental assessment of the project is currently being completed. Subject to planning approval, the construction phase of the project is anticipated to commence in 2024 and be completed in 2026.	Whilst some additional impacts to traffic may occur from increased vehicles and traffic in the regional area during construction, due to the location of the Humelink project this is not anticipated to result in significant cumulative impacts to haul roads utilised by the proposal.
Grade separating road interfaces	1.5km south west	Transport for NSW is currently in the early planning stages to grade separate road and rail interfaces at four locations where Inland Rail crosses the NSW road network. The nearest grade separation proposal is the Olympic Highway at Harris Gates proposal, located north of Illabo.	Subject to planning approval, the construction phase of the project is anticipated to commence in early 2025 and be completed in early 2027.	The grade separation project has not yet been approved. It is therefore difficult to predict if the construction period of the grade separation project and the proposal would overlap. Timing of this project will be further investigated when more information is available.

6 Mitigation and management measures

6.1 Approach to mitigation and management

Environmental management for the proposal would be carried out in accordance with the approach detailed in Chapter 27 (Approach to environmental management and mitigation) of the EIS.

This would include a traffic, transport and access sub-plan, prepared as part of the Construction Environmental Management Plan (CEMP) and an operational environmental management framework (EMF).

6.2 Summary of mitigation measures

The mitigation measures to manage impacts to traffic, transport and access from the proposal during detailed design/pre-construction and construction phases are outlined in Table 6.1. Given the limited impact on traffic, transport and access once the proposal is operational, there are no mitigation measures proposed during this phase.

Table 6.1 Proposal-specific mitigation measures for traffic, transport and access

Issue/impact	Mitigation and management measure	Project phase
Road user safety at changes to the road network	Road Safety Audits (RSA) and a risk assessment would be undertaken where changes to the road network are required, in accordance with relevant Austroads guidelines, to ensure the safety of all road users is considered in the design process.	Detailed design/ pre-construction
Road user safety at level crossings	Public level crossings would be designed in accordance with relevant guidelines and standards, including AS 1742.7:2016: Manual of uniform traffic control devices (Standards Australia, 2016), and in consultation with Transport for NSW.	Detailed design/ pre-construction
Closure of level crossings	Consultation with Transport for NSW would be undertaken regarding the proposed closure of level crossings.	Detailed design/ pre-construction
Pre-construction route at Troy Street	Input would be sought from affected residents and the local councils prior to the alternative route being established on Troy Street in accordance with the Inland Rail Communications and Engagement Strategy. Consultation with relevant stakeholders would be undertaken regarding the need to temporarily relocate the Stockinbingal bus stop during the temporary closure of Hibernia Street. Stakeholders would include Transport for NSW and Cootamundra-Gundagai Regional Council.	Detailed design/ pre-construction
General impacts of construction activities on traffic, transport, access, pedestrians and cyclists	A traffic, transport and access management plan would be prepared and implemented as part of the Construction Environmental Management Plan. The plan would include measures, processes and responsibilities to minimise the potential for impacts on the community and the operation of the surrounding road and transport environment during construction. The plan would be developed in consultation with local councils, Transport for NSW, emergency services and public transport/bus operators. It would include, as appropriate, additional reasonable and feasible measures identified as an outcome of consultation undertaken under the Inland Rail Communications and Engagement Strategy.	Construction
General impacts of construction activities on traffic flow	Traffic control would be engaged to maintain vehicle flow and safe access where required on construction and diversion routes and at construction accesses. This would include at the Hibernia Street and Dudauman Street intersection, to prevent queuing across the existing rail line.	Construction

Issue/impact	Mitigation and management measure	Project phase
Emergency vehicle access	Emergency vehicle access routes that may be impacted by the proposal would be identified and appropriate control measures would be implemented, in consultation with the relevant emergency services providers.	Construction
Heavy vehicles damaging local roads	A dilapidation survey would be undertaken of the made public roads within the proposed haulage routes at the commencement of construction and provided to the relevant road authority. Upgrades to pavements on construction routes would be undertaken prior to construction, as deemed to be required. Pavement monitoring would be carried out during works. Rectification measures would be implemented as needed during and/or following completion of construction to address any damage caused by construction.	Construction
Impact on livestock highways	Local Land Services would be notified of increased heavy vehicle movements along livestock highways during the construction phase as well as periods of changed traffic operations. Construction staff would be informed of the location of the livestock highways.	Construction

6.3 Residual impacts

The management of any residual impacts is considered in Chapter 27 (Approach to environmental management and mitigation) of the EIS for both the construction and operation phase.

7 Conclusion

The proposed Illabo to Stockinbingal section of Inland Rail would ultimately allow for faster and more frequent freight train services. This report has assessed the impacts of the construction and operation of the proposal to the surrounding existing transport networks including road, rail and public transport services.

7.1 Construction phase

During construction, the main traffic and transport impacts would be related to the movement of construction vehicles to and between the construction sites. This includes an estimated maximum workforce of 450 people, who are assumed to travel to the site from nearby population centres of Cootamundra, Wagga Wagga, Young, Temora and Junee. Although unlikely to occur in reality, a conservative approach has been taken to the assessment, assuming that plant and equipment, concrete, quarry and water tanker deliveries may occur during the peak hour, as well as arrivals or departures of the workforce. Intersectional movement of earthworks haulage and water tankers has also been considered.

It was found that an adequate level of service was maintained on the assessed roads and intersections affected by the additional traffic generated during construction. Due to the realignment of Burley Griffin Way, the western end of Hibernia Street will be temporarily closed to traffic, and traffic diverted onto Dudauman Street and Troy Street. This detour, planned to last for 15 days, increases the turning movements at the intersection, causing some delays on the southern approach. The modelling showed the queuing is not expected to extend to a level crossing approximately 60m south of the intersection, but the possibility of this should be considered and mitigated against by traffic control engaged at the site. This diversion will also impact a current bus service, with Stockinbingal Coach Stop requiring relocation during the temporary closure of Hibernia Street.

Prior to construction commencing, a Road Safety Audit (RSA) and risk assessment should be undertaken where changes to the road network are required, with the road safety of all users considered, and special consideration taken on intersection locations where an increase in turning movements is expected. To mitigate against impacts during construction, a Traffic Management Plan (TMP) is to be prepared and implemented as part of the Construction Environmental Management Plan (CEMP), in consultation with stakeholders. This plan would include measures, processes and responsibilities to minimise the potential for impacts on the community and the operation of the surrounding road and transport environment during construction. Furthermore, Local Land Services are to be advised of increased heavy vehicle movements along livestock highways and a Road Dilapidation Report prepared for local roads which will be used by haulage vehicles, with rectification works carried out as needed to address any damage caused by construction vehicles.

7.2 Operational phase

Once the proposal is operational, minimal traffic generating activity is anticipated and fewer freight vehicles are expected on the road network. Low volumes of maintenance and repair vehicles may be required on an ad-hoc basis but, given the anticipated low volume and infrequent nature of these trips, their impact on the road network is expected to be negligible.

The realignment of Burley Griffin Way provides potential safety and operational benefits to the road network, including:

- the removal of vehicle interaction at the Troy Street intersection, which the realignment would bypass
- the removal of vehicle interaction with the existing level crossing on Burley Griffin Way, which will be replaced with a road over rail (bridge) grade separation to the west of the existing level crossing.

As Troy Street will become a no-through road, some residents will experience minor increases to journey time to access Burley Griffin Way.

The primary traffic impacts relate to changes in conditions due to the proposed level crossings and the associated delays. The anticipated delays for a 1.8km train would be fairly small (just over two minutes) and, as traffic activity at most level crossings in the proposal area is low, the volume of traffic likely to be delayed by train activity is not substantial.

8 References

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TECHNICAL REPORT 3

Traffic, Transport and Access Impact Assessment

Appendix A Public level crossing treatment methodology

ILLABO TO STOCKINBINGAL ENVIRONMENTAL IMPACT STATEMENT

Public level crossing treatment methodology

Introduction

The key principles guiding the decision-making process for determining treatments at public road–rail interfaces includes:

- Using a risk-based decision-making process focused on minimising risk So Far As Is Reasonably Practicable (SFAIRP)
- Consistency in the determination of road–rail interface treatments across the projects of the Inland Rail Program
- Applying a consistent methodology to determine if the cost of the potential available treatment is grossly disproportionate to the level of risk to safety and the projected benefits
- Ensuring the feasibility of the Inland Rail Program by proposing cost-effective solutions.

An overview of the process followed in the assessment of road–rail interfaces across the Illabo to Stockinbingal (I2S) project and the methodology followed in the development of road–rail interface treatments is outlined below.

Process overview—determination of road rail interface treatments

Identification of all potential road–rail interfaces within the proposal site

An important objective of level crossing investigations is the clear and accurate identification of all rail-road interfaces within the proposal site. The list of identified road–rail interfaces is then provided to the relevant road manager for review in order to ensure that all interfaces and the associated road infrastructure managers have been correctly identified.

Identify opportunities to minimise the number of proposed road–rail interfaces

Initial consideration will be given to the elimination of level crossing risks by assessing all road–rail interfaces for closure. This is in line with the Transport for New South Wales (TfNSW) *Level Crossing Closures Policy* (n.d.), which notes that:

> *'in order to manage the risks to safety associated with road and rail interfaces, the closure of public and private level crossings in NSW is to be pursued, where it is practical and cost effective to do so'.*

Road closures will only be progressed if endorsed by the relevant road manager.

Review whether the road–rail interfaces meet the criteria for automatic grades separation

ARTC's policy is that rail-road interfaces will be automatically grade separated in the following three instances:

1. Rail-road interfaces with four rail tracks (current)
2. Rail-road interfaces of freeways and highways of four or more lanes (current and committed future plans)
3. Where grade separation is the logical option for topographical or other technical engineering reasons.

All other crossings will be assessed using the Inland Rail Level Crossing Risk Tool.

Inland Rail Level Crossing Risk Tool

Where a road–rail interface is required, a methodology has been developed to identify what risk treatments should be implemented at individual road rail interfaces as part of the Inland Rail project scope. This methodology is in the form of a formalised Level Crossing Risk Tool that identifies risk treatments and assists ARTC in being able to demonstrate that risks to safety would be managed SFAIRP for both new and existing road–rail interfaces.

The Australian Transport Council in May 2003 agreed to adopt the Australian Level Crossing Assessment Model (ALCAM) as the only comprehensive level crossing assessment model in Australia. ALCAM is an assessment tool used to identify key potential risks at level crossings and assess the overall effects of proposed treatments. It does not specify what treatment is warranted at level rail–road crossing sites nor attempt to define a 'safe' or acceptable level of risk. This is a decision for each rail infrastructure manager.

In line with Office of the National Rail Safety Regulator (ONRSR) recommendation around the use of quantitative risk assessment techniques, a tool was developed which moved from a 'warrant' approach (e.g. decisions around control types based on basic metrics such as road type or traffic volumes) to a cost benefit analysis (CBA) approach for safety risk management. The approach uses ALCAM as one of the main inputs into the decision process for the recommended level of control at Inland Rail level crossings.

ARTC use a consistent methodology to develop all proposed road–rail interface treatments across the Inland Rail Program. In June 2020, the ONRSR finalised an audit of the *Inland Rail Road–Rail Crossing Strategy*, which included a number of the level crossing interfaces in NSW. The audit recognised a consistent, systematic and comprehensive process for the assessment of level crossings is applied to determine adequate treatments, noting that the approach ensures level crossing safety risks are eliminated or minimised, SFAIRP. There were no findings or recommendations identified by the audit requiring action by ARTC.

Section 10 of ONRSR's *Policy on Level Crossings* (ONRSR, 2019) provides support for the use of ALCAM as follows:

> *'ONRSR accepts the use of ALCAM as a tool to help prioritise investment (when used in conjunction with other relevant factors, such as recent occurrence history). This tool has been endorsed by state and territory ministers.'*

Consideration of factors other than ALCAM that may influence the recommended level of control are also taken into account, where relevant, on a case-by-case basis, including:

- Collision and near-collision history
- Traffic and transport impacts
- Local knowledge of driver or pedestrian behaviour.

The assessment incorporates a compliance check against *AS1742.7-2016 Manual of uniform traffic control devices, Part 7: Railway crossings* (Standards Australia, 2016).

Level crossing treatment (control) options considered as part of the process include:

- Installation of passive (stop sign) level crossings—compliant with AS1742.7-2016
- Installation of active level crossings (flashing lights and boom barriers)
- Grade separation
- Other treatments identified based on-site specific risks.

Active controls are where a device, such as flashing lights or boom barriers, is activated prior to and during the passage of a train through the level crossing.

Cost benefit analysis

Part of the test as to whether risks have been managed SFAIRP is to determine whether the cost of the additional control is grossly disproportionate to the benefit gained via a CBA. From a financial perspective, three key inputs are required for the CBA:

1. *The avoided cost if an additional risk control is implemented*—the risk tool relies on ALCAM, which provides a quantitative measure of risk, which also enables the modelling of risk reduction generated by changing the controls at the level crossing. Risk reduction (benefits) can be calculated by comparing two risk scores for two scenarios, e.g. one level crossing with stop signs and one with flashing lights and boom barriers.
2. *The cost of implementing the additional risk control*—this is a combination of the capital cost of the additional control and the annual maintenance and repair cost over the life of the additional control.
3. *What would be considered grossly disproportionate*—from a legal perspective, the ONRSR *Meaning of Duty to Ensure Safety So Far As Is Reasonably Practicable Guideline* provides some guidance on what would be considered grossly disproportionate—the 'Grossly Disproportionate Factor' or GDF. The guideline suggests that the GDF may be dependent on the likelihood and consequence, with low risks having a factor of 2 and high risks having a factor of 10.

The use of ALCAM assessments in the determination of level crossing treatments

ALCAM assessments are undertaken for all proposed public road level crossings in the proposal site, thus providing a baseline risk score. The proposal functionality in the ALCAM system is used to model what the ALCAM risk score would be, assuming the introduction of Inland Rail. This incorporates forecast train speeds, volumes and train lengths. Updated road traffic counts, including a breakdown between light and heavy vehicles, are also collected for all public roads and included in this analysis.

If a crossing is assessed as being non-compliant for a passive stop sign control, the next level of control is applied. For example, if, based on the updated train speeds, sufficient sighting distance for a stop sign crossing as per *AS 1742.7-2016 Manual of uniform traffic control devices Part 7: Railway crossings* (Standards Australia, 2016) cannot be achieved, then the minimum control is flashing lights and boom barriers.

Even when a crossing is compliant for a passive stop sign control, the next level of control is modelled in ALCAM and a cost benefit/GDF analysis is undertaken, until the risk factor is reduced and a cost-effective level of crossing protection is established. For example, a passive control would be compared to a boom barrier control, which would then be compared to a grade separated control.

Preliminary design

A preliminary level of design is first undertaken to confirm that a level crossing with the proposed control, which complies with the relevant standards, can be constructed. This design incorporates any road design standards that have been provided by the relevant road infrastructure manager.

Site-specific level crossing treatments are then reviewed with the respective road infrastructure managers as the project progresses through the design process.

Interface agreements

In accordance with National and State Rail Safety Law requirements, all current and proposed public road crossings will be subject to an Interface Agreement.

Conclusion

The objective is to develop a consistent methodology in the selection of level crossing treatments that is acceptable to key stakeholders and minimises risk SFAIRP.

TECHNICAL REPORT 3

Traffic, Transport and Access Impact Assessment

Appendix B Traffic counts

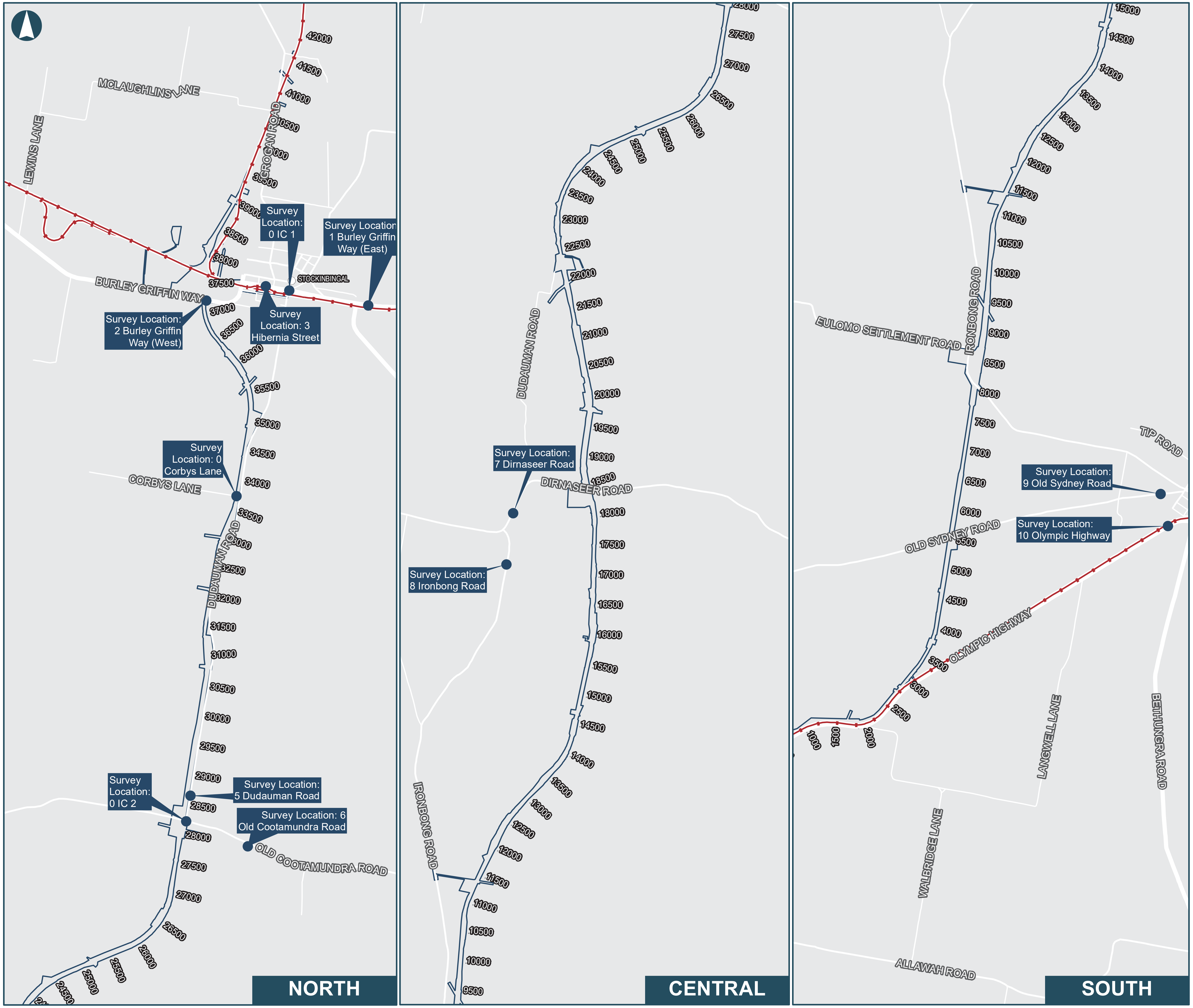
ILLABO TO STOCKINBINGAL ENVIRONMENTAL IMPACT STATEMENT

INLAND RAIL ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

ILLABO TO STOCKINBINGAL

Project traffic survey locations



Proposal Site
Sub-arterial road
Arterial road
Existing Rail
Traffic survey location

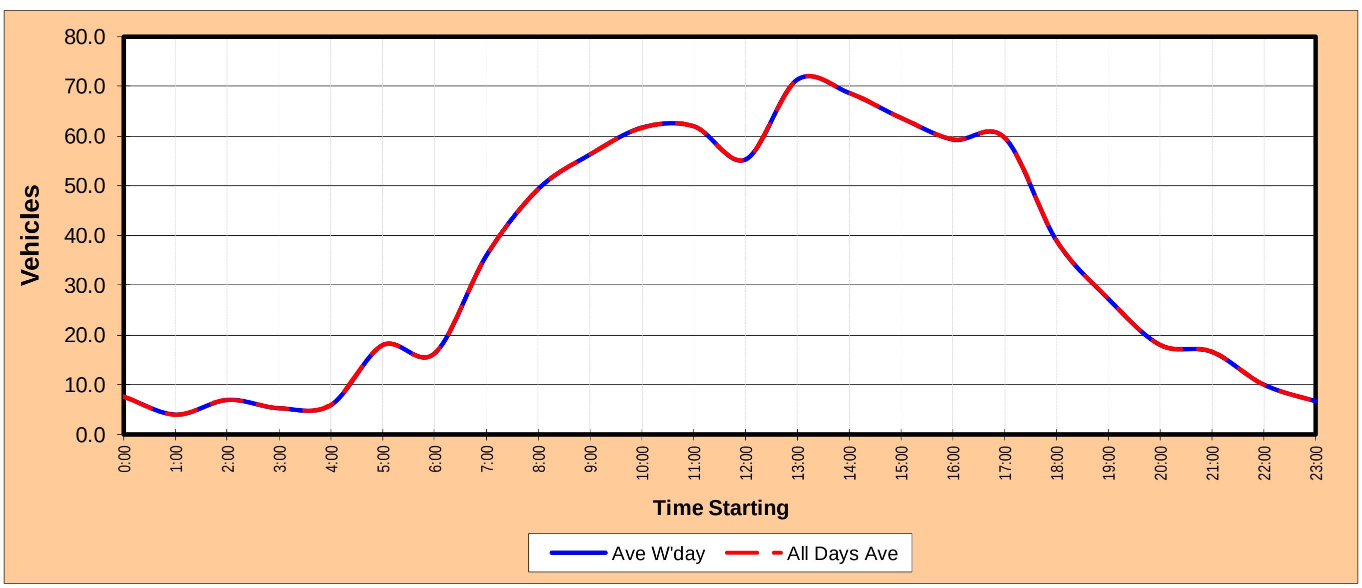
0 0.5 1 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 7/23/2021
Author: IRDJV
Data Sources: IRDJV, ARTC, LPI
Paper: A3
Scale: 1:60,000

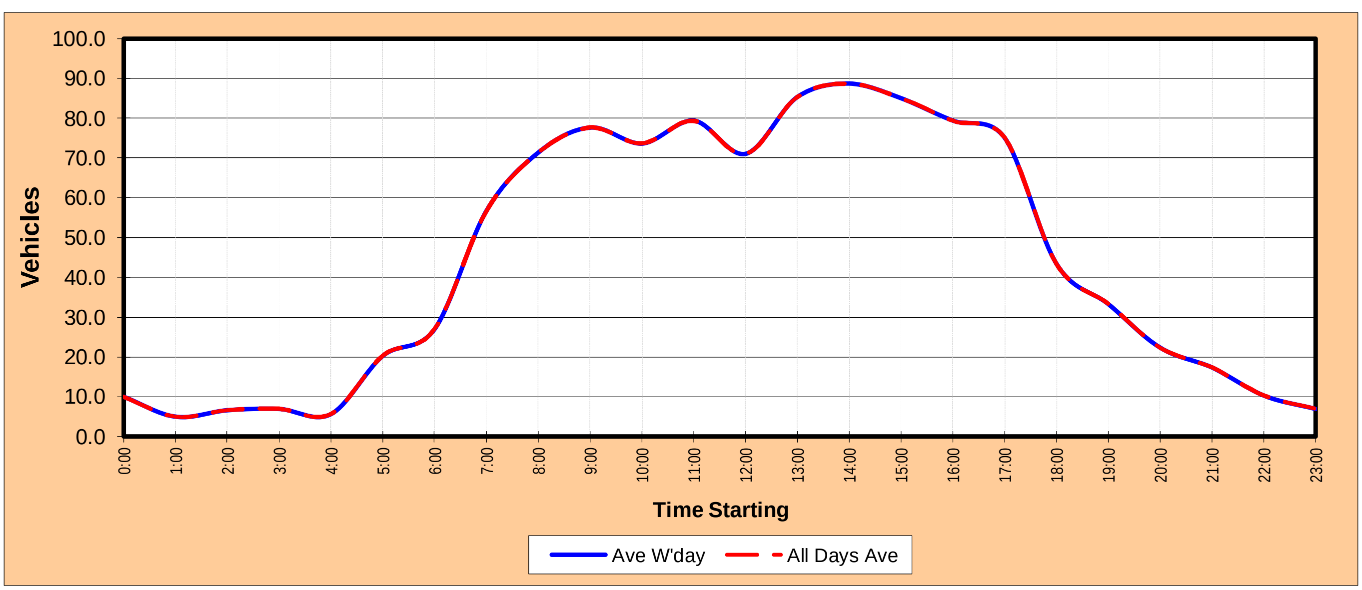
Road	Burley Griffin Way			
Location	East of Elwood Street		Average Weekday	825
Suburb	Stockinbingal		All Day Average	825
Site No.	837302		Weekday Heavy's	36.8%
Start Date	Tuesday 28/08/2018		All Day Heavy's	36.8%
Direction	Two ways			

Starting Time	Day of Week Mon	Tue 28-Aug	Wed 29-Aug	Thu 30-Aug	Fri	Sat	Sun	Ave W'day	All Days Ave
AM Peak		**69**	**61**	**78**					
PM Peak		**85**	**71**	**74**					
0:00		7	11	5				8	8
1:00		5	5	2				4	4
2:00		7	5	9				7	7
3:00		7	4	5				5	5
4:00		7	10	1				6	6
5:00		23	15	16				18	18
6:00		19	15	15				16	16
7:00		31	42	35				36	36
8:00		45	44	59				49	49
9:00		53	54	62				56	56
10:00		52	55	78				62	62
11:00		69	61	56				62	62
12:00		56	46	64				55	55
13:00		85	66	63				71	71
14:00		70	71	65				69	69
15:00		74	53	64				64	64
16:00		69	46	63				59	59
17:00		53	52	74				60	60
18:00		37	43	37				39	39
19:00		19	28	35				27	27
20:00		14	20	20				18	18
21:00		19	18	13				17	17
22:00		9	11	10				10	10
23:00		9	4	7				7	7
Total		**839**	**779**	**858**				**825**	**825**
% Heavies		**38.3%**	**39.5%**	**32.9%**				**36.8%**	**36.8%**



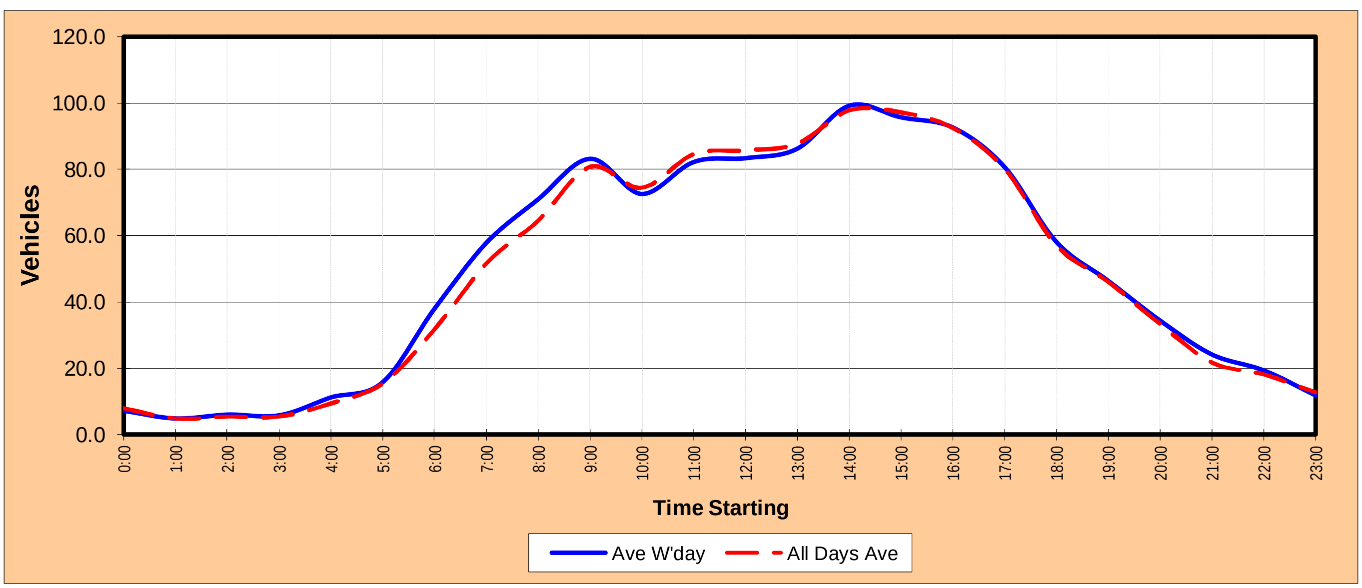
Road	Burley Griffin Way	Average Weekday	1058
Location	West of Tamora Street	All Day Average	1058
Suburb	Stockinbingal	Weekday Heavy's	31.5%
Site No.	837301	All Day Heavy's	31.5%
Start Date	Tuesday 28/08/2018		
Direction	Two ways		

Starting Time	Mon	Tue 28-Aug	Wed 29-Aug	Thu 30-Aug	Fri	Sat	Sun	Ave W'day	All Days Ave
	Day of Week								
AM Peak		**87**	**77**	**84**					
PM Peak		**93**	**101**	**88**					
0:00		8	12	10				10	10
1:00		7	6	2				5	5
2:00		7	5	8				7	7
3:00		9	5	7				7	7
4:00		6	10	1				6	6
5:00		24	18	19				20	20
6:00		35	24	22				27	27
7:00		51	61	58				57	57
8:00		63	73	78				71	71
9:00		81	71	81				78	78
10:00		66	71	84				74	74
11:00		87	77	74				79	79
12:00		69	63	81				71	71
13:00		93	79	84				85	85
14:00		89	101	76				89	89
15:00		90	77	88				85	85
16:00		89	65	84				79	79
17:00		68	75	82				75	75
18:00		41	47	42				43	43
19:00		28	37	35				33	33
20:00		22	23	22				22	22
21:00		19	21	12				17	17
22:00		8	13	10				10	10
23:00		10	3	8				7	7
Total		**1070**	**1037**	**1068**				**1058**	**1058**
% Heavies		**33.4%**	**33.2%**	**28.1%**				**31.5%**	**31.5%**



Road	Hibernia St			
Location	Near Bowling Club		Average Weekday	1187
Suburb	Stockinbingal		All Day Average	1166
Site No.	8524_1		Weekday Heavy's	26.2%
Start Date	Monday 18/02/2019		All Day Heavy's	22.4%
Direction	Two ways			

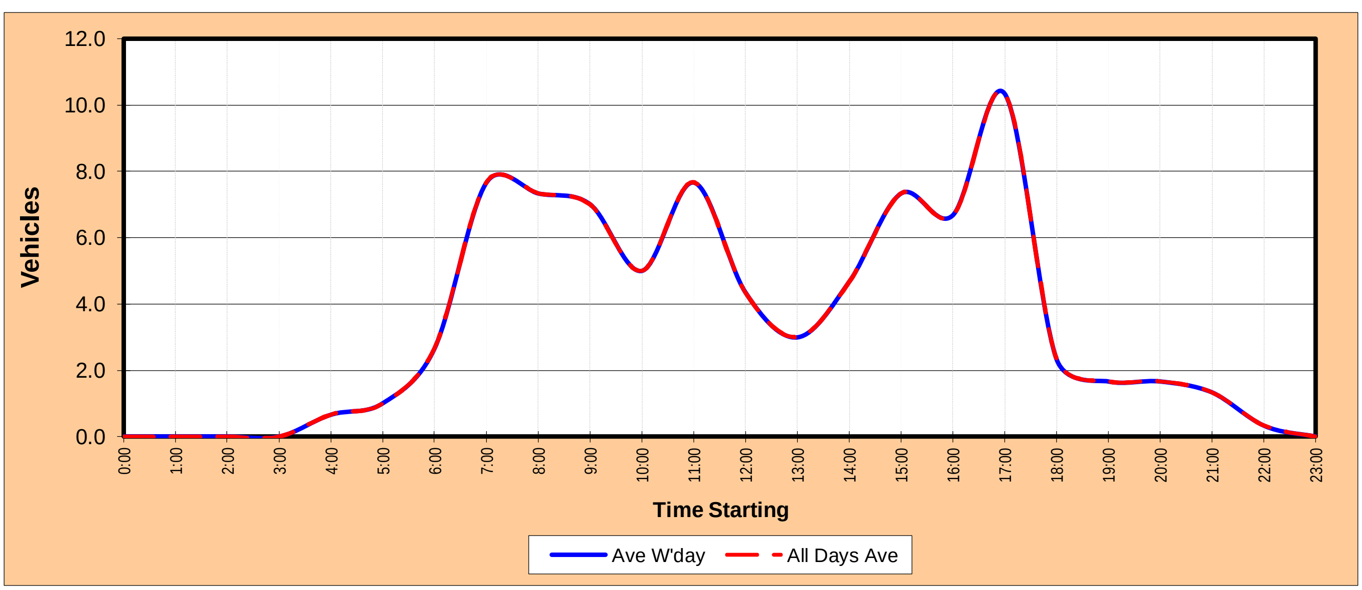
Starting Time	Day of Week							Ave W'day	All Days Ave
	Mon 18-Feb	Tue 19-Feb	Wed 20-Feb	Thu 21-Feb	Fri 22-Feb	Sat 23-Feb	Sun 24-Feb		
AM Peak	**86**	**75**	**79**	**101**	**105**	**80**	**103**		
PM Peak	**103**	**95**	**85**	**139**	**124**	**76**	**128**		
0:00	3	12	6	7	8	12	8	7	8
1:00	4	5	4	5	6	4	6	5	5
2:00	5	6	8	6	5	5	3	6	5
3:00	8	7	5	6	3	7	2	6	5
4:00	11	14	13	7	11	5	5	11	9
5:00	14	20	19	14	12	22	7	16	15
6:00	32	41	36	31	50	24	8	38	32
7:00	51	56	53	65	64	40	32	58	52
8:00	49	75	79	75	77	56	41	71	65
9:00	67	71	72	101	105	72	77	83	81
10:00	65	53	62	87	96	80	78	73	74
11:00	86	74	72	99	80	78	103	82	85
12:00	80	52	59	139	87	60	123	83	86
13:00	80	67	81	114	89	76	107	86	88
14:00	103	95	82	106	110	61	127	99	98
15:00	99	88	84	93	114	74	128	96	97
16:00	77	85	85	99	117	66	118	93	92
17:00	70	59	72	78	124	50	107	81	80
18:00	44	52	52	57	85	42	67	58	57
19:00	35	38	42	52	65	39	51	46	46
20:00	28	33	34	31	46	28	33	34	33
21:00	20	19	17	25	40	10	21	24	22
22:00	13	16	21	18	29	15	15	19	18
23:00	7	9	12	14	17	20	10	12	13
Total	**1051**	**1047**	**1070**	**1329**	**1440**	**946**	**1277**	**1187**	**1166**
% Heavies	**25.9%**	**30.9%**	**31.6%**	**25.7%**	**19.7%**	**12.1%**	**12.2%**	**26.2%**	**22.4%**



Road	Dudauman Road
Location	
Suburb	Stockinbingal
Site No.	837304
Start Date	Tuesday 28/08/2018
Direction	Two ways

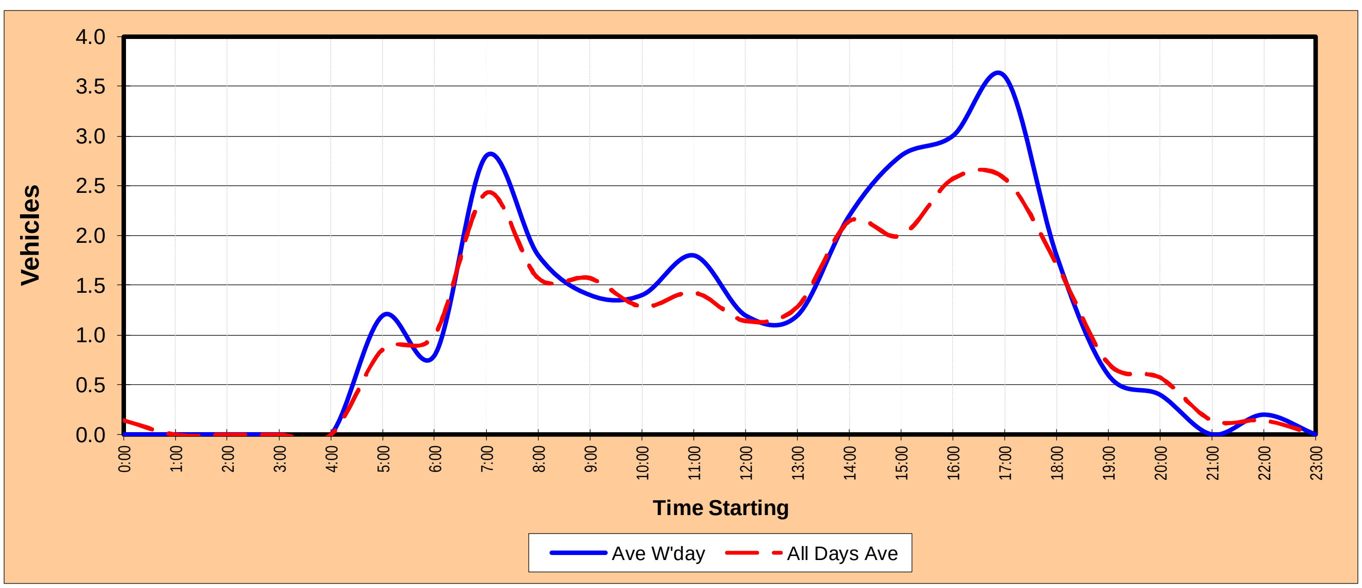
Average Weekday	83
All Day Average	83
Weekday Heavy's	33.9%
All Day Heavy's	33.9%

Starting Time	Day of Week Mon	Tue 28-Aug	Wed 29-Aug	Thu 30-Aug	Fri	Sat	Sun	Ave W'day	All Days Ave
AM Peak		9	9	11					
PM Peak		10	12	10					
0:00		0	0	0				0	0
1:00		0	0	0				0	0
2:00		0	0	0				0	0
3:00		0	0	0				0	0
4:00		1	0	1				1	1
5:00		1	1	1				1	1
6:00		4	3	1				3	3
7:00		8	7	8				8	8
8:00		9	9	4				7	7
9:00		6	4	11				7	7
10:00		8	4	3				5	5
11:00		7	6	10				8	8
12:00		6	3	4				4	4
13:00		2	3	4				3	3
14:00		4	4	6				5	5
15:00		10	5	7				7	7
16:00		5	5	10				7	7
17:00		10	12	9				10	10
18:00		4	3	0				2	2
19:00		2	2	1				2	2
20:00		2	1	2				2	2
21:00		2	1	1				1	1
22:00		1	0	0				0	0
23:00		0	0	0				0	0
Total		92	73	83				83	83
% Heavies		34.8%	31.5%	34.9%				33.9%	33.9%



Road	Corbys Ln				
Location	West Of Dudauman Rd		Average Weekday	28	
Suburb	Stockinbingal		All Day Average	25	
Site No.	8524_3		Weekday Heavy's	25.5%	
Start Date	Monday 18/02/2019		All Day Heavy's	29.4%	
Direction	Two ways				

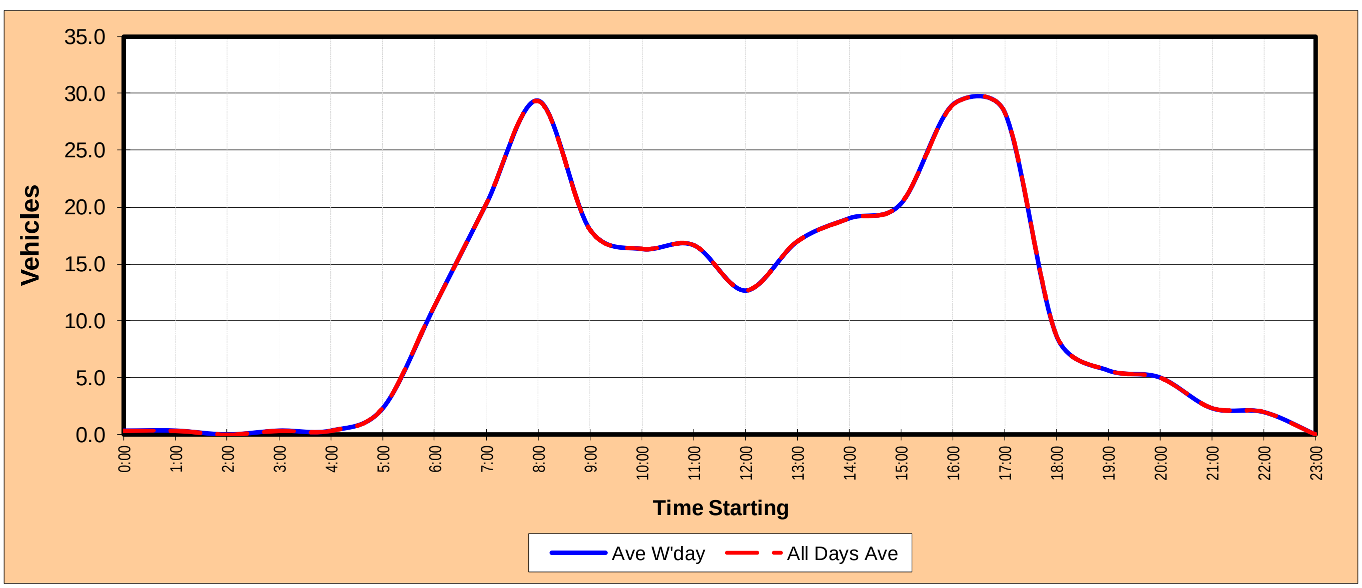
Starting Time	Day of Week							Ave W'day	All Days Ave
	Mon 18-Feb	Tue 19-Feb	Wed 20-Feb	Thu 21-Feb	Fri 22-Feb	Sat 23-Feb	Sun 24-Feb		
AM Peak	2	3	5	4	5	4	2		
PM Peak	6	5	5	3	8	3	2		
0:00	0	0	0	0	0	0	1	0	0
1:00	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	0	0	0
4:00	0	0	0	0	0	0	0	0	0
5:00	1	1	1	2	1	0	0	1	1
6:00	0	0	1	1	2	1	2	1	1
7:00	2	3	3	4	2	2	1	3	2
8:00	1	1	2	0	5	1	1	2	2
9:00	1	1	2	1	2	4	0	1	2
10:00	0	1	2	3	1	1	1	1	1
11:00	0	1	5	1	2	0	1	2	1
12:00	1	1	1	2	1	2	0	1	1
13:00	0	1	5	0	0	1	2	1	1
14:00	6	0	3	1	1	2	2	2	2
15:00	2	2	1	1	8	0	0	3	2
16:00	5	5	2	1	2	3	0	3	3
17:00	4	0	5	3	6	0	0	4	3
18:00	3	1	0	3	2	2	1	2	2
19:00	0	1	1	0	1	2	0	1	1
20:00	0	0	0	2	0	1	1	0	1
21:00	0	0	0	0	0	1	0	0	0
22:00	0	0	0	0	1	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0
Total	**26**	**19**	**34**	**25**	**37**	**23**	**13**	**28**	**25**
% Heavies	**19.2%**	**26.3%**	**23.5%**	**20.0%**	**35.1%**	**56.5%**	**23.1%**	**25.5%**	**29.4%**



austraffic

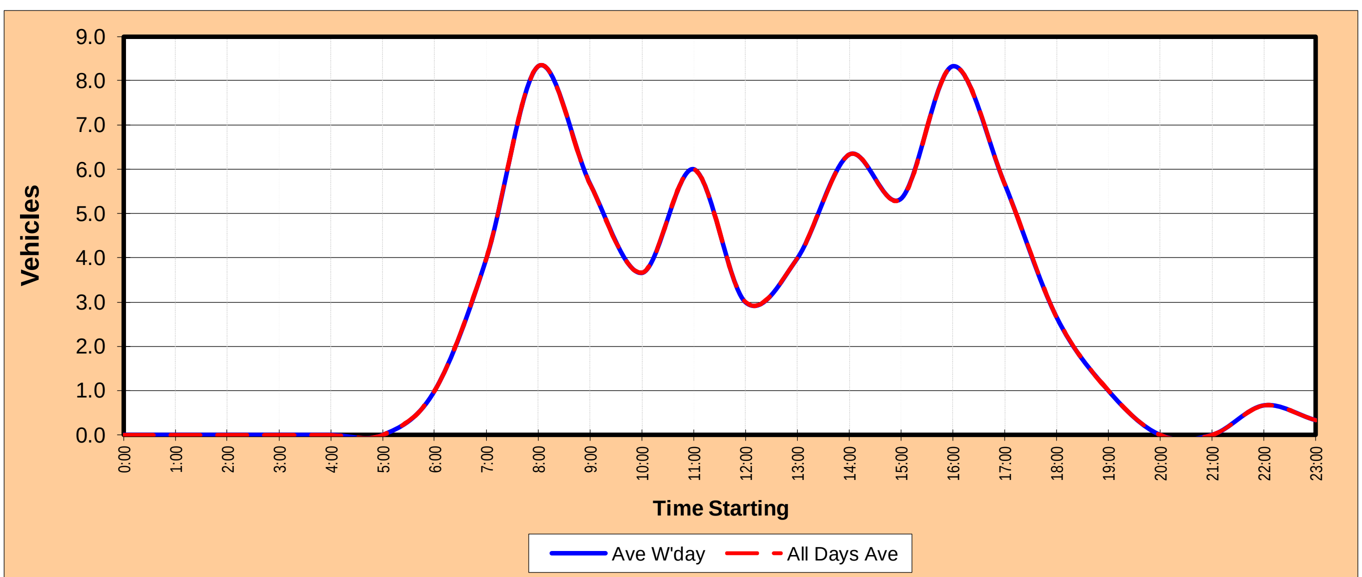
Road	Old Cootamundra Road		
Location	Near Dudauman Road	Average Weekday	266
Suburb	Cootamundra	All Day Average	266
Site No.	837303	Weekday Heavy's	25.8%
Start Date	Tuesday 28/08/2018	All Day Heavy's	25.8%
Direction	Two ways		

Starting Time	Day of Week							Ave W'day	All Days Ave
	Mon	Tue 28-Aug	Wed 29-Aug	Thu 30-Aug	Fri	Sat	Sun		
AM Peak		**26**	**32**	**30**					
PM Peak		**28**	**30**	**31**					
0:00		0	0	1				0	0
1:00		0	1	0				0	0
2:00		0	0	0				0	0
3:00		0	1	0				0	0
4:00		0	0	1				0	0
5:00		3	3	1				2	2
6:00		11	10	13				11	11
7:00		16	25	20				20	20
8:00		26	32	30				29	29
9:00		15	19	20				18	18
10:00		16	14	19				16	16
11:00		14	12	24				17	17
12:00		13	16	9				13	13
13:00		16	17	18				17	17
14:00		19	17	21				19	19
15:00		19	19	23				20	20
16:00		28	28	31				29	29
17:00		28	30	27				28	28
18:00		9	11	6				9	9
19:00		5	11	1				6	6
20:00		6	4	5				5	5
21:00		2	2	3				2	2
22:00		1	3	2				2	2
23:00		0	0	0				0	0
Total		**247**	**275**	**275**				**266**	**266**
% Heavies		**27.1%**	**23.6%**	**26.9%**				**25.8%**	**25.8%**



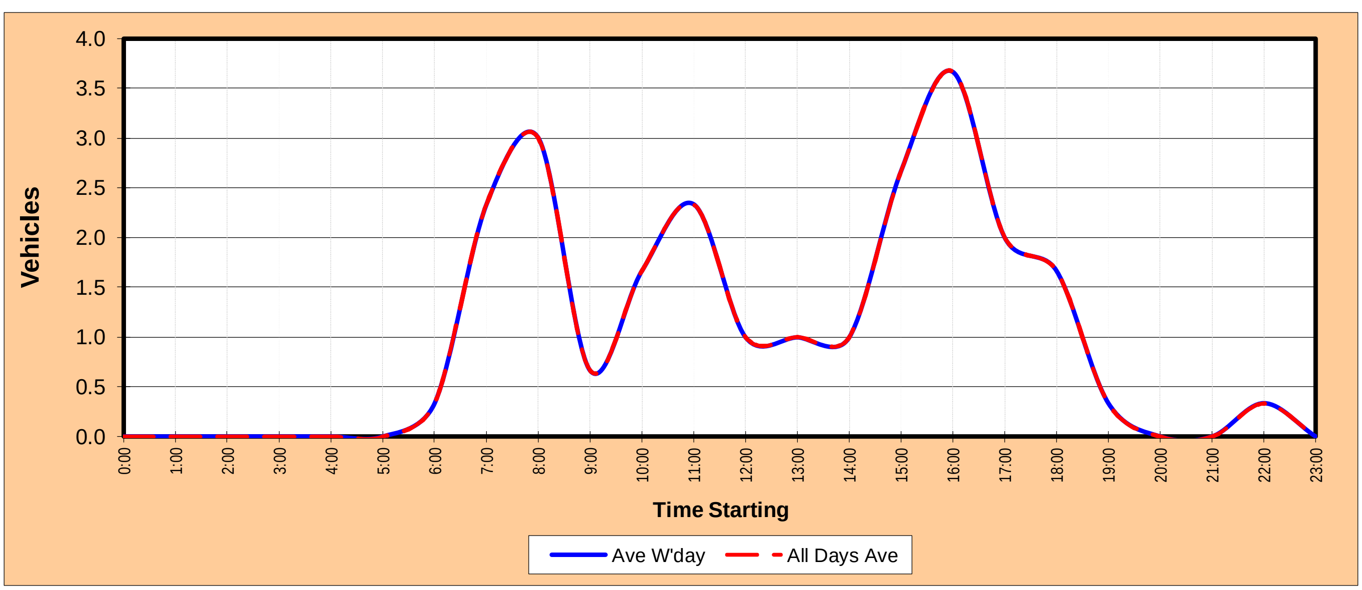
Road	Dirnaseer Road			
Location	East of Ironbong Road		Average Weekday	66
Suburb	Bethungra		All Day Average	66
Site No.	837305		Weekday Heavy's	15.2%
Start Date	Tuesday 28/08/2018		All Day Heavy's	15.2%
Direction	Two ways			

Starting Time	**Mon**	**Tue 28-Aug**	**Wed 29-Aug**	**Thu 30-Aug**	**Fri**	**Sat**	**Sun**	**Ave W'day**	**All Days Ave**
	Day of Week								
AM Peak		**8**	**9**	**12**					
PM Peak		**10**	**9**	**7**					
0:00		0	0	0				0	0
1:00		0	0	0				0	0
2:00		0	0	0				0	0
3:00		0	0	0				0	0
4:00		0	0	0				0	0
5:00		0	0	0				0	0
6:00		0	1	2				1	1
7:00		5	2	5				4	4
8:00		4	9	12				8	8
9:00		2	6	9				6	6
10:00		4	3	4				4	4
11:00		8	5	5				6	6
12:00		1	3	5				3	3
13:00		5	5	2				4	4
14:00		5	8	6				6	6
15:00		5	4	7				5	5
16:00		10	9	6				8	8
17:00		5	7	5				6	6
18:00		1	3	4				3	3
19:00		0	3	0				1	1
20:00		0	0	0				0	0
21:00		0	0	0				0	0
22:00		1	1	0				1	1
23:00		0	0	1				0	0
Total		**56**	**69**	**73**				**66**	**66**
% Heavies		**14.3%**	**17.4%**	**13.7%**				**15.2%**	**15.2%**



Road	Ironbong Road		
Location		Average Weekday	24
Suburb	Bethungra	All Day Average	24
Site No.	837306	Weekday Heavy's	26.4%
Start Date	Tuesday 28/08/2018	All Day Heavy's	26.4%
Direction	Two ways		

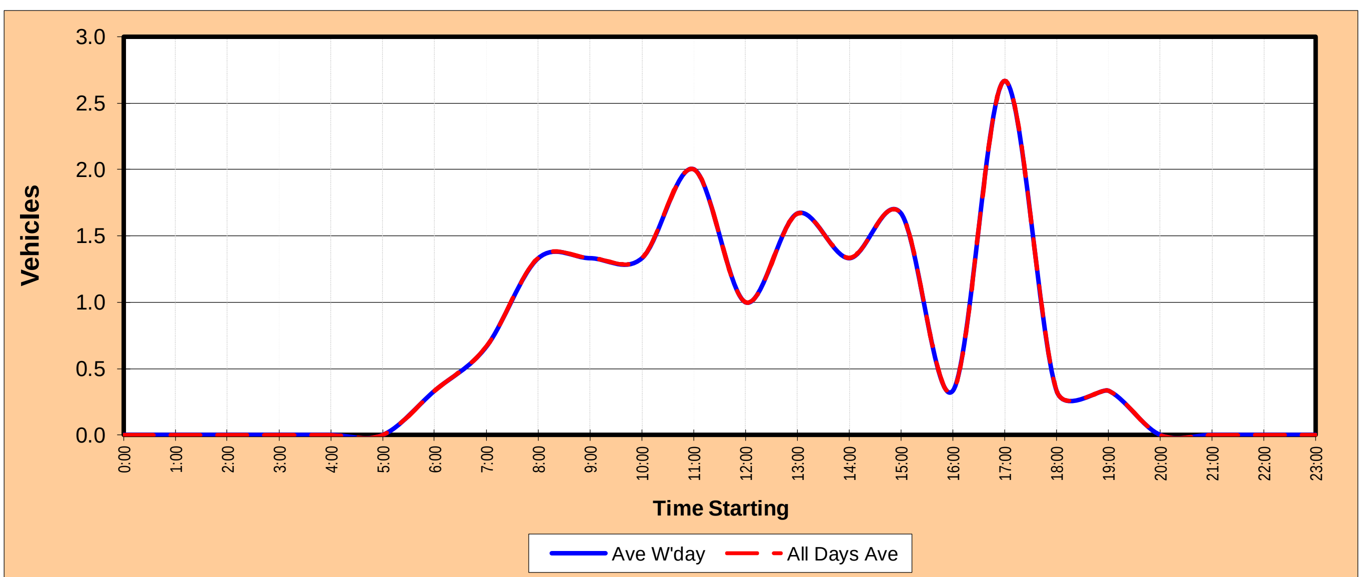
Starting Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Ave W'day	All Days Ave
		28-Aug	29-Aug	30-Aug					
AM Peak		**4**	**2**	**6**					
PM Peak		**4**	**5**	**4**					
0:00		0	0	0				0	0
1:00		0	0	0				0	0
2:00		0	0	0				0	0
3:00		0	0	0				0	0
4:00		0	0	0				0	0
5:00		0	0	0				0	0
6:00		0	1	0				0	0
7:00		3	1	3				2	2
8:00		1	2	6				3	3
9:00		0	1	1				1	1
10:00		3	0	2				2	2
11:00		4	1	2				2	2
12:00		0	1	2				1	1
13:00		1	2	0				1	1
14:00		2	0	1				1	1
15:00		2	2	4				3	3
16:00		4	5	2				4	4
17:00		3	1	2				2	2
18:00		0	2	3				2	2
19:00		0	1	0				0	0
20:00		0	0	0				0	0
21:00		0	0	0				0	0
22:00		0	1	0				0	0
23:00		0	0	0				0	0
Total		**23**	**21**	**28**				**24**	**24**
% Heavies		**30.4%**	**33.3%**	**17.9%**				**26.4%**	**26.4%**



Road	Old Sydney Road
Location	Maybe 500m west of Baylis Street
Suburb	Bethungra
Site No.	837307
Start Date	Tuesday 28/08/2018
Direction	Two ways

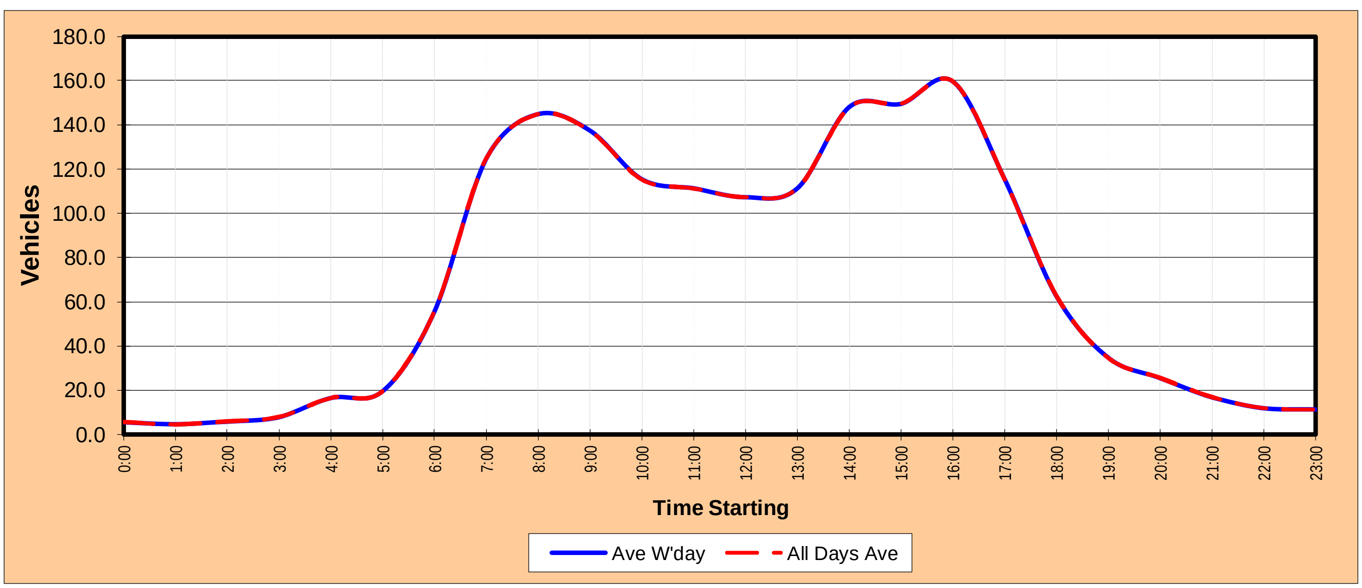
Average Weekday	16
All Day Average	16
Weekday Heavy's	12.2%
All Day Heavy's	12.2%

Starting Time	Day of Week							Ave W'day	All Days Ave
	Mon	Tue 28-Aug	Wed 29-Aug	Thu 30-Aug	Fri	Sat	Sun		
AM Peak		3	2	2					
PM Peak		2	5	3					
0:00		0	0	0				0	0
1:00		0	0	0				0	0
2:00		0	0	0				0	0
3:00		0	0	0				0	0
4:00		0	0	0				0	0
5:00		0	0	0				0	0
6:00		1	0	0				0	0
7:00		0	0	2				1	1
8:00		0	2	2				1	1
9:00		2	2	0				1	1
10:00		2	1	1				1	1
11:00		3	2	1				2	2
12:00		1	1	1				1	1
13:00		2	1	2				2	2
14:00		2	1	1				1	1
15:00		1	1	3				2	2
16:00		0	0	1				0	0
17:00		0	5	3				3	3
18:00		0	1	0				0	0
19:00		0	1	0				0	0
20:00		0	0	0				0	0
21:00		0	0	0				0	0
22:00		0	0	0				0	0
23:00		0	0	0				0	0
Total		**14**	**18**	**17**				**16**	**16**
% Heavies		**14.3%**	**5.6%**	**17.6%**				**12.2%**	**12.2%**



Road	Olympic Highway	Average Weekday	1705
Location	West of Bethungra	All Day Average	1705
Suburb	Bethungra	Weekday Heavy's	21.2%
Site No.	837308	All Day Heavy's	21.2%
Start Date	Tuesday 28/08/2018		
Direction	Two ways		

Starting Time	Mon	Tue 28-Aug	Wed 29-Aug	Thu 30-Aug	Fri	Sat	Sun	Ave W'day	All Days Ave
	Day of Week								
AM Peak		**171**	**132**	**152**					
PM Peak		**155**	**150**	**194**					
0:00		7	5	5				6	6
1:00		7	3	4				5	5
2:00		6	6	6				6	6
3:00		9	7	8				8	8
4:00		19	13	18				17	17
5:00		19	19	21				20	20
6:00		58	54	56				56	56
7:00		117	119	139				125	125
8:00		171	116	148				145	145
9:00		128	132	152				137	137
10:00		106	125	115				115	115
11:00		115	106	113				111	111
12:00		118	97	107				107	107
13:00		111	122	101				111	111
14:00		114	136	194				148	148
15:00		155	144	150				150	150
16:00		136	150	193				160	160
17:00		106	119	121				115	115
18:00		46	69	73				63	63
19:00		32	38	34				35	35
20:00		20	31	26				26	26
21:00		17	12	22				17	17
22:00		9	8	19				12	12
23:00		11	10	13				11	11
Total		**1637**	**1641**	**1838**				**1705**	**1705**
% Heavies		**21.0%**	**22.4%**	**20.4%**				**21.2%**	**21.2%**



TECHNICAL REPORT 3

Traffic, Transport and Access Impact Assessment

Appendix C SIDRA results

ILLABO TO STOCKINBINGAL ENVIRONMENTAL IMPACT STATEMENT

MOVEMENT SUMMARY

Site: A [2024 AM Peak]

Olympic Highway/ Goldfields Way
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Olympic Highway (S)												
1	L2	1	0.0	0.050	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	58.3
2	T1	84	21.3	0.050	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.9
3	R2	84	21.3	0.079	6.7	LOS A	0.3	2.6	0.31	0.58	0.31	51.8
Approach		169	21.1	0.079	3.4	NA	0.3	2.6	0.15	0.29	0.15	55.6
East: Olympic Highway (E)												
4	L2	84	21.3	0.077	6.2	LOS A	0.3	2.3	0.20	0.55	0.20	52.1
5	T1	1	0.0	0.160	7.4	LOS A	0.6	5.3	0.51	0.73	0.51	51.0
6	R2	84	21.3	0.160	9.9	LOS A	0.6	5.3	0.51	0.73	0.51	49.6
Approach		169	21.1	0.160	8.0	LOS A	0.6	5.3	0.36	0.64	0.36	50.8
North: Goldfields Way (N)												
7	L2	84	21.3	0.052	5.8	LOS A	0.0	0.0	0.00	0.57	0.00	52.7
8	T1	84	21.3	0.050	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	59.9
9	R2	1	0.0	0.050	5.8	LOS A	0.0	0.1	0.01	0.01	0.01	58.0
Approach		169	21.1	0.052	2.9	NA	0.0	0.1	0.00	0.29	0.00	56.1
West: Talbingo Lane												
10	L2	1	0.0	0.004	5.8	LOS A	0.0	0.1	0.31	0.54	0.31	52.3
11	T1	1	0.0	0.004	7.4	LOS A	0.0	0.1	0.31	0.54	0.31	52.7
12	R2	1	0.0	0.004	8.7	LOS A	0.0	0.1	0.31	0.54	0.31	52.0
Approach		3	0.0	0.004	7.3	LOS A	0.0	0.1	0.31	0.54	0.31	52.3
All Vehicles		512	21.0	0.160	4.8	NA	0.6	5.3	0.17	0.41	0.17	54.0

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

MOVEMENT SUMMARY

Site: A [2024 AM Peak + Construction Vehicles]

Olympic Highway/ Goldfields Way
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Olympic Highway (S)												
1	L2	1	0.0	0.141	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	58.3
2	T1	216	40.5	0.141	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	173	37.2	0.219	8.6	LOS A	0.9	8.7	0.50	0.71	0.50	50.1
Approach		389	38.9	0.219	3.9	NA	0.9	8.7	0.22	0.32	0.22	55.1
East: Olympic Highway (E)												
4	L2	131	49.2	0.154	7.5	LOS A	0.6	5.9	0.35	0.61	0.35	50.6
5	T1	1	0.0	0.717	29.2	LOS C	4.5	41.3	0.91	1.25	1.86	35.8
6	R2	148	38.3	0.717	40.5	LOS C	4.5	41.3	0.91	1.25	1.86	34.8
Approach		280	43.2	0.717	25.1	LOS B	4.5	41.3	0.65	0.95	1.16	40.7
North: Goldfields Way (N)												
7	L2	140	40.6	0.097	6.0	LOS A	0.0	0.0	0.00	0.57	0.00	51.9
8	T1	154	56.8	0.109	0.0	LOS A	0.0	0.1	0.01	0.00	0.01	59.9
9	R2	1	0.0	0.109	6.4	LOS A	0.0	0.1	0.01	0.00	0.01	58.0
Approach		295	48.9	0.109	2.9	NA	0.0	0.1	0.00	0.27	0.00	55.8
West: Talbingo Lane												
10	L2	1	0.0	0.008	6.5	LOS A	0.0	0.2	0.56	0.66	0.56	48.8
11	T1	1	0.0	0.008	13.8	LOS A	0.0	0.2	0.56	0.66	0.56	49.2
12	R2	1	0.0	0.008	16.7	LOS B	0.0	0.2	0.56	0.66	0.56	48.6
Approach		3	0.0	0.008	12.3	LOS A	0.0	0.2	0.56	0.66	0.56	48.8
All Vehicles		967	43.1	0.717	9.7	NA	4.5	41.3	0.28	0.49	0.43	50.2

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

MOVEMENT SUMMARY

Site: A [2024 PM Peak]

Olympic Highway/ Goldfields Way
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Olympic Highway (S)												
1	L2	1	0.0	0.050	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	58.3
2	T1	84	21.3	0.050	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.9
3	R2	84	21.3	0.079	6.7	LOS A	0.3	2.6	0.31	0.58	0.31	51.8
Approach		169	21.1	0.079	3.4	NA	0.3	2.6	0.15	0.29	0.15	55.6
East: Olympic Highway (E)												
4	L2	84	21.3	0.077	6.2	LOS A	0.3	2.3	0.20	0.55	0.20	52.1
5	T1	1	0.0	0.160	7.4	LOS A	0.6	5.3	0.51	0.73	0.51	51.0
6	R2	84	21.3	0.160	9.9	LOS A	0.6	5.3	0.51	0.73	0.51	49.6
Approach		169	21.1	0.160	8.0	LOS A	0.6	5.3	0.36	0.64	0.36	50.8
North: Goldfields Way (N)												
7	L2	84	21.3	0.052	5.8	LOS A	0.0	0.0	0.00	0.57	0.00	52.7
8	T1	84	21.3	0.050	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	59.9
9	R2	1	0.0	0.050	5.8	LOS A	0.0	0.1	0.01	0.01	0.01	58.0
Approach		169	21.1	0.052	2.9	NA	0.0	0.1	0.00	0.29	0.00	56.1
West: Talbingo Lane												
10	L2	1	0.0	0.004	5.8	LOS A	0.0	0.1	0.31	0.54	0.31	52.3
11	T1	1	0.0	0.004	7.4	LOS A	0.0	0.1	0.31	0.54	0.31	52.7
12	R2	1	0.0	0.004	8.7	LOS A	0.0	0.1	0.31	0.54	0.31	52.0
Approach		3	0.0	0.004	7.3	LOS A	0.0	0.1	0.31	0.54	0.31	52.3
All Vehicles		512	21.0	0.160	4.8	NA	0.6	5.3	0.17	0.41	0.17	54.0

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

MOVEMENT SUMMARY

Site: A [2024 PM Peak + Construction Vehicles]

Olympic Highway/ Goldfields Way
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Olympic Highway (S)												
1	L2	1	0.0	0.109	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	58.3
2	T1	154	56.8	0.109	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	131	49.2	0.198	9.8	LOS A	0.8	8.1	0.55	0.76	0.55	49.0
Approach		285	53.1	0.198	4.5	NA	0.8	8.1	0.25	0.35	0.25	54.4
East: Olympic Highway (E)												
4	L2	173	37.2	0.208	7.8	LOS A	0.8	7.6	0.41	0.66	0.41	50.7
5	T1	1	0.0	0.645	24.0	LOS B	3.7	34.8	0.88	1.18	1.61	37.9
6	R2	140	40.6	0.645	34.8	LOS C	3.7	34.8	0.88	1.18	1.61	36.7
Approach		314	38.6	0.645	19.9	LOS B	3.7	34.8	0.62	0.89	0.95	43.3
North: Goldfields Way (N)												
7	L2	148	38.3	0.102	6.0	LOS A	0.0	0.0	0.00	0.57	0.00	52.0
8	T1	216	40.5	0.140	0.0	LOS A	0.0	0.1	0.00	0.00	0.00	59.9
9	R2	1	0.0	0.140	6.2	LOS A	0.0	0.1	0.00	0.00	0.00	58.0
Approach		365	39.5	0.140	2.5	NA	0.0	0.1	0.00	0.23	0.00	56.4
West: Talbingo Lane												
10	L2	1	0.0	0.008	6.2	LOS A	0.0	0.2	0.53	0.64	0.53	49.0
11	T1	1	0.0	0.008	13.2	LOS A	0.0	0.2	0.53	0.64	0.53	49.3
12	R2	1	0.0	0.008	16.7	LOS B	0.0	0.2	0.53	0.64	0.53	48.8
Approach		3	0.0	0.008	12.0	LOS A	0.0	0.2	0.53	0.64	0.53	49.0
All Vehicles		967	43.1	0.645	8.7	NA	3.7	34.8	0.28	0.48	0.38	50.8

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

MOVEMENT SUMMARY

Site: B [2024 AM Peak]

Olympic Highway / Dirnaseer Road
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Olympic Highway (E)												
5	T1	84	21.3	0.040	0.0	LOS A	0.0	0.2	0.02	0.02	0.02	59.7
6	R2	3	0.0	0.040	5.8	LOS A	0.0	0.2	0.02	0.03	0.02	57.4
Approach		87	20.5	0.040	0.2	NA	0.0	0.2	0.02	0.02	0.02	59.6
North: Dirnaseer Road (N)												
7	L2	3	0.0	0.006	5.9	LOS A	0.0	0.2	0.23	0.54	0.23	52.9
9	R2	3	0.0	0.006	6.6	LOS A	0.0	0.2	0.23	0.54	0.23	52.7
Approach		6	0.0	0.006	6.2	LOS A	0.0	0.2	0.23	0.54	0.23	52.8
West: Olympic Highway (W)												
10	L2	3	0.0	0.002	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	53.6
11	T1	84	21.3	0.049	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		87	20.5	0.049	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
All Vehicles		181	19.8	0.049	0.4	NA	0.0	0.2	0.02	0.04	0.02	59.4

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

MOVEMENT SUMMARY

Site: B [2024 AM Peak + Construction Vehicles]

Olympic Highway / Dirnaseer Road
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Olympic Highway (E)												
5	T1	292	30.0	0.249	0.6	LOS A	1.3	11.2	0.19	0.17	0.19	57.9
6	R2	141	32.8	0.249	7.3	LOS A	1.3	11.2	0.33	0.29	0.33	52.9
Approach		433	30.9	0.249	2.8	NA	1.3	11.2	0.24	0.21	0.24	56.2
North: Dirnaseer Road (N)												
7	L2	49	93.6	0.080	8.4	LOS A	0.3	3.5	0.37	0.67	0.37	48.5
9	R2	3	0.0	0.080	12.7	LOS A	0.3	3.5	0.37	0.67	0.37	51.8
Approach		53	88.0	0.080	8.7	LOS A	0.3	3.5	0.37	0.67	0.37	48.6
West: Olympic Highway (W)												
10	L2	3	0.0	0.002	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	53.6
11	T1	154	56.8	0.108	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		157	55.7	0.108	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
All Vehicles		642	41.6	0.249	2.6	NA	1.3	11.2	0.19	0.20	0.19	56.3

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

MOVEMENT SUMMARY

Site: B [2024 PM Peak]

Olympic Highway / Dirnaseer Road
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Olympic Highway (E)												
5	T1	84	21.3	0.040	0.0	LOS A	0.0	0.2	0.02	0.02	0.02	59.7
6	R2	3	0.0	0.040	5.8	LOS A	0.0	0.2	0.02	0.03	0.02	57.4
Approach		87	20.5	0.040	0.2	NA	0.0	0.2	0.02	0.02	0.02	59.6
North: Dirnaseer Road (N)												
7	L2	3	0.0	0.006	5.9	LOS A	0.0	0.2	0.23	0.54	0.23	52.9
9	R2	3	0.0	0.006	6.6	LOS A	0.0	0.2	0.23	0.54	0.23	52.7
Approach		6	0.0	0.006	6.2	LOS A	0.0	0.2	0.23	0.54	0.23	52.8
West: Olympic Highway (W)												
10	L2	3	0.0	0.002	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	53.6
11	T1	84	21.3	0.049	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		87	20.5	0.049	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
All Vehicles		181	19.8	0.049	0.4	NA	0.0	0.2	0.02	0.04	0.02	59.4

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

MOVEMENT SUMMARY

▽ Site: B [2024 PM Peak + Construction Vehicles]

Olympic Highway / Dirnaseer Road
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Olympic Highway (E)												
5	T1	154	56.8	0.152	1.5	LOS A	0.8	8.6	0.24	0.09	0.24	58.0
6	R2	49	93.6	0.152	10.6	LOS A	0.8	8.6	0.42	0.15	0.42	50.5
Approach		203	65.8	0.152	3.7	NA	0.8	8.6	0.28	0.11	0.28	56.0
North: Dirnaseer Road (N)												
7	L2	141	32.8	0.190	8.3	LOS A	0.7	6.5	0.46	0.70	0.46	50.5
9	R2	3	0.0	0.190	11.9	LOS A	0.7	6.5	0.46	0.70	0.46	51.5
Approach		144	32.1	0.190	8.4	LOS A	0.7	6.5	0.46	0.70	0.46	50.5
West: Olympic Highway (W)												
10	L2	3	0.0	0.002	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	53.6
11	T1	292	30.0	0.179	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		295	29.6	0.179	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.9
All Vehicles		642	41.6	0.190	3.1	NA	0.8	8.6	0.19	0.19	0.19	56.3

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

MOVEMENT SUMMARY

Site: C [2024 AM Peak]

Old Cootamundra Road / Dudauman Road
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Old Cootamundra Road (E)												
5	T1	13	25.0	0.010	0.0	LOS A	0.0	0.2	0.04	0.15	0.04	58.5
6	R2	4	25.0	0.010	5.8	LOS A	0.0	0.2	0.04	0.15	0.04	55.1
Approach		17	25.0	0.010	1.5	NA	0.0	0.2	0.04	0.15	0.04	57.6
North: Dudauman Road (N)												
7	L2	4	25.0	0.007	5.9	LOS A	0.0	0.2	0.07	0.56	0.07	52.4
9	R2	4	25.0	0.007	5.9	LOS A	0.0	0.2	0.07	0.56	0.07	51.8
Approach		8	25.0	0.007	5.9	LOS A	0.0	0.2	0.07	0.56	0.07	52.1
West: Old Cootamundra Road (W)												
10	L2	4	25.0	0.010	5.8	LOS A	0.0	0.0	0.00	0.15	0.00	55.9
11	T1	13	25.0	0.010	0.0	LOS A	0.0	0.0	0.00	0.15	0.00	58.7
Approach		17	25.0	0.010	1.5	NA	0.0	0.0	0.00	0.15	0.00	57.9
All Vehicles		42	25.0	0.010	2.3	NA	0.0	0.2	0.03	0.23	0.03	56.5

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

MOVEMENT SUMMARY

Site: C [2024 AM Peak + Construction Vehicles]

Old Cootamundra Road / Dudauman Road
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Old Cootamundra Road (E)												
5	T1	76	87.5	0.130	1.1	LOS A	0.6	6.3	0.38	0.41	0.38	54.7
6	R2	81	40.3	0.130	7.4	LOS A	0.6	6.3	0.38	0.41	0.38	51.0
Approach		157	63.1	0.130	4.4	NA	0.6	6.3	0.38	0.41	0.38	52.7
North: Dudauman Road (N)												
7	L2	36	91.2	0.248	7.4	LOS A	0.9	11.9	0.41	0.67	0.41	47.6
9	R2	106	97.0	0.248	11.2	LOS A	0.9	11.9	0.41	0.67	0.41	46.8
Approach		142	95.6	0.248	10.2	LOS A	0.9	11.9	0.41	0.67	0.41	47.0
West: Old Cootamundra Road (W)												
10	L2	115	89.9	0.162	6.6	LOS A	0.0	0.0	0.00	0.34	0.00	51.7
11	T1	76	87.5	0.162	0.0	LOS A	0.0	0.0	0.00	0.34	0.00	57.1
Approach		191	89.0	0.162	4.0	NA	0.0	0.0	0.00	0.34	0.00	53.7
All Vehicles		489	82.6	0.248	5.9	NA	0.9	11.9	0.24	0.46	0.24	51.3

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

MOVEMENT SUMMARY

Site: C [2024 PM Peak]

Old Cootamundra Road / Dudauman Road
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Old Cootamundra Road (E)												
5	T1	13	25.0	0.010	0.0	LOS A	0.0	0.2	0.04	0.15	0.04	58.5
6	R2	4	25.0	0.010	5.8	LOS A	0.0	0.2	0.04	0.15	0.04	55.1
Approach		17	25.0	0.010	1.5	NA	0.0	0.2	0.04	0.15	0.04	57.6
North: Dudauman Road (N)												
7	L2	4	25.0	0.007	5.9	LOS A	0.0	0.2	0.07	0.56	0.07	52.4
9	R2	4	25.0	0.007	5.9	LOS A	0.0	0.2	0.07	0.56	0.07	51.8
Approach		8	25.0	0.007	5.9	LOS A	0.0	0.2	0.07	0.56	0.07	52.1
West: Old Cootamundra Road (W)												
10	L2	4	25.0	0.010	5.8	LOS A	0.0	0.0	0.00	0.15	0.00	55.9
11	T1	13	25.0	0.010	0.0	LOS A	0.0	0.0	0.00	0.15	0.00	58.7
Approach		17	25.0	0.010	1.5	NA	0.0	0.0	0.00	0.15	0.00	57.9
All Vehicles		42	25.0	0.010	2.3	NA	0.0	0.2	0.03	0.23	0.03	56.5

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

MOVEMENT SUMMARY

Site: C [2024 PM Peak + Construction Vehicles]

Old Cootamundra Road / Dudauman Road
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Old Cootamundra Road (E)												
5	T1	76	87.5	0.105	1.1	LOS A	0.4	4.9	0.31	0.19	0.31	57.4
6	R2	36	91.2	0.105	8.7	LOS A	0.4	4.9	0.31	0.19	0.31	51.1
Approach		112	88.7	0.105	3.5	NA	0.4	4.9	0.31	0.19	0.31	55.2
North: Dudauman Road (N)												
7	L2	81	40.3	0.271	6.6	LOS A	1.1	12.1	0.34	0.60	0.34	50.2
9	R2	115	89.9	0.271	10.3	LOS A	1.1	12.1	0.34	0.60	0.34	47.7
Approach		196	69.4	0.271	8.8	LOS A	1.1	12.1	0.34	0.60	0.34	48.7
West: Old Cootamundra Road (W)												
10	L2	106	97.0	0.158	6.7	LOS A	0.0	0.0	0.00	0.33	0.00	52.7
11	T1	76	87.5	0.158	0.0	LOS A	0.0	0.0	0.00	0.33	0.00	58.6
Approach		182	93.1	0.158	3.9	NA	0.0	0.0	0.00	0.33	0.00	55.0
All Vehicles		489	82.6	0.271	5.8	NA	1.1	12.1	0.21	0.40	0.21	52.3

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

MOVEMENT SUMMARY

Site: D [2024 AM Peak - 2.1]

Hibernia Street / Dudauman Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Dudauman Street (S)												
1	L2	4	25.0	0.012	6.0	LOS A	0.0	0.4	0.19	0.54	0.19	52.4
2	T1	4	25.0	0.012	5.0	LOS A	0.0	0.4	0.19	0.54	0.19	52.7
3	R2	4	25.0	0.012	6.6	LOS A	0.0	0.4	0.19	0.54	0.19	51.8
Approach		13	25.0	0.012	5.9	LOS A	0.0	0.4	0.19	0.54	0.19	52.3
East: Hibernia Street (E)												
4	L2	4	25.0	0.040	6.0	LOS A	0.0	0.3	0.03	0.07	0.03	56.4
5	T1	58	25.5	0.040	0.0	LOS A	0.0	0.3	0.03	0.07	0.03	59.2
6	R2	4	25.0	0.040	6.0	LOS A	0.0	0.3	0.03	0.07	0.03	55.7
Approach		66	25.4	0.040	0.8	NA	0.0	0.3	0.03	0.07	0.03	58.8
North: Dudauman Street (N)												
7	L2	4	25.0	0.012	6.0	LOS A	0.0	0.4	0.19	0.54	0.19	52.4
8	T1	4	25.0	0.012	5.0	LOS A	0.0	0.4	0.19	0.54	0.19	52.7
9	R2	4	25.0	0.012	6.6	LOS A	0.0	0.4	0.19	0.54	0.19	51.8
Approach		13	25.0	0.012	5.9	LOS A	0.0	0.4	0.19	0.54	0.19	52.3
West: Hibernia Street (W)												
10	L2	4	25.0	0.040	6.0	LOS A	0.0	0.3	0.03	0.07	0.03	56.4
11	T1	58	25.5	0.040	0.0	LOS A	0.0	0.3	0.03	0.07	0.03	59.2
12	R2	4	25.0	0.040	6.0	LOS A	0.0	0.3	0.03	0.07	0.03	55.7
Approach		66	25.4	0.040	0.8	NA	0.0	0.3	0.03	0.07	0.03	58.8
All Vehicles		158	25.3	0.040	1.6	NA	0.0	0.4	0.06	0.15	0.06	57.6

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

MOVEMENT SUMMARY

Site: D [2024 AM Peak + construction vehicles - 2.1]

Hibernia Street / Dudauman Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Dudauman Street (S)												
1	L2	79	88.0	0.503	9.4	LOS A	3.2	36.0	0.46	0.83	0.70	45.3
2	T1	86	84.1	0.503	13.7	LOS A	3.2	36.0	0.46	0.83	0.70	45.9
3	R2	94	51.7	0.503	17.8	LOS B	3.2	36.0	0.46	0.83	0.70	45.9
Approach		259	73.6	0.503	13.9	LOS A	3.2	36.0	0.46	0.83	0.70	45.7
East: Hibernia Street (E)												
4	L2	186	26.0	0.229	5.9	LOS A	0.8	7.1	0.11	0.41	0.11	53.1
5	T1	78	40.5	0.229	0.2	LOS A	0.8	7.1	0.11	0.41	0.11	55.6
6	R2	81	40.3	0.229	6.2	LOS A	0.8	7.1	0.11	0.41	0.11	51.8
Approach		345	32.6	0.229	4.7	NA	0.8	7.1	0.11	0.41	0.11	53.3
North: Dudauman Street (N)												
7	L2	36	91.2	0.241	6.9	LOS A	0.9	11.5	0.29	0.62	0.29	46.8
8	T1	78	93.2	0.241	13.2	LOS A	0.9	11.5	0.29	0.62	0.29	47.3
9	R2	1	0.0	0.241	9.5	LOS A	0.9	11.5	0.29	0.62	0.29	49.6
Approach		115	91.7	0.241	11.2	LOS A	0.9	11.5	0.29	0.62	0.29	47.2
West: Hibernia Street (W)												
10	L2	1	0.0	0.120	8.2	LOS A	0.6	7.6	0.49	0.34	0.49	53.1
11	T1	33	96.8	0.120	2.5	LOS A	0.6	7.6	0.49	0.34	0.49	54.4
12	R2	71	98.5	0.120	9.3	LOS A	0.6	7.6	0.49	0.34	0.49	48.5
Approach		104	97.0	0.120	7.1	NA	0.6	7.6	0.49	0.34	0.49	50.2
All Vehicles		823	61.9	0.503	8.8	NA	3.2	36.0	0.29	0.56	0.37	49.4

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

MOVEMENT SUMMARY

Site: D [2024 PM Peak - 2.1]

Hibernia Street / Dudauman Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Dudauman Street (S)												
1	L2	4	25.0	0.012	6.0	LOS A	0.0	0.4	0.19	0.54	0.19	52.4
2	T1	4	25.0	0.012	5.0	LOS A	0.0	0.4	0.19	0.54	0.19	52.7
3	R2	4	25.0	0.012	6.6	LOS A	0.0	0.4	0.19	0.54	0.19	51.8
Approach		13	25.0	0.012	5.9	LOS A	0.0	0.4	0.19	0.54	0.19	52.3
East: Hibernia Street (E)												
4	L2	4	25.0	0.040	6.0	LOS A	0.0	0.3	0.03	0.07	0.03	56.4
5	T1	58	25.5	0.040	0.0	LOS A	0.0	0.3	0.03	0.07	0.03	59.2
6	R2	4	25.0	0.040	6.0	LOS A	0.0	0.3	0.03	0.07	0.03	55.7
Approach		66	25.4	0.040	0.8	NA	0.0	0.3	0.03	0.07	0.03	58.8
North: Dudauman Street (N)												
7	L2	4	25.0	0.012	6.0	LOS A	0.0	0.4	0.19	0.54	0.19	52.4
8	T1	4	25.0	0.012	5.0	LOS A	0.0	0.4	0.19	0.54	0.19	52.7
9	R2	4	25.0	0.012	6.6	LOS A	0.0	0.4	0.19	0.54	0.19	51.8
Approach		13	25.0	0.012	5.9	LOS A	0.0	0.4	0.19	0.54	0.19	52.3
West: Hibernia Street (W)												
10	L2	4	25.0	0.040	6.0	LOS A	0.0	0.3	0.03	0.07	0.03	56.4
11	T1	58	25.5	0.040	0.0	LOS A	0.0	0.3	0.03	0.07	0.03	59.2
12	R2	4	25.0	0.040	6.0	LOS A	0.0	0.3	0.03	0.07	0.03	55.7
Approach		66	25.4	0.040	0.8	NA	0.0	0.3	0.03	0.07	0.03	58.8
All Vehicles		158	25.3	0.040	1.6	NA	0.0	0.4	0.06	0.15	0.06	57.6

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

MOVEMENT SUMMARY

Site: D [2024 PM Peak + construction vehicles - 2.1]

Hibernia Street / Dudauman Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Dudauman Street (S)												
1	L2	71	98.5	0.597	9.9	LOS A	4.5	46.6	0.39	0.85	0.67	44.6
2	T1	78	93.2	0.597	13.7	LOS A	4.5	46.6	0.39	0.85	0.67	45.3
3	R2	186	26.0	0.597	16.0	LOS B	4.5	46.6	0.39	0.85	0.67	46.4
Approach		335	56.9	0.597	14.2	LOS A	4.5	46.6	0.39	0.85	0.67	45.8
East: Hibernia Street (E)												
4	L2	94	51.7	0.132	6.4	LOS A	0.4	4.7	0.15	0.40	0.15	51.1
5	T1	33	96.8	0.132	0.4	LOS A	0.4	4.7	0.15	0.40	0.15	54.6
6	R2	36	91.2	0.132	7.2	LOS A	0.4	4.7	0.15	0.40	0.15	48.9
Approach		162	69.5	0.132	5.4	NA	0.4	4.7	0.15	0.40	0.15	51.3
North: Dudauman Street (N)												
7	L2	81	40.3	0.235	6.5	LOS A	1.0	10.4	0.31	0.57	0.31	50.1
8	T1	86	84.1	0.235	10.0	LOS A	1.0	10.4	0.31	0.57	0.31	49.1
9	R2	1	0.0	0.235	9.2	LOS A	1.0	10.4	0.31	0.57	0.31	51.2
Approach		168	62.5	0.235	8.3	LOS A	1.0	10.4	0.31	0.57	0.31	49.6
West: Hibernia Streett (W)												
10	L2	1	0.0	0.138	6.8	LOS A	0.7	7.4	0.32	0.24	0.32	56.2
11	T1	78	40.5	0.138	1.0	LOS A	0.7	7.4	0.32	0.24	0.32	57.7
12	R2	79	88.0	0.138	7.7	LOS A	0.7	7.4	0.32	0.24	0.32	51.5
Approach		158	64.0	0.138	4.4	NA	0.7	7.4	0.32	0.24	0.32	54.4
All Vehicles		823	61.9	0.597	9.4	NA	4.5	46.6	0.32	0.59	0.43	49.1

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

MOVEMENT SUMMARY

▽ Site: E [2024 AM Peak]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Dudauman Street (S)												
1	L2	1	0.0	0.003	5.5	LOS A	0.0	0.0	0.00	0.12	0.00	57.1
2	T1	4	25.0	0.003	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	58.7
Approach		5	20.0	0.003	1.1	NA	0.0	0.0	0.00	0.12	0.00	58.3
North: Dudauman Street (N)												
8	T1	4	25.0	0.003	0.0	LOS A	0.0	0.0	0.01	0.12	0.01	58.6
9	R2	1	0.0	0.003	5.5	LOS A	0.0	0.0	0.01	0.12	0.01	56.5
Approach		5	20.0	0.003	1.1	NA	0.0	0.0	0.01	0.12	0.01	58.2
West: Troy St (W)												
10	L2	4	25.0	0.007	5.8	LOS A	0.0	0.2	0.03	0.57	0.03	52.5
12	R2	4	25.0	0.007	5.8	LOS A	0.0	0.2	0.03	0.57	0.03	51.9
Approach		8	25.0	0.007	5.8	LOS A	0.0	0.2	0.03	0.57	0.03	52.2
All Vehicles		19	22.2	0.007	3.2	NA	0.0	0.2	0.02	0.32	0.02	55.4

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

MOVEMENT SUMMARY

Site: E [2024 AM Peak + construction vehicles]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Dudauman Street (S)												
1	L2	103	99.0	0.156	6.7	LOS A	0.0	0.0	0.00	0.33	0.00	52.6
2	T1	74	95.7	0.156	0.0	LOS A	0.0	0.0	0.00	0.33	0.00	58.6
Approach		177	97.6	0.156	3.9	NA	0.0	0.0	0.00	0.33	0.00	54.9
North: Dudauman Street (N)												
8	T1	94	75.3	0.264	1.5	LOS A	1.4	14.3	0.45	0.51	0.45	54.3
9	R2	222	38.9	0.264	7.5	LOS A	1.4	14.3	0.45	0.51	0.45	50.8
Approach		316	49.7	0.264	5.7	NA	1.4	14.3	0.45	0.51	0.45	51.8
West: Troy St (W)												
10	L2	140	61.7	0.422	8.1	LOS A	2.4	27.3	0.37	0.64	0.49	47.4
12	R2	109	95.2	0.422	17.0	LOS B	2.4	27.3	0.37	0.64	0.49	45.6
Approach		249	76.4	0.422	12.0	LOS A	2.4	27.3	0.37	0.64	0.49	46.6
All Vehicles		742	70.1	0.422	7.4	NA	2.4	27.3	0.32	0.51	0.36	50.6

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

MOVEMENT SUMMARY

Site: E [2024 PM Peak]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Dudauman Street (S)												
1	L2	1	0.0	0.003	5.5	LOS A	0.0	0.0	0.00	0.12	0.00	57.1
2	T1	4	25.0	0.003	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	58.7
Approach		5	20.0	0.003	1.1	NA	0.0	0.0	0.00	0.12	0.00	58.3
North: Dudauman Street (N)												
8	T1	4	25.0	0.003	0.0	LOS A	0.0	0.0	0.01	0.12	0.01	58.6
9	R2	1	0.0	0.003	5.5	LOS A	0.0	0.0	0.01	0.12	0.01	56.5
Approach		5	20.0	0.003	1.1	NA	0.0	0.0	0.01	0.12	0.01	58.2
West: Troy St (W)												
10	L2	4	25.0	0.007	5.8	LOS A	0.0	0.2	0.03	0.57	0.03	52.5
12	R2	4	25.0	0.007	5.8	LOS A	0.0	0.2	0.03	0.57	0.03	51.9
Approach		8	25.0	0.007	5.8	LOS A	0.0	0.2	0.03	0.57	0.03	52.2
All Vehicles		19	22.2	0.007	3.2	NA	0.0	0.2	0.02	0.32	0.02	55.4

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

MOVEMENT SUMMARY

Site: E [2024 PM Peak + construction vehicles]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Dudauman Street (S)												
1	L2	107	95.1	0.169	6.7	LOS A	0.0	0.0	0.00	0.30	0.00	53.0
2	T1	94	75.3	0.169	0.0	LOS A	0.0	0.0	0.00	0.30	0.00	59.0
Approach		201	85.9	0.169	3.6	NA	0.0	0.0	0.00	0.30	0.00	55.6
North: Dudauman Street (N)												
8	T1	74	95.7	0.203	1.8	LOS A	1.0	11.9	0.47	0.55	0.47	53.7
9	R2	140	61.7	0.203	8.2	LOS A	1.0	11.9	0.47	0.55	0.47	49.3
Approach		214	73.4	0.203	6.0	NA	1.0	11.9	0.47	0.55	0.47	50.8
West: Troy St (W)												
10	L2	222	38.9	0.435	7.6	LOS A	2.7	27.8	0.37	0.62	0.46	49.3
12	R2	105	99.0	0.435	15.4	LOS B	2.7	27.8	0.37	0.62	0.46	46.5
Approach		327	58.2	0.435	10.1	LOS A	2.7	27.8	0.37	0.62	0.46	48.4
All Vehicles		742	70.1	0.435	7.1	NA	2.7	27.8	0.30	0.51	0.34	50.8

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

MOVEMENT SUMMARY

Site: F [2024 AM Peak]

Olympic Highway/ Baylis Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Olympic Highway (S)												
1	L2	1	0.0	0.053	5.5	LOS A	0.2	2.1	0.02	0.58	0.02	53.7
2	T1	1	0.0	0.053	0.0	LOS A	0.2	2.1	0.02	0.58	0.02	55.1
3	R2	84	21.3	0.053	5.7	LOS A	0.2	2.1	0.02	0.58	0.02	52.2
Approach		86	20.7	0.053	5.6	NA	0.2	2.1	0.02	0.58	0.02	52.2
East: Olympic Highway (E)												
4	L2	84	21.3	0.059	5.8	LOS A	0.2	2.0	0.01	0.57	0.01	52.7
5	T1	1	0.0	0.059	4.5	LOS A	0.2	2.0	0.01	0.57	0.01	53.8
6	R2	1	0.0	0.059	5.9	LOS A	0.2	2.0	0.01	0.57	0.01	53.1
Approach		86	20.7	0.059	5.8	LOS A	0.2	2.0	0.01	0.57	0.01	52.7
North: Ironbong Street (N)												
7	L2	1	0.0	0.002	5.5	LOS A	0.0	0.0	0.01	0.39	0.01	55.1
8	T1	1	0.0	0.002	0.0	LOS A	0.0	0.0	0.01	0.39	0.01	56.5
9	R2	1	0.0	0.002	5.5	LOS A	0.0	0.0	0.01	0.39	0.01	54.5
Approach		3	0.0	0.002	3.7	NA	0.0	0.0	0.01	0.39	0.01	55.4
West: Baylis Street (W)												
10	L2	1	0.0	0.003	5.5	LOS A	0.0	0.1	0.01	0.57	0.01	53.7
11	T1	1	0.0	0.003	4.5	LOS A	0.0	0.1	0.01	0.57	0.01	53.9
12	R2	1	0.0	0.003	6.3	LOS A	0.0	0.1	0.01	0.57	0.01	53.2
Approach		3	0.0	0.003	5.4	LOS A	0.0	0.1	0.01	0.57	0.01	53.6
All Vehicles		179	20.0	0.059	5.7	NA	0.2	2.1	0.01	0.57	0.01	52.6

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

MOVEMENT SUMMARY

Site: F [2024 AM Peak + construction vehicles]

Olympic Highway/ Baylis Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Olympic Highway (S)												
1	L2	147	99.3	0.213	6.7	LOS A	0.8	9.8	0.02	0.57	0.02	49.7
2	T1	1	0.0	0.213	0.0	LOS A	0.8	9.8	0.02	0.57	0.02	55.1
3	R2	131	49.2	0.213	6.1	LOS A	0.8	9.8	0.02	0.57	0.02	51.0
Approach		279	75.5	0.213	6.4	NA	0.8	9.8	0.02	0.57	0.02	50.3
East: Olympic Highway (E)												
4	L2	222	28.9	0.398	5.9	LOS A	2.0	18.0	0.01	0.56	0.01	51.5
5	T1	163	42.6	0.398	8.6	LOS A	2.0	18.0	0.01	0.56	0.01	51.4
6	R2	1	0.0	0.398	7.5	LOS A	2.0	18.0	0.01	0.56	0.01	52.2
Approach		386	34.6	0.398	7.1	LOS A	2.0	18.0	0.01	0.56	0.01	51.4
North: Ironbong Street (N)												
7	L2	1	0.0	0.002	6.0	LOS A	0.0	0.1	0.25	0.33	0.25	54.3
8	T1	1	0.0	0.002	0.4	LOS A	0.0	0.1	0.25	0.33	0.25	55.7
9	R2	1	0.0	0.002	6.1	LOS A	0.0	0.1	0.25	0.33	0.25	53.8
Approach		3	0.0	0.002	4.2	NA	0.0	0.1	0.25	0.33	0.25	54.6
West: Baylis Street (W)												
10	L2	1	0.0	0.851	27.1	LOS B	7.7	99.8	0.50	1.03	1.52	34.6
11	T1	71	98.5	0.851	30.7	LOS C	7.7	99.8	0.50	1.03	1.52	33.3
12	R2	147	99.3	0.851	50.3	LOS D	7.7	99.8	0.50	1.03	1.52	32.6
Approach		219	98.6	0.851	43.9	LOS D	7.7	99.8	0.50	1.03	1.52	32.8
All Vehicles		887	63.1	0.851	15.9	NA	7.7	99.8	0.13	0.68	0.38	44.9

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

MOVEMENT SUMMARY

Site: F [2024 PM Peak]

Olympic Highway/ Baylis Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Olympic Highway (S)												
1	L2	1	0.0	0.053	5.5	LOS A	0.2	2.1	0.02	0.58	0.02	53.7
2	T1	1	0.0	0.053	0.0	LOS A	0.2	2.1	0.02	0.58	0.02	55.1
3	R2	84	21.3	0.053	5.7	LOS A	0.2	2.1	0.02	0.58	0.02	52.2
Approach		86	20.7	0.053	5.6	NA	0.2	2.1	0.02	0.58	0.02	52.2
East: Olympic Highway (E)												
4	L2	84	21.3	0.059	5.8	LOS A	0.2	2.0	0.01	0.57	0.01	52.7
5	T1	1	0.0	0.059	4.5	LOS A	0.2	2.0	0.01	0.57	0.01	53.8
6	R2	1	0.0	0.059	5.9	LOS A	0.2	2.0	0.01	0.57	0.01	53.1
Approach		86	20.7	0.059	5.8	LOS A	0.2	2.0	0.01	0.57	0.01	52.7
North: Ironbong Street (N)												
7	L2	1	0.0	0.002	5.5	LOS A	0.0	0.0	0.01	0.39	0.01	55.1
8	T1	1	0.0	0.002	0.0	LOS A	0.0	0.0	0.01	0.39	0.01	56.5
9	R2	1	0.0	0.002	5.5	LOS A	0.0	0.0	0.01	0.39	0.01	54.5
Approach		3	0.0	0.002	3.7	NA	0.0	0.0	0.01	0.39	0.01	55.4
West: Baylis Street (W)												
10	L2	1	0.0	0.003	5.5	LOS A	0.0	0.1	0.01	0.57	0.01	53.7
11	T1	1	0.0	0.003	4.5	LOS A	0.0	0.1	0.01	0.57	0.01	53.9
12	R2	1	0.0	0.003	6.3	LOS A	0.0	0.1	0.01	0.57	0.01	53.2
Approach		3	0.0	0.003	5.4	LOS A	0.0	0.1	0.01	0.57	0.01	53.6
All Vehicles		179	20.0	0.059	5.7	NA	0.2	2.1	0.01	0.57	0.01	52.6

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

MOVEMENT SUMMARY

Site: F [2024 PM Peak + construction vehicles]

Olympic Highway/ Baylis Street
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Olympic Highway (S)												
1	L2	147	99.3	0.254	6.7	LOS A	1.2	12.9	0.02	0.57	0.02	49.6
2	T1	1	0.0	0.254	0.0	LOS A	1.2	12.9	0.02	0.57	0.02	55.0
3	R2	222	28.9	0.254	5.8	LOS A	1.2	12.9	0.02	0.57	0.02	51.8
Approach		371	56.8	0.254	6.1	NA	1.2	12.9	0.02	0.57	0.02	50.9
East: Olympic Highway (E)												
4	L2	131	49.2	0.274	6.1	LOS A	1.2	12.7	0.00	0.56	0.00	49.7
5	T1	71	98.5	0.274	12.8	LOS A	1.2	12.7	0.00	0.56	0.00	48.6
6	R2	1	0.0	0.274	8.7	LOS A	1.2	12.7	0.00	0.56	0.00	51.1
Approach		202	66.1	0.274	8.5	LOS A	1.2	12.7	0.00	0.56	0.00	49.3
North: Ironbong Street (N)												
7	L2	1	0.0	0.002	6.0	LOS A	0.0	0.1	0.25	0.33	0.25	54.3
8	T1	1	0.0	0.002	0.4	LOS A	0.0	0.1	0.25	0.33	0.25	55.7
9	R2	1	0.0	0.002	6.1	LOS A	0.0	0.1	0.25	0.33	0.25	53.8
Approach		3	0.0	0.002	4.2	NA	0.0	0.1	0.25	0.33	0.25	54.6
West: Baylis Street (W)												
10	L2	1	0.0	0.828	19.0	LOS B	8.7	96.5	0.51	1.21	1.50	40.0
11	T1	163	42.6	0.828	22.0	LOS B	8.7	96.5	0.51	1.21	1.50	39.3
12	R2	147	99.3	0.828	38.7	LOS C	8.7	96.5	0.51	1.21	1.50	37.3
Approach		312	69.3	0.828	29.9	LOS C	8.7	96.5	0.51	1.21	1.50	38.3
All Vehicles		887	63.1	0.828	15.0	NA	8.7	96.5	0.19	0.79	0.54	45.4

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

MOVEMENT SUMMARY

Site: Access 1 [2024 AM Peak + construction vehicles]

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

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Olympic Highway (E)												
5	T1	84	21.3	0.103	0.5	LOS A	0.4	3.8	0.25	0.26	0.25	56.9
6	R2	67	31.3	0.103	6.5	LOS A	0.4	3.8	0.25	0.26	0.25	53.4
Approach		152	25.7	0.103	3.2	NA	0.4	3.8	0.25	0.26	0.25	55.3
North: Access												
7	L2	21	100.0	0.068	10.9	LOS A	0.2	3.1	0.29	0.96	0.29	48.9
9	R2	21	100.0	0.068	13.0	LOS A	0.2	3.1	0.29	0.96	0.29	48.3
Approach		42	100.0	0.068	12.0	LOS A	0.2	3.1	0.29	0.96	0.29	48.6
West: Olympic Highway (W)												
10	L2	59	35.7	0.089	6.0	LOS A	0.0	0.0	0.00	0.24	0.00	54.9
11	T1	84	21.3	0.089	0.0	LOS A	0.0	0.0	0.00	0.24	0.00	58.1
Approach		143	27.2	0.089	2.5	NA	0.0	0.0	0.00	0.24	0.00	56.7
All Vehicles		337	35.6	0.103	4.0	NA	0.4	3.8	0.15	0.34	0.15	54.9

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

MOVEMENT SUMMARY

Site: Access 1 [2024 PM Peak + construction vehicles]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Olympic Highway (E)												
5	T1	84	21.3	0.076	0.3	LOS A	0.2	2.1	0.14	0.19	0.14	58.2
6	R2	21	100.0	0.076	6.9	LOS A	0.2	2.1	0.14	0.19	0.14	53.6
Approach		105	37.0	0.076	2.4	NA	0.2	2.1	0.14	0.19	0.14	57.2
North: Access												
7	L2	67	31.3	0.138	9.8	LOS A	0.5	4.8	0.25	0.94	0.25	50.3
9	R2	59	35.7	0.138	10.6	LOS A	0.5	4.8	0.25	0.94	0.25	49.6
Approach		126	33.3	0.138	10.2	LOS A	0.5	4.8	0.25	0.94	0.25	50.0
West: Olympic Highway (W)												
10	L2	21	100.0	0.069	6.1	LOS A	0.0	0.0	0.00	0.19	0.00	54.8
11	T1	84	21.3	0.069	0.0	LOS A	0.0	0.0	0.00	0.19	0.00	58.7
Approach		105	37.0	0.069	2.0	NA	0.0	0.0	0.00	0.19	0.00	57.9
All Vehicles		337	35.6	0.138	4.7	NA	0.5	4.8	0.14	0.47	0.14	54.4

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

MOVEMENT SUMMARY

Site: Access 2 [2024 AM Peak + construction vehicles]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Olympic Highway (E)												
5	T1	84	21.3	0.103	0.5	LOS A	0.4	3.8	0.25	0.26	0.25	56.9
6	R2	67	31.3	0.103	6.5	LOS A	0.4	3.8	0.25	0.26	0.25	53.4
Approach		152	25.7	0.103	3.2	NA	0.4	3.8	0.25	0.26	0.25	55.3
North: Access												
7	L2	21	100.0	0.068	10.9	LOS A	0.2	3.1	0.29	0.96	0.29	48.9
9	R2	21	100.0	0.068	13.0	LOS A	0.2	3.1	0.29	0.96	0.29	48.3
Approach		42	100.0	0.068	12.0	LOS A	0.2	3.1	0.29	0.96	0.29	48.6
West: Olympic Highway (W)												
10	L2	59	35.7	0.089	6.0	LOS A	0.0	0.0	0.00	0.24	0.00	54.9
11	T1	84	21.3	0.089	0.0	LOS A	0.0	0.0	0.00	0.24	0.00	58.1
Approach		143	27.2	0.089	2.5	NA	0.0	0.0	0.00	0.24	0.00	56.7
All Vehicles		337	35.6	0.103	4.0	NA	0.4	3.8	0.15	0.34	0.15	54.9

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

MOVEMENT SUMMARY

Site: Access 2 [2024 PM Peak + construction vehicles]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Olympic Highway (E)												
5	T1	84	21.3	0.076	0.3	LOS A	0.2	2.1	0.14	0.19	0.14	58.2
6	R2	21	100.0	0.076	6.9	LOS A	0.2	2.1	0.14	0.19	0.14	53.6
Approach		105	37.0	0.076	2.4	NA	0.2	2.1	0.14	0.19	0.14	57.2
North: Access												
7	L2	67	31.3	0.138	9.8	LOS A	0.5	4.8	0.25	0.94	0.25	50.3
9	R2	59	35.7	0.138	10.6	LOS A	0.5	4.8	0.25	0.94	0.25	49.6
Approach		126	33.3	0.138	10.2	LOS A	0.5	4.8	0.25	0.94	0.25	50.0
West: Olympic Highway (W)												
10	L2	21	100.0	0.069	6.1	LOS A	0.0	0.0	0.00	0.19	0.00	54.8
11	T1	84	21.3	0.069	0.0	LOS A	0.0	0.0	0.00	0.19	0.00	58.7
Approach		105	37.0	0.069	2.0	NA	0.0	0.0	0.00	0.19	0.00	57.9
All Vehicles		337	35.6	0.138	4.7	NA	0.5	4.8	0.14	0.47	0.14	54.4

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

MOVEMENT SUMMARY

Site: Access 3 [2024 AM Peak + construction vehicles]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Access (S)												
1	L2	12	100.0	0.032	10.1	LOS A	0.1	1.4	0.01	1.08	0.01	49.5
2	T1	1	0.0	0.032	8.2	LOS A	0.1	1.4	0.01	1.08	0.01	51.1
3	R2	11	100.0	0.032	11.0	LOS A	0.1	1.4	0.01	1.08	0.01	48.9
Approach		23	95.5	0.032	10.5	LOS A	0.1	1.4	0.01	1.08	0.01	49.3
East: Old Sydney Road (E)												
4	L2	57	18.5	0.048	5.8	LOS A	0.1	1.0	0.04	0.56	0.04	52.8
5	T1	1	0.0	0.048	0.1	LOS A	0.1	1.0	0.04	0.56	0.04	55.0
6	R2	12	100.0	0.048	6.2	LOS A	0.1	1.0	0.04	0.56	0.04	50.9
Approach		69	31.8	0.048	5.8	NA	0.1	1.0	0.04	0.56	0.04	52.5
North: Access (N)												
7	L2	12	100.0	0.031	10.1	LOS A	0.1	1.4	0.01	1.08	0.01	49.6
8	T1	1	0.0	0.031	8.3	LOS A	0.1	1.4	0.01	1.08	0.01	51.2
9	R2	11	100.0	0.031	10.7	LOS A	0.1	1.4	0.01	1.08	0.01	49.0
Approach		23	95.5	0.031	10.4	LOS A	0.1	1.4	0.01	1.08	0.01	49.4
West: Old Sydney Road (W)												
10	L2	11	100.0	0.040	6.3	LOS A	0.2	1.7	0.16	0.53	0.16	51.2
11	T1	1	0.0	0.040	0.2	LOS A	0.2	1.7	0.16	0.53	0.16	54.6
12	R2	49	23.4	0.040	6.0	LOS A	0.2	1.7	0.16	0.53	0.16	51.7
Approach		61	36.2	0.040	6.0	NA	0.2	1.7	0.16	0.53	0.16	51.7
All Vehicles		177	50.0	0.048	7.0	NA	0.2	1.7	0.07	0.68	0.07	51.4

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

MOVEMENT SUMMARY

Site: Access 3 [2024 PM Peak + construction vehicles]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Access (S)												
1	L2	49	23.4	0.104	9.0	LOS A	0.4	3.3	0.01	1.03	0.01	50.9
2	T1	1	0.0	0.104	8.0	LOS A	0.4	3.3	0.01	1.03	0.01	51.5
3	R2	57	18.5	0.104	8.6	LOS A	0.4	3.3	0.01	1.03	0.01	50.5
Approach		107	20.6	0.104	8.8	LOS A	0.4	3.3	0.01	1.03	0.01	50.7
East: Old Sydney Road (E)												
4	L2	11	100.0	0.020	6.2	LOS A	0.1	1.0	0.08	0.54	0.08	51.5
5	T1	1	0.0	0.020	0.1	LOS A	0.1	1.0	0.08	0.54	0.08	55.0
6	R2	12	100.0	0.020	6.2	LOS A	0.1	1.0	0.08	0.54	0.08	50.9
Approach		23	95.5	0.020	6.0	NA	0.1	1.0	0.08	0.54	0.08	51.4
North: Access (N)												
7	L2	12	100.0	0.031	10.1	LOS A	0.1	1.4	0.01	1.08	0.01	49.6
8	T1	1	0.0	0.031	7.9	LOS A	0.1	1.4	0.01	1.08	0.01	51.3
9	R2	11	100.0	0.031	10.7	LOS A	0.1	1.4	0.01	1.08	0.01	49.0
Approach		23	95.5	0.031	10.4	LOS A	0.1	1.4	0.01	1.08	0.01	49.4
West: Old Sydney Road (W)												
10	L2	11	100.0	0.020	6.2	LOS A	0.1	1.0	0.08	0.54	0.08	51.5
11	T1	1	0.0	0.020	0.1	LOS A	0.1	1.0	0.08	0.54	0.08	55.0
12	R2	12	100.0	0.020	6.2	LOS A	0.1	1.0	0.08	0.54	0.08	50.9
Approach		23	95.5	0.020	6.0	NA	0.1	1.0	0.08	0.54	0.08	51.4
All Vehicles		177	50.0	0.104	8.2	NA	0.4	3.3	0.03	0.91	0.03	50.7

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

MOVEMENT SUMMARY

Site: Access 4 [2024 AM Peak + construction vehicles]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Access (S)												
1	L2	6	100.0	0.033	10.1	LOS A	0.1	1.5	0.01	1.08	0.01	49.4
2	T1	1	0.0	0.033	8.3	LOS A	0.1	1.5	0.01	1.08	0.01	51.0
3	R2	15	100.0	0.033	10.9	LOS A	0.1	1.5	0.01	1.08	0.01	48.8
Approach		22	95.2	0.033	10.6	LOS A	0.1	1.5	0.01	1.08	0.01	49.1
East: Ironbong Road (E)												
4	L2	15	100.0	0.051	6.3	LOS A	0.2	2.1	0.14	0.53	0.14	51.3
5	T1	1	0.0	0.051	0.2	LOS A	0.2	2.1	0.14	0.53	0.14	54.7
6	R2	61	24.1	0.051	5.9	LOS A	0.2	2.1	0.14	0.53	0.14	51.7
Approach		77	38.4	0.051	6.0	NA	0.2	2.1	0.14	0.53	0.14	51.7
North: Access (N)												
7	L2	15	100.0	0.029	10.1	LOS A	0.1	1.4	0.01	1.08	0.01	49.6
8	T1	1	0.0	0.029	8.2	LOS A	0.1	1.4	0.01	1.08	0.01	51.3
9	R2	7	100.0	0.029	10.9	LOS A	0.1	1.4	0.01	1.08	0.01	49.0
Approach		23	95.5	0.029	10.3	LOS A	0.1	1.4	0.01	1.08	0.01	49.5
West: Ironbong Road (W)												
10	L2	45	16.3	0.035	5.8	LOS A	0.1	0.5	0.03	0.55	0.03	52.9
11	T1	1	0.0	0.035	0.1	LOS A	0.1	0.5	0.03	0.55	0.03	55.0
12	R2	6	100.0	0.035	6.2	LOS A	0.1	0.5	0.03	0.55	0.03	50.9
Approach		53	26.0	0.035	5.7	NA	0.1	0.5	0.03	0.55	0.03	52.7
All Vehicles		175	49.4	0.051	7.0	NA	0.2	2.1	0.08	0.68	0.08	51.3

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

MOVEMENT SUMMARY

Site: Access 4 [2024 PM Peak + construction vehicles]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Access (S)												
1	L2	6	100.0	0.033	10.1	LOS A	0.1	1.5	0.01	1.08	0.01	49.4
2	T1	1	0.0	0.033	7.9	LOS A	0.1	1.5	0.01	1.08	0.01	51.1
3	R2	15	100.0	0.033	10.9	LOS A	0.1	1.5	0.01	1.08	0.01	48.8
Approach		22	95.2	0.033	10.6	LOS A	0.1	1.5	0.01	1.08	0.01	49.1
East: Ironbong Road (E)												
4	L2	15	100.0	0.027	6.2	LOS A	0.1	1.3	0.06	0.55	0.06	51.5
5	T1	1	0.0	0.027	0.1	LOS A	0.1	1.3	0.06	0.55	0.06	55.0
6	R2	15	100.0	0.027	6.1	LOS A	0.1	1.3	0.06	0.55	0.06	50.9
Approach		31	96.6	0.027	6.0	NA	0.1	1.3	0.06	0.55	0.06	51.3
North: Access (N)												
7	L2	61	24.1	0.099	9.0	LOS A	0.4	3.2	0.01	1.03	0.01	50.9
8	T1	1	0.0	0.099	8.0	LOS A	0.4	3.2	0.01	1.03	0.01	51.6
9	R2	45	16.3	0.099	8.4	LOS A	0.4	3.2	0.01	1.03	0.01	50.6
Approach		107	20.6	0.099	8.8	LOS A	0.4	3.2	0.01	1.03	0.01	50.8
West: Ironbong Road (W)												
10	L2	7	100.0	0.013	6.2	LOS A	0.0	0.6	0.09	0.52	0.09	51.6
11	T1	1	0.0	0.013	0.1	LOS A	0.0	0.6	0.09	0.52	0.09	55.1
12	R2	6	100.0	0.013	6.2	LOS A	0.0	0.6	0.09	0.52	0.09	51.0
Approach		15	92.9	0.013	6.0	NA	0.0	0.6	0.09	0.52	0.09	51.6
All Vehicles		175	49.4	0.099	8.3	NA	0.4	3.2	0.02	0.91	0.02	50.7

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

MOVEMENT SUMMARY

Site: Access 5 [2024 AM Peak + construction vehicles]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Access (S)												
1	L2	9	100.0	0.018	10.1	LOS A	0.1	0.8	0.02	1.06	0.02	49.7
2	T1	1	0.0	0.018	8.1	LOS A	0.1	0.8	0.02	1.06	0.02	51.4
3	R2	4	100.0	0.018	10.7	LOS A	0.1	0.8	0.02	1.06	0.02	49.1
Approach		15	92.9	0.018	10.2	LOS A	0.1	0.8	0.02	1.06	0.02	49.6
East: Dirnaseer Rd (E)												
4	L2	51	8.3	0.035	5.7	LOS A	0.1	0.4	0.02	0.54	0.02	53.5
5	T1	3	0.0	0.035	0.1	LOS A	0.1	0.4	0.02	0.54	0.02	55.2
6	R2	4	100.0	0.035	6.2	LOS A	0.1	0.4	0.02	0.54	0.02	51.1
Approach		58	14.5	0.035	5.4	NA	0.1	0.4	0.02	0.54	0.02	53.4
North: Access (N)												
7	L2	4	100.0	0.021	10.1	LOS A	0.1	0.9	0.03	1.06	0.03	49.6
8	T1	1	0.0	0.021	8.2	LOS A	0.1	0.9	0.03	1.06	0.03	51.3
9	R2	9	100.0	0.021	10.5	LOS A	0.1	0.9	0.03	1.06	0.03	49.0
Approach		15	92.9	0.021	10.3	LOS A	0.1	0.9	0.03	1.06	0.03	49.3
West: Dirnaseer Rd (W)												
10	L2	9	100.0	0.039	6.3	LOS A	0.2	1.6	0.15	0.52	0.15	51.4
11	T1	3	0.0	0.039	0.2	LOS A	0.2	1.6	0.15	0.52	0.15	54.9
12	R2	47	20.0	0.039	5.9	LOS A	0.2	1.6	0.15	0.52	0.15	52.1
Approach		60	31.6	0.039	5.7	NA	0.2	1.6	0.15	0.52	0.15	52.1
All Vehicles		147	37.1	0.039	6.5	NA	0.2	1.6	0.07	0.64	0.07	52.0

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

MOVEMENT SUMMARY

Site: Access 5 [2024 PM Peak + construction vehicles]

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

Movement Performance - Vehicles													
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Access (S)												
1	L2	47	20.0	0.091	8.9	LOS A	0.3	2.7	0.02	1.01	0.02	51.1
2	T1	1	0.0	0.091	7.9	LOS A	0.3	2.7	0.02	1.01	0.02	51.6
3	R2	51	8.3	0.091	8.0	LOS A	0.3	2.7	0.02	1.01	0.02	51.1
Approach		99	13.8	0.091	8.4	LOS A	0.3	2.7	0.02	1.01	0.02	51.1
East: Dirnaseer Rd (E)												
4	L2	4	100.0	0.010	6.2	LOS A	0.0	0.4	0.07	0.47	0.07	52.5
5	T1	3	0.0	0.010	0.1	LOS A	0.0	0.4	0.07	0.47	0.07	56.1
6	R2	4	100.0	0.010	6.2	LOS A	0.0	0.4	0.07	0.47	0.07	51.8
Approach		12	72.7	0.010	5.2	NA	0.0	0.4	0.07	0.47	0.07	53.1
North: Access (N)												
7	L2	4	100.0	0.021	10.1	LOS A	0.1	0.9	0.03	1.06	0.03	49.6
8	T1	1	0.0	0.021	7.8	LOS A	0.1	0.9	0.03	1.06	0.03	51.3
9	R2	9	100.0	0.021	10.5	LOS A	0.1	0.9	0.03	1.06	0.03	49.0
Approach		15	92.9	0.021	10.3	LOS A	0.1	0.9	0.03	1.06	0.03	49.4
West: Dirnaseer Rd (W)												
10	L2	9	100.0	0.019	6.2	LOS A	0.1	0.9	0.05	0.52	0.05	52.0
11	T1	3	0.0	0.019	0.1	LOS A	0.1	0.9	0.05	0.52	0.05	55.5
12	R2	9	100.0	0.019	6.1	LOS A	0.1	0.9	0.05	0.52	0.05	51.3
Approach		22	85.7	0.019	5.7	NA	0.1	0.9	0.05	0.52	0.05	52.2
All Vehicles		147	37.1	0.091	7.8	NA	0.3	2.7	0.03	0.90	0.03	51.2

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

MOVEMENT SUMMARY

Site: Access 6 [2024 AM Peak + construction vehicles]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Access (S)												
1	L2	7	100.0	0.037	10.2	LOS A	0.1	1.6	0.10	1.02	0.10	49.3
2	T1	1	0.0	0.037	8.3	LOS A	0.1	1.6	0.10	1.02	0.10	50.9
3	R2	15	100.0	0.037	11.5	LOS A	0.1	1.6	0.10	1.02	0.10	48.7
Approach		23	95.5	0.037	11.0	LOS A	0.1	1.6	0.10	1.02	0.10	49.0
East: Old Cootamundra Road (E)												
4	L2	61	24.1	0.062	5.9	LOS A	0.2	1.5	0.05	0.49	0.05	53.0
5	T1	13	25.0	0.062	0.1	LOS A	0.2	1.5	0.05	0.49	0.05	55.5
6	R2	15	100.0	0.062	6.2	LOS A	0.2	1.5	0.05	0.49	0.05	51.3
Approach		88	36.9	0.062	5.2	NA	0.2	1.5	0.05	0.49	0.05	53.1
North: Access (N)												
7	L2	15	100.0	0.028	10.2	LOS A	0.1	1.3	0.07	1.03	0.07	49.7
8	T1	1	0.0	0.028	8.5	LOS A	0.1	1.3	0.07	1.03	0.07	51.3
9	R2	6	100.0	0.028	10.9	LOS A	0.1	1.3	0.07	1.03	0.07	49.1
Approach		22	95.2	0.028	10.4	LOS A	0.1	1.3	0.07	1.03	0.07	49.6
West: Old Cootamundra Road (W)												
10	L2	6	100.0	0.041	6.4	LOS A	0.2	1.6	0.19	0.45	0.19	51.8
11	T1	13	25.0	0.041	0.3	LOS A	0.2	1.6	0.19	0.45	0.19	55.3
12	R2	45	16.3	0.041	5.9	LOS A	0.2	1.6	0.19	0.45	0.19	52.6
Approach		64	26.2	0.041	5.0	NA	0.2	1.6	0.19	0.45	0.19	53.0
All Vehicles		198	46.8	0.062	6.3	NA	0.2	1.6	0.10	0.60	0.10	52.1

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

MOVEMENT SUMMARY

Site: Access 6 [2024 PM Peak + construction vehicles]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Access (S)												
1	L2	44	14.3	0.109	8.7	LOS A	0.4	3.4	0.08	0.99	0.08	51.2
2	T1	1	0.0	0.109	8.1	LOS A	0.4	3.4	0.08	0.99	0.08	51.5
3	R2	61	24.1	0.109	9.1	LOS A	0.4	3.4	0.08	0.99	0.08	50.3
Approach		106	19.8	0.109	8.9	LOS A	0.4	3.4	0.08	0.99	0.08	50.6
East: Old Cootamundra Road (E)												
4	L2	15	100.0	0.035	6.2	LOS A	0.1	1.5	0.09	0.45	0.09	52.3
5	T1	13	25.0	0.035	0.1	LOS A	0.1	1.5	0.09	0.45	0.09	55.9
6	R2	15	100.0	0.035	6.2	LOS A	0.1	1.5	0.09	0.45	0.09	51.6
Approach		42	77.5	0.035	5.1	NA	0.1	1.5	0.09	0.45	0.09	53.1
North: Access (N)												
7	L2	15	100.0	0.030	10.2	LOS A	0.1	1.4	0.07	1.03	0.07	49.7
8	T1	1	0.0	0.030	8.0	LOS A	0.1	1.4	0.07	1.03	0.07	51.3
9	R2	7	100.0	0.030	10.9	LOS A	0.1	1.4	0.07	1.03	0.07	49.1
Approach		23	95.5	0.030	10.4	LOS A	0.1	1.4	0.07	1.03	0.07	49.6
West: Old Cootamundra Road (W)												
10	L2	7	100.0	0.021	6.2	LOS A	0.1	0.7	0.09	0.38	0.09	53.0
11	T1	13	25.0	0.021	0.1	LOS A	0.1	0.7	0.09	0.38	0.09	56.6
12	R2	6	100.0	0.021	6.3	LOS A	0.1	0.7	0.09	0.38	0.09	52.3
Approach		26	64.0	0.021	4.3	NA	0.1	0.7	0.09	0.38	0.09	54.5
All Vehicles		198	46.8	0.109	7.4	NA	0.4	3.4	0.08	0.80	0.08	51.5

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

MOVEMENT SUMMARY

Site: Access 7 [2024 AM Peak + construction vehicles]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Dudauman Road (S)												
1	L2	76	38.9	0.055	6.0	LOS A	0.0	0.0	0.00	0.54	0.00	52.3
2	T1	4	25.0	0.055	0.0	LOS A	0.0	0.0	0.00	0.54	0.00	55.3
Approach		80	38.2	0.055	5.7	NA	0.0	0.0	0.00	0.54	0.00	52.4
North: Dudauman Road (N)												
8	T1	4	25.0	0.038	0.3	LOS A	0.2	1.5	0.21	0.52	0.21	54.8
9	R2	52	26.5	0.038	6.1	LOS A	0.2	1.5	0.21	0.52	0.21	51.7
Approach		56	26.4	0.038	5.7	NA	0.2	1.5	0.21	0.52	0.21	51.9
West: Access												
10	L2	14	100.0	0.059	10.2	LOS A	0.2	2.7	0.04	1.06	0.04	49.6
12	R2	29	100.0	0.059	10.6	LOS A	0.2	2.7	0.04	1.06	0.04	49.0
Approach		43	100.0	0.059	10.5	LOS A	0.2	2.7	0.04	1.06	0.04	49.2
All Vehicles		179	49.4	0.059	6.8	NA	0.2	2.7	0.08	0.66	0.08	51.4

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

MOVEMENT SUMMARY

Site: Access 7 [2024 PM Peak + construction vehicles]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Dudauman Road (S)												
1	L2	29	100.0	0.030	6.1	LOS A	0.0	0.0	0.00	0.53	0.00	51.9
2	T1	4	25.0	0.030	0.0	LOS A	0.0	0.0	0.00	0.53	0.00	55.4
Approach		34	90.6	0.030	5.7	NA	0.0	0.0	0.00	0.53	0.00	52.4
North: Dudauman Road (N)												
8	T1	4	25.0	0.016	0.3	LOS A	0.1	0.8	0.16	0.48	0.16	55.4
9	R2	14	100.0	0.016	6.3	LOS A	0.1	0.8	0.16	0.48	0.16	51.2
Approach		18	82.4	0.016	5.5	NA	0.1	0.8	0.16	0.48	0.16	52.2
West: Access												
10	L2	52	26.5	0.123	9.2	LOS A	0.5	4.2	0.04	1.03	0.04	50.8
12	R2	76	38.9	0.123	9.4	LOS A	0.5	4.2	0.04	1.03	0.04	49.8
Approach		127	33.9	0.123	9.3	LOS A	0.5	4.2	0.04	1.03	0.04	50.2
All Vehicles		179	49.4	0.123	8.1	NA	0.5	4.2	0.04	0.88	0.04	50.8

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

MOVEMENT SUMMARY

Site: Access 8 [2024 AM Peak + construction vehicles]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Access (S)												
1	L2	6	100.0	0.040	10.6	LOS A	0.1	1.8	0.28	0.96	0.28	48.8
2	T1	1	0.0	0.040	8.9	LOS A	0.1	1.8	0.28	0.96	0.28	50.4
3	R2	15	100.0	0.040	12.8	LOS A	0.1	1.8	0.28	0.96	0.28	48.2
Approach		22	95.2	0.040	12.0	LOS A	0.1	1.8	0.28	0.96	0.28	48.5
East: Burley Griffin Way (E)												
4	L2	15	100.0	0.087	6.5	LOS A	0.4	3.4	0.21	0.34	0.21	52.5
5	T1	53	32.0	0.087	0.3	LOS A	0.4	3.4	0.21	0.34	0.21	56.1
6	R2	61	24.1	0.087	6.2	LOS A	0.4	3.4	0.21	0.34	0.21	53.0
Approach		128	36.1	0.087	4.1	NA	0.4	3.4	0.21	0.34	0.21	54.1
North: Access (N)												
7	L2	15	100.0	0.034	10.6	LOS A	0.1	1.6	0.21	0.96	0.21	49.3
8	T1	1	0.0	0.034	8.9	LOS A	0.1	1.6	0.21	0.96	0.21	50.9
9	R2	7	100.0	0.034	12.8	LOS A	0.1	1.6	0.21	0.96	0.21	48.7
Approach		23	95.5	0.034	11.3	LOS A	0.1	1.6	0.21	0.96	0.21	49.1
West: Burley Griffin Way (W)												
10	L2	45	16.3	0.068	5.8	LOS A	0.1	0.8	0.05	0.30	0.05	54.7
11	T1	53	32.0	0.068	0.1	LOS A	0.1	0.8	0.05	0.30	0.05	56.9
12	R2	6	100.0	0.068	6.6	LOS A	0.1	0.8	0.05	0.30	0.05	52.6
Approach		104	29.3	0.068	3.2	NA	0.1	0.8	0.05	0.30	0.05	55.7
All Vehicles		278	43.2	0.087	4.8	NA	0.4	3.4	0.16	0.43	0.16	53.7

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

MOVEMENT SUMMARY

Site: Access 8 [2024 PM Peak + construction vehicles]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Access (S)												
1	L2	6	100.0	0.040	10.6	LOS A	0.1	1.7	0.28	0.96	0.28	48.8
2	T1	1	0.0	0.040	8.5	LOS A	0.1	1.7	0.28	0.96	0.28	50.4
3	R2	15	100.0	0.040	12.8	LOS A	0.1	1.7	0.28	0.96	0.28	48.3
Approach		22	95.2	0.040	12.0	LOS A	0.1	1.7	0.28	0.96	0.28	48.5
East: Burley Griffin Way (E)												
4	L2	15	100.0	0.063	6.4	LOS A	0.2	1.8	0.11	0.29	0.11	53.5
5	T1	53	32.0	0.063	0.2	LOS A	0.2	1.8	0.11	0.29	0.11	57.2
6	R2	15	100.0	0.063	6.5	LOS A	0.2	1.8	0.11	0.29	0.11	52.8
Approach		82	56.4	0.063	3.5	NA	0.2	1.8	0.11	0.29	0.11	55.7
North: Access (N)												
7	L2	61	24.1	0.110	9.3	LOS A	0.4	3.5	0.19	0.94	0.19	50.7
8	T1	1	0.0	0.110	8.6	LOS A	0.4	3.5	0.19	0.94	0.19	51.4
9	R2	45	16.3	0.110	9.4	LOS A	0.4	3.5	0.19	0.94	0.19	50.5
Approach		107	20.6	0.110	9.3	LOS A	0.4	3.5	0.19	0.94	0.19	50.6
West: Burley Griffin Way (W)												
10	L2	7	100.0	0.047	6.4	LOS A	0.1	0.8	0.07	0.19	0.07	54.4
11	T1	53	32.0	0.047	0.1	LOS A	0.1	0.8	0.07	0.19	0.07	58.3
12	R2	6	100.0	0.047	6.6	LOS A	0.1	0.8	0.07	0.19	0.07	53.7
Approach		66	46.0	0.047	2.2	NA	0.1	0.8	0.07	0.19	0.07	57.4
All Vehicles		278	43.2	0.110	5.6	NA	0.4	3.5	0.14	0.57	0.14	53.4

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

MOVEMENT SUMMARY

Site: Access 9 [2024 AM Peak + construction vehicles]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Burley Griffin Way (E)												
5	T1	53	32.0	0.080	0.4	LOS A	0.4	3.2	0.22	0.32	0.22	56.3
6	R2	65	29.0	0.080	6.2	LOS A	0.4	3.2	0.22	0.32	0.22	53.0
Approach		118	30.4	0.080	3.6	NA	0.4	3.2	0.22	0.32	0.22	54.4
North: Access												
7	L2	19	100.0	0.037	10.6	LOS A	0.1	1.7	0.20	0.96	0.20	49.5
9	R2	8	100.0	0.037	11.8	LOS A	0.1	1.7	0.20	0.96	0.20	48.9
Approach		27	100.0	0.037	11.0	LOS A	0.1	1.7	0.20	0.96	0.20	49.3
West: Burley Griffin Way (W)												
10	L2	46	18.2	0.061	5.8	LOS A	0.0	0.0	0.00	0.27	0.00	55.0
11	T1	53	32.0	0.061	0.0	LOS A	0.0	0.0	0.00	0.27	0.00	57.3
Approach		99	25.5	0.061	2.7	NA	0.0	0.0	0.00	0.27	0.00	56.2
All Vehicles		244	36.2	0.080	4.1	NA	0.4	3.2	0.13	0.37	0.13	54.5

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

MOVEMENT SUMMARY

Site: Access 9 [2024 PM Peak + construction vehicles]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Burley Griffin Way (E)												
5	T1	53	32.0	0.054	0.2	LOS A	0.2	1.8	0.13	0.24	0.13	57.7
6	R2	19	100.0	0.054	6.5	LOS A	0.2	1.8	0.13	0.24	0.13	53.2
Approach		72	50.0	0.054	2.8	NA	0.2	1.8	0.13	0.24	0.13	56.4
North: Access												
7	L2	65	29.0	0.107	9.5	LOS A	0.4	3.5	0.18	0.94	0.18	50.6
9	R2	46	18.2	0.107	9.1	LOS A	0.4	3.5	0.18	0.94	0.18	50.5
Approach		112	24.5	0.107	9.3	LOS A	0.4	3.5	0.18	0.94	0.18	50.6
West: Burley Griffin Way (W)												
10	L2	8	100.0	0.040	6.1	LOS A	0.0	0.0	0.00	0.14	0.00	55.0
11	T1	53	32.0	0.040	0.0	LOS A	0.0	0.0	0.00	0.14	0.00	59.0
Approach		61	41.4	0.040	1.5	NA	0.0	0.0	0.00	0.14	0.00	58.4
All Vehicles		244	36.2	0.107	5.0	NA	0.4	3.5	0.12	0.54	0.12	54.0

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

MOVEMENT SUMMARY

Site: Access 11 [2024 AM Peak + construction vehicles]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Grogan Road (S)												
1	L2	111	23.8	0.072	5.8	LOS A	0.0	0.0	0.00	0.55	0.00	52.8
2	T1	4	25.0	0.072	0.0	LOS A	0.0	0.0	0.00	0.55	0.00	55.2
Approach		115	23.9	0.072	5.6	NA	0.0	0.0	0.00	0.55	0.00	52.8
North: Grogan Road (N)												
8	T1	4	25.0	0.003	0.1	LOS A	0.0	0.0	0.10	0.12	0.10	58.3
9	R2	1	0.0	0.003	5.8	LOS A	0.0	0.0	0.10	0.12	0.10	56.2
Approach		5	20.0	0.003	1.2	NA	0.0	0.0	0.10	0.12	0.10	57.9
West: Access												
10	L2	1	0.0	0.038	8.0	LOS A	0.1	1.6	0.13	1.01	0.13	51.8
12	R2	26	100.0	0.038	10.2	LOS A	0.1	1.6	0.13	1.01	0.13	49.3
Approach		27	96.2	0.038	10.1	LOS A	0.1	1.6	0.13	1.01	0.13	49.4
All Vehicles		147	37.1	0.072	6.3	NA	0.1	1.6	0.03	0.62	0.03	52.3

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

MOVEMENT SUMMARY

Site: Access 11 [2024 PM Peak + construction vehicles]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Grogan Road (S)												
1	L2	26	100.0	0.027	6.1	LOS A	0.0	0.0	0.00	0.53	0.00	52.0
2	T1	4	25.0	0.027	0.0	LOS A	0.0	0.0	0.00	0.53	0.00	55.5
Approach		31	89.7	0.027	5.7	NA	0.0	0.0	0.00	0.53	0.00	52.4
North: Grogan Road (N)												
8	T1	4	25.0	0.003	0.0	LOS A	0.0	0.0	0.05	0.12	0.05	58.5
9	R2	1	0.0	0.003	5.6	LOS A	0.0	0.0	0.05	0.12	0.05	56.3
Approach		5	20.0	0.003	1.1	NA	0.0	0.0	0.05	0.12	0.05	58.0
West: Access												
10	L2	1	0.0	0.111	8.0	LOS A	0.4	3.2	0.10	0.97	0.10	52.1
12	R2	111	23.8	0.111	8.6	LOS A	0.4	3.2	0.10	0.97	0.10	50.6
Approach		112	23.6	0.111	8.6	LOS A	0.4	3.2	0.10	0.97	0.10	50.6
All Vehicles		147	37.1	0.111	7.6	NA	0.4	3.2	0.08	0.85	0.08	51.2

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