



SMEC INTERNAL REF. 3002112

Junee Freight and Transport Plan

Traffic Study Report – Stage 3

Prepared for Junee Shire Council
16 September 2022

Document Control

Document	Traffic Study Report – Stage 3
File Location	X:\Projects\30021\3002112 Junee Traffic Study\140 Traffic Study\143 Stage 3
Project Name	Junee Freight and Transport Plan
Project Number	3002112
Revision Number	C

Revision History

Revision No.	Date	Prepared By	Reviewed By	Approved for Issue By
A	28/03/2022	Mohammad Khodr/Bayzid Khan	Josh Everett	Christophe Steinbach
B	13/09/2022	Christophe Steinbach	Josh Everett	Christophe Steinbach
C	16/09/2022	Josh Everett	Christophe Steinbach	Christophe Steinbach

Issue Register

Distribution List	Date Issued	Number of Copies
Junee Shire Council	16/09/2022	Digital Only

SMEC Company Details

Approved by	Josh Everett		
Address	Level 9, 12 Moore Street		
	Canberra	Australia	2601
Telephone	+61 2 6234 1960	Website	www.smec.com
Email	Josh.Everett@smec.com		
Signature			

The information within this document is and shall remain the property of: SMEC for Junee Shire Council

Important Notice

This report is confidential and is provided solely for the purposes of preparing Freight and Transport Plan for Junee. This report is provided pursuant to a Consultancy Agreement between [SMEC Australia Pty Limited] ("SMEC") and Junee Shire Council, under which SMEC undertook to perform a specific and limited task for Junee Shire Council. This report is strictly limited to the matters stated in it and subject to the various assumptions, qualifications and limitations in it and does not apply by implication to other matters. SMEC makes no representation that the scope, assumptions, qualifications and exclusions set out in this report will be suitable or sufficient for other purposes nor that the content of the report covers all matters which you may regard as material for your purposes.

The report supersedes all previous draft or interim reports, whether written or presented orally, before the date of this report. This report has not and will not be updated for events or transactions occurring after the date of the report or any other matters which might have a material effect on its contents, or which come to light after the date of the report. SMEC is not obliged to inform you of any such event, transaction or matter nor to update the report for anything that occurs, or of which SMEC becomes aware, after the date of this report.

Unless expressly agreed otherwise in writing, SMEC does not accept a duty of care or any other legal responsibility whatsoever in relation to this report, or any related enquiries, advice or other work, nor does SMEC make any representation in connection with this report, to any person other than Junee Shire Council. Any other person who receives a draft or a copy of this report (or any part of it) or discusses it (or any part of it) or any related matter with SMEC, does so on the basis that he or she acknowledges and accepts that he or she may not rely on this report nor on any related information or advice given by SMEC for any purpose whatsoever.

DRAFT

Table of Contents

1	Introduction	1
1.1	Background of the Study	1
1.2	Purpose of the Study.....	1
1.3	Scope of the Report	1
1.4	Structure of the Report	1
2	Existing Transport Context	2
2.1	Freight	2
2.2	Other Transport Network	4
2.2.1	Active Transport	4
2.2.2	Public Transport.....	5
2.2.3	General Traffic	8
2.3	Crash Data Analysis	9
2.4	Key Network Constraints	12
3	Traffic Flow and Analysis	22
3.1	Traffic Survey and Data Collection	22
3.1.1	Methodology.....	22
3.1.2	Survey Location	22
3.2	Traffic Flow Analysis	23
3.2.1	Old Junee Road (Site 1).....	23
3.2.2	Queen Street (Site 2)	25
3.2.3	Olympic Highway – East of Junee (Site 3).....	27
3.2.4	Broadway (Site 4)	29
3.2.5	Olympic Highway – Main Street (Site 5).....	31
3.2.6	Olympic Highway – Seignior Street (Site 6).....	33
3.2.7	Lorne Street (Site 7).....	35
3.2.8	Gundagai Road (Site 8).....	37
3.2.9	Olympic Highway – West of Junee (Site 9).....	39
3.2.10	Byrnes Road (Site 10).....	41
3.3	Traffic Growth and Annual Average Daily Traffic (AADT)	43
4	Infrastructure Review	45
4.1	Gap Assessment Overview	45
4.2	High Priority Sites.....	50
4.2.1	Belmore Street – Lorne Street intersection	50
4.2.2	Peel Street/Lorne Street (Belmore Street to Cox Street).....	50
4.2.3	Lorne Street (Belmore Street to Hill Street).....	51
4.2.4	Olympic Highway – Level Crossing.....	51
4.2.5	Kemp Street bridge.....	52
4.2.6	Kemp Street – Ducker Street intersection	53
4.2.7	Edgar/William/Ducker Streets.....	53
4.2.8	Queen Street – Olympic Hwy intersection.....	54
4.2.9	Queen Street, near Junee North Public School	55

4.2.10	HL Robinson Bridge	55
4.3	Medium Priority Sites	56
4.3.1	Olympic Highway underpass	56
4.3.2	Olympic Highway	57
4.3.3	Lord Street Bridge.....	58
4.3.4	Byrnes Road.....	59
4.4	Freight Network Context.....	60
5	Potential Mitigation Measures	63
5.1	Development of Mitigation Measures	63
6	Summary.....	69
7	Implementation Plan.....	72

List of Figures

Figure 2-1: Commodity Movement Volume Growth 2011 - 2031.....	3
Figure 2-2: Seasonal Transport Flows in the Region for all Commodities.....	3
Figure 2-3: Existing Freight Route (B Double) and Key Freight Traffic Generators in the vicinity of Junee.....	4
Figure 2-4: Existing Active Transport Links along Freight Routes in Junee.....	5
Figure 2-5: Location of Bus Stops in the vicinity of Junee Train Station	6
Figure 2-6: Existing School Bus Services and Routes in Junee	8
Figure 2-7: Location of Crashes within Junee LGA (5 years, 2015-2019).....	10
Figure 2-8: Distribution of Crashes by Injury Type (5 years, 2015-2019).....	10
Figure 2-9 Distribution of Crashes by Location (Injury Crashes Only).....	11
Figure 2-10: Level crossing, looking east toward Main Street	13
Figure 2-11: Existing Crossing Rail Crossing Facilities in Junee	14
Figure 2-12: Northbound approach to rail underpass	15
Figure 2-13: Heavy vehicle traversing underpass	16
Figure 2-14: Possible layout for intersection of Kemp Street and Ducker Street	17
Figure 2-15: Lord Street Bridge showing current dilapidated state	18
Figure 2-16: HL Robinson Bridge, with intersection of Old Junee Road and Goldfields Way in background	19
Figure 2-17: Zebra Crossing over Lorne Street, looking south toward school bus stop.....	20
Figure 2-18: Heavy vehicle on Queen Street (westbound) entering school zone.....	21
Figure 3-1: Location of Mid-Block Traffic Survey.....	22
Figure 3-2: Average Weekday (24-Hours) and Average All Days (24-Hours) Traffic Flows on Old Junee Road (Both Directions).....	24
Figure 3-3: Distribution of Daily Vehicle Flows (Both Direction) by Vehicle Classification on Old Junee Road	24
Figure 3-4: Average Speed and 85 th Percentile Speed of Vehicles on Old Junee Road (Both Directions).....	25
Figure 3-5: Average Weekday (24-Hours) and Average All Days (24-Hours) Traffic Flows on Queen Street (Both Directions)	26
Figure 3-6: Distribution of Daily Vehicle Flows (Both Direction) by Vehicle Classification on Queen Street.....	26
Figure 3-7: Average Speed and 85 th Percentile Speed on Queen Street (Both Directions).....	27
Figure 3-8: Average Weekday (24-Hours) and Average All Days (24-Hours) Traffic Flows on Olympic Highway – East of Junee (Both Directions).....	28
Figure 3-9: Distribution of Daily Vehicle Flows (Both Direction) by Vehicle Classification on Olympic Highway – East of Junee	28
Figure 3-10: Average Speed and 85 th Percentile Speed on Olympic Highway – East of Junee (Both Directions) ..	29

Figure 3-11: Average Weekday (24-Hours) and Average All Days (24-Hours) Traffic Flows on Broadway (Both Directions)	30
Figure 3-12: Distribution of Daily Vehicle Flows (Both Direction) by Vehicle Classification on Broadway	30
Figure 3-13: Average Speed and 85 th Percentile Speed on Broadway (Both Directions)	31
Figure 3-14: Average Weekday (24-Hours) and Average All Days (24-Hours) Traffic Flows on Olympic Highway – Main Street (Both Directions)	32
Figure 3-15: Distribution of Daily Vehicle Flows (Both Direction) by Vehicle Classification on Olympic Highway – Main Street	32
Figure 3-16: Average Speed and 85 th Percentile Speed on Olympic Highway – Main Street (Both Directions)	33
Figure 3-17: Average Weekday (24-Hours) and Average All Days (24-Hours) Traffic Flows on Olympic Highway – Seignior Street (Both Directions)	34
Figure 3-18: Distribution of Daily Vehicle Flows (Both Direction) by Vehicle Classification on Olympic Highway – Seignior Street	34
Figure 3-19: Average Speed and 85 th Percentile Speed on Olympic Highway – Seignior Street (Both Directions)	35
Figure 3-20: Average Weekday (24-Hours) and Average All Days (24-Hours) Traffic Flows on Lorne Street (Both Directions)	36
Figure 3-21: Distribution of Daily Vehicle Flows (Both Direction) by Vehicle Classification on Lorne Street	36
Figure 3-22: Average Speed and 85 th Percentile Speed on Lorne Street (Both Directions)	37
Figure 3-23: Average Weekday (24-Hours) and Average All Days (24-Hours) Traffic Flows on Gundagai Road (Both Directions)	38
Figure 3-24: Distribution of Daily Vehicle Flows (Both Direction) by Vehicle Classification on Gundagai Road	38
Figure 3-25: Average Speed and 85 th Percentile Speed on Gundagai Road (Both Directions)	39
Figure 3-26: Average Weekday (24-Hours) and Average All Days (24-Hours) Traffic Flows on Olympic Highway – West of Junee (Both Directions)	40
Figure 3-27: Distribution of Daily Vehicle Flows (Both Direction) by Vehicle Classification on Olympic Highway – West of Junee	40
Figure 3-28: Average Speed and 85 th Percentile Speed on Olympic Highway – West of Junee (Both Directions)	41
Figure 3-29: Average Weekday (24-Hours) and Average All Days (24-Hours) Traffic Flows on Byrnes Road (Both Directions)	42
Figure 3-30: Distribution of Daily Vehicle Flows (Both Direction) by Vehicle Classification on Byrnes Road	42
Figure 3-31: Average Speed and 85 th Percentile Speed on Byrnes Road (Both Directions)	43
Figure 4-1: Priority locations for safety and operational concerns in Junee	46
Figure 4-2: Lorne Street near the school crossing at Junee Public School (looking south)	51
Figure 4-3: Olympic Highway level crossing (looking north)	52
Figure 4-4: Kemp Street Bridge (looking east)	53
Figure 4-5: Intersection of Edgar Street (Byrnes Road) and William Street (looking south)	54
Figure 4-6: Intersection of Queen Street and Olympic Highway (looking east)	55
Figure 4-7: HL Robinson Bridge (looking west)	56
Figure 4-8: Olympic Highway underpass (looking west)	57
Figure 4-9: Olympic Highway west of Kemp Street intersection (looking west)	58
Figure 4-10: Lord Street bridge (looking east)	59
Figure 4-11: Byrnes Road (looking south)	60
Figure 4-12: Junee Road freight network (key corridors)	61
Figure 5-1: Location of proposed mitigation measures	68
Figure 6-1: Location of short-term proposed mitigation measures	71

List of Tables

Table 1-1: Short-term proposed mitigation measure summary	xi
Table 2-1: Existing Bus Services of Junee.....	5
Table 2-2: Existing School Bus Services in Junee.....	7
Table 2-3: Junee Station Train Services	8
Table 2-4: Weightage of Injury Crashes.....	11
Table 2-5: Crash Severity Index of Junee Shire Council and New South Wales.....	11
Table 3-1: Daily Traffic Flows (Typical Weekday) and Heavy Vehicle Percentages.....	23
Table 3-2: AADT and Forecasted Daily Traffic Flows	44
Table 4-1: Priority locations of safety and operational constraints to the operation of freight movements in Junee 47	
Table 5-1: Potential mitigation measures of priority sites	65
Table 6-1: Short-term proposed mitigation measure summary	69

DRAFT

Executive Summary

SMEC has been engaged by Junee Shire Council (JSC) to undertake a traffic investigation of the Junee road freight network.

The purpose of the study is to understand road safety issues, and ensure freight routes can safely traverse through or around Junee Town, without posing a risk to public safety, causing adverse effects on the community in the form of noise, emissions, or causing long term damage to road infrastructure as a result of increased road traffic volumes.

Existing Transport Context

Junee is a small regional district and provides key freight connections for north-south and east-west directions, in addition to this, it consists of other active transport, public transport and general traffic. Key observations on the existing transport context include:

- The key freight routes pass through Junee transport goods to/from horticulture, grain, livestock as well as timber/pulp industries located in the vicinity of Junee Shire Council. The Regional Freight Transport Plan prepared by Riverina Eastern Regional Organisation of Councils project a significant increase in meat and livestock and manufacturing industries by 2031.
- Active Transport links are only provided within the Junee township.
- All five Public Bus and six School Bus services are operated by Junee Buses running between Junee and Wagga Wagga.
- The Olympic Highway, Old Junee Road, and Byrnes Road are the key major corridors, including for freight movements.
- Crash history analysis showed a total of 103 crashes recorded over the 5-year period (2015-2019), of which 76 (73.8%) crashes involved some level of injuries.

Key Network Constraints

A range of network constraints were identified in the study area which impact on the road network within Junee, and are summarised below:

- Train operation and movements at Junee:
 - There are 13 rail services per day between Albury and Illabo which is anticipated to increase to 24 services by 2040 (ARTC 2021).
 - Junee railway station provides for train driver shift changes for several rail operators. This shift change currently requires the level crossing to be closed for extended periods.
 - The railway sidings in Junee are used to shunt trains and reposition locomotive for operational purposes, activating the level crossing.
 - In addition to impacts on light and heavy vehicles (from level crossing operation), emergency services are required to use detour routes for travel to/from the Junee District Hospital.
 - During demolition and replacement of the Kemp Street bridge, there will be an increased reliance on the level crossing.
- Limited east-west connectivity due to existing train line:
 - The rail tracks through Junee bisect the town into two sections and creates a significant barrier for pedestrians, general traffic and freight movements.

- Increased train movements through Junee would increase the duration of level crossing closures, with ensuing impacts on the adjacent road network.
- Olympic Highway rail underpass:
 - The underpass has a clearance of 4.6m which limits high vehicles from traversing that route. Over-height vehicles travelling east-west are required to travel along Old Junee Road and Queen Street, while vehicles travelling north-south would use the level crossing and follow a circuitous route through residential areas.
- Kemp Street Bridge:
 - This Kemp Street Bridge is proposed to be raised and upgraded as part of the Inland Rail project, to permit passage for heavy vehicles up to an A-double vehicle travelling at higher mass limits (HML). To support the new bridge, upgrades to the adjacent intersection at Ducker Street is required.
- Lord Street Bridge:
 - Lord Street Bridge is an old brick bridge located on Lord Street between Prince Street and Earl Street. The bridge is in very poor condition and needs to be replaced/updated to accommodate B-doubles.
- HL Robinson Bridge:
 - The HL Robinson Bridge has been assessed as being satisfactory for HML Semi Trailer and B-doubles up to 26m but is not suitable for Road Trains or A-doubles and needs to be upgraded/replaced to accommodate these higher productivity vehicles. Increasing the load restrictions would improve the transport of grain to the grain processing facilities on Queen Street.
- High pedestrian activities areas:
 - There are a number of areas in Junee that have high numbers of pedestrians and other vulnerable road users, including the commercial centre, school zones (including Junee Public School and Junee North Public School) and recreational areas.

Infrastructure Review

An overview assessment of the urban road network in Junee identified 14 locations where there are existing safety or operational concerns related to the movement of freight and its interaction with other road users. To assist the prioritisation of these locations, an assessment framework was developed considering both the “freight” and “urban” context of each of the priority sites, to discern the locations’ relative priority:

- Freight context:
 - Respective freight corridor role within Junee.
 - Daily heavy vehicle (HVs) movements including articulated HVs.
 - Freight accessibility impacts.
 - Impact on freight movements.
- Urban context:
 - Road safety impacts.
 - Accessibility impacts.
 - Amenity impacts.
 - Infrastructure impacts.

Ten (10) high priority locations and four (4) medium priority locations were identified, these included:

- High priority sites:
 - Intersection of Belmore Street/Lorne Street
 - Lorne Street/Peel Street corridor through the Junee town centre
 - Lorne Street (Belmore Street to Hill Street) past the Junee Public School
 - Olympic Highway level crossing
 - Kemp Street Bridge
 - Intersection of Kemp Street and Ducker Street
 - Intersections of Ducker Street/Edgar Street/William Street
 - Intersection of Olympic Highway/Queen Street
 - Queen Street past the Junee North Public School
 - HL Robinson Bridge
- Medium priority sites:
 - Olympic Highway underpass
 - Olympic Highway (south of Goldfields Way to north of Queen Street)
 - Lord Street bridge
 - Byrnes Road

When considering the 14 identified priorities within the Junee urban area, the overarching context of the priority locations was considered within both the freight and urban context, but also the “existing” and “future” state of freight movements within Junee.

Junee’s road freight network is characterised by several key freight corridors which either travel through the Junee urban area, or on Junee’s urban fringe. The key road freight corridors include:

- Route 1: The Olympic Highway corridor through Junee (including the level crossing).
- Route 2: The heavy vehicle bypass of Junee via Goldfields Way, Old Junee Road and Queen Street.
- Route 3: Gundagai Road (Gundagai to Junee).
- Route 4: Byrnes Road (Edgar Street); and
- Route 5: The internal (internal to Junee) “road freight connectors” from Cox Street (from the intersection of Olympic Highway) to Byrnes Road including Peel Street, Lorne Street, Ducker Street, William Street, as well as the Kemp Street bridge connection from the Olympic Highway.

When considering the “existing” and “future” state of the road freight network in Junee, it is noted that the Inland Rail project will have a significant impact. Inland rail (projected for opening in 2027) will see a rise in the number of daily double-stacked freight trains through Junee to 20 daily freight trains.

The introduction of double-stacked trains (with Inland Rail) will also require the replacement of the existing load limited Kemp Street bridge (projected opening year mid-2025), which will improve the standard of an alternate crossing of the rail corridor (with the bridge being able to accommodate most heavy vehicle types).

As such, the Inland Rail project (including the replacement of the Kemp Street bridge) will likely see a change in light and heavy vehicle movements within the Junee area including (but not limited to):

- Increased reliance (and traffic volumes) on the heavy vehicle bypass of Junee for north-south through movements on the Olympic Highway, with ensuing impacts on:
 - The condition of the HL Robinson Bridge.
 - The safety of the Queen Street and the Olympic Highway intersection (noting existing intersection geometry deficiencies).
 - The safety of Queen Street through the school zone at Junee North Public School (including the school crossing).
- Increased reliance (and traffic volumes) on the internal “road freight connectors” within Junee, with ensuing impacts on the:
 - The safety and amenity of the Junee town centre including the Peel Street/Lorne Street corridor.
 - The safety of Lorne Street through the school zone at Junee Public School (including pedestrian crossing and parking vehicles).
 - The Ducker, Edgar and William Street corridors, with increased heavy vehicle movements from the Kemp Street bridge.

Potential Mitigation Measures

In identifying potential mitigation measures, priority sites were reviewed and considered against several key criteria to ensure Junee Shire Council was well positioned to progress the development of priority sites. This included:

- Considering mitigation measures within the context of the integrated nature of the road network in Junee (e.g. connected priority sites within the Junee town centre).
- Identification of indicative improvement types to address the priority sites.
- When considering priority sites, consideration of the scale of safety and operational issues when considering potential mitigation measures (i.e. appropriateness of proposed mitigation measures).
- Consideration of the “feasibility” of proposed works, in terms of “scale”.
- Consideration of timing of potential mitigation works (e.g. short (0-5 years), medium (5-10 years) or long term (>10 years)).
- Consideration of the indicative capital cost of works, and likely “value for money” that proposed mitigation measure would likely provide.
- Identification of respective road authorities (i.e. Junee Shire Council for local roads and Transport for NSW (TfNSW) for state-controlled roads). Where mitigation measures are identified on state roads, further consultation would be recommended with TfNSW.
- Consideration of potential funding programs (e.g. NSW State and Federal Government grants) pending the type and capital value of the mitigation measures.
- To align with the TfNSW Future Transport 2056 Strategy, priority sites and potential mitigation measures were also viewed through each of the Future Transport 2056 “Guiding Principles” which included Customer focused; Successful places; A strong economy; Safety and performance; and Accessible services.

Summary

The Inland Rail project will have a significant impact on Junee, with up to 20 daily freight trains forecast to travel through Junee by 2027 (projected opening of Inland Rail).

The introduction of double-stacked trains will also require the replacement of the existing load limited Kemp Street bridge (projected opening year mid-2025), which will improve the standard of an alternate crossing of the rail corridor (with the bridge being able to accommodate most heavy vehicle types).

As such, the Inland Rail project (including the replacement of the Kemp Street bridge) will likely see a change in light and heavy vehicle movements within the Junee area including due in part to the number and duration of level crossing closures, including:

- Increased reliance (and traffic volumes) on the heavy vehicle bypass of Junee (Old Junee Road) for north-south through movements on the Olympic Highway; and
- Increased reliance (and traffic volumes) on the internal "road freight connectors" within Junee.

Noting the interconnectedness of the freight network with the Junee urban area, a "program" approach of mitigation measures which focus on high priority areas of "conflict" between each respective freight corridor and key places, or infrastructure constraints are summarised in Table 1-1 (by freight corridor).

Table 1-1: Short-term proposed mitigation measure summary

Key Freight Corridor	Summary ID	Place or Infrastructure constraints	Potential Improvement Type/Scope
Internal road freight connectors	S1	Junee CBD (Belmore Street, Lorne-Peel Street)	<ul style="list-style-type: none"> • Upgraded pedestrian crossings. • Upgraded intersections. • Improved delineation and signage. • Reduced speed limits within "town centre". • Potential change in road priorities (to support HV movements) at Cox Street/Peel Street.
	S2	Junee Public School - Lorne Street (Belmore Street to Hill Street)	<ul style="list-style-type: none"> • Potential relocation of school entrance (and parking) to Stewart Street.
	S3	Various intersections: <ul style="list-style-type: none"> • Kemp Street / Ducker Street • Ducker Street/William Street • William Street/Edgar Street 	<ul style="list-style-type: none"> • Upgraded intersections (for improved HV passage). • Improved delineation and signage. • Potential change in road priorities (to support HV movements).
Olympic Highway	S4	Open Level Crossing	<ul style="list-style-type: none"> • Variable message signs (VMSs) at key decision points to detour traffic around the level crossing.
	S5	Junee CBD (Olympic Highway)	<ul style="list-style-type: none"> • Reduced speed limits within "town centre". • Traffic calming measures.
HV bypass of Junee	S6	Queen Street / Olympic Highway	<ul style="list-style-type: none"> • Intersection geometry restrict HV movements. • Kemp Street Bridge upgrade (by ARTC) would facilitate larger/heavier HV movements through this intersection.

Key Freight Corridor	Summary ID	Place or Infrastructure constraints	Potential Improvement Type/Scope
	S7	Junee North Public School	<ul style="list-style-type: none"> Potential relocation of staff, pick up areas (including bus) off Queen Street onto vacant land immediately west of school site.
	S8	HL Robinson Bridge (load limit)	<ul style="list-style-type: none"> Bridge strengthening and/or replacement.

Implementation Plan

Key next steps for the progress the proposed short-term mitigation measures could include:

- Stakeholder consultation of the draft Junee Freight and Transport Plan (this report), including with residents and stakeholders (e.g. TfNSW, ARTC, NSW Department of Education) to confirm the respective priorities of proposed mitigation measures.
- Design (including options) of proposed mitigation measures.
- Assessment of constraints (environmental, property, heritage, etc) for each proposed mitigation measure.
- Development of a multi-criteria analysis framework to identify the preferred option for each mitigation measure.
- Preparation of cost estimates (of the preferred option for each mitigation measure).
- Economic analysis of the preferred option for each mitigation measure.
- Review of grant program guidelines to confirm eligibility of proposed mitigation measures; and
- Preparation of funding submissions against grant programs for prioritised mitigation measures.

1 Introduction

1.1 Background of the Study

Junee Shire is a small growing regional district, located north of Wagga Wagga in South-Western NSW. Due to its location, Junee Shire is a critical connecting link in the freight network for both road and rail transport. Junee Shire Council (JSC) road network includes heavy vehicle routes for vehicles travelling north-south between Wagga Wagga and Temora/West Wyalong and Cootamundra/Young, and east-west between Gundagai and Narrandera. Junee is also located on the Inland Rail route, which will experience a significant increase in freight on the rail network in the future.

1.2 Purpose of the Study

JSC needs to ensure infrastructure maintenance and development funding is allocated appropriately, to ensure these freight routes can be developed into the future. In addition to this, ensuring vehicles can safely traverse through or around Junee Town, without posing a risk to public safety, causing adverse effects on the community in the form of noise, emissions, or causing long term damage to road infrastructure, as a result of increased road traffic volumes.

1.3 Scope of the Report

The scope of this report is to understand existing traffic conditions, crash data analysis, discuss existing issues, along with options for mitigation of the existing issues and planning for future capacity and freight movements. These options will be assessed and collated into a road network strategy for JSC to facilitate safe and efficient freight traffic movements in and around Junee.

The report also includes analysis of mid-block traffic count survey data at 10 road segments to understand current heavy and light vehicles traffic flows on key road network. The findings of this assessment will inform the future upgrade requirements to facilitate safe and efficient freight traffic movements in and around Junee.

This report is intended to be a draft report to be used as a starting point for discussions with JSC and agreement on preferred mitigation and upgrade options to allow the development of the road network strategy. No final decisions have been made regarding the proposed mitigation options.

1.4 Structure of the Report

The remainder of this report is structured with sections as follows:

- Chapter 2 – provides a summary of the existing transport context, crash data and key network constraints.
- Chapter 3 – provides an overview of traffic surveys undertaken over the road network (including future traffic growth).
- Chapter 4 – provides a review of existing and emerging infrastructure constraints, and introduces a prioritisation framework considering the “freight” and “urban” context to identify high and medium priority locations for potential mitigation measures.
- Chapter 5 – identifies key criteria to consider the development of mitigation measures, and provides an indicative scope for mitigation measures.
- Chapter 6 – summarises study findings, including identifying short-term (high priority) mitigation measures.
- Chapter 7 – provides an implementation plan (next steps) for Junee Shire Council to progress the study.

2 Existing Transport Context

2.1 Freight

Junee is a small regional district and provides key freight connections for north-south and east-west directions. The key freight routes pass through Junee transporting goods to/from horticulture, grain, livestock as well as timber/pulp industries located in the vicinity of Junee Shire Council.

The grain processing facilities are located in Junee and surrounding areas. Old Junee Road, Olympic Highway as well as Inland Rail (Southern Line and Griffith Line) are used to transport grains to/from Junee. The meat and livestock industry use Old Junee Road and Olympic Highway to transport their products. The timber/pulp industry primarily use Gundagai Road with some timber/pulp freight transported along Old Junee Road and Olympic Highway. This freight route is a major route between Gundagai and Wagga Wagga.

The Regional Freight Transport Plan prepared by Riverina Eastern Regional Organisation of Councils (November 2019) project a significant increase in meat and livestock industries in the Riverina Region between 2011 and 2031 as shown in Figure 2-1, including Junee, which is anticipated to experience an increase the freight movements in the area, especially Old Junee Road and Olympic Highway by 2031. The Plan also forecast growth in grain, timber and horticulture industries by 2031.

Figure 2-2 shows the seasonal freight movement requirements in the Riverina Region by industry type (Riverina Joint Organisation Transport Analytics, Final Report, June 2021). The figure shows that majority of freight movements occur during November and December, mainly to the seasonal transport of crops.

Figure 2-3 shows the existing freight routes (B Double) and key freight traffic generators in the vicinity of Junee. The key freight traffic generators located in the area are:

- Harefield Intermodal Terminal
- Abattoir (Junee Lamb)
- Junee Correctional Centre
- Graincorp Junee subterminal
- Riverina Intermodal Freight and Logistics (RiFL) Hub at Bomen

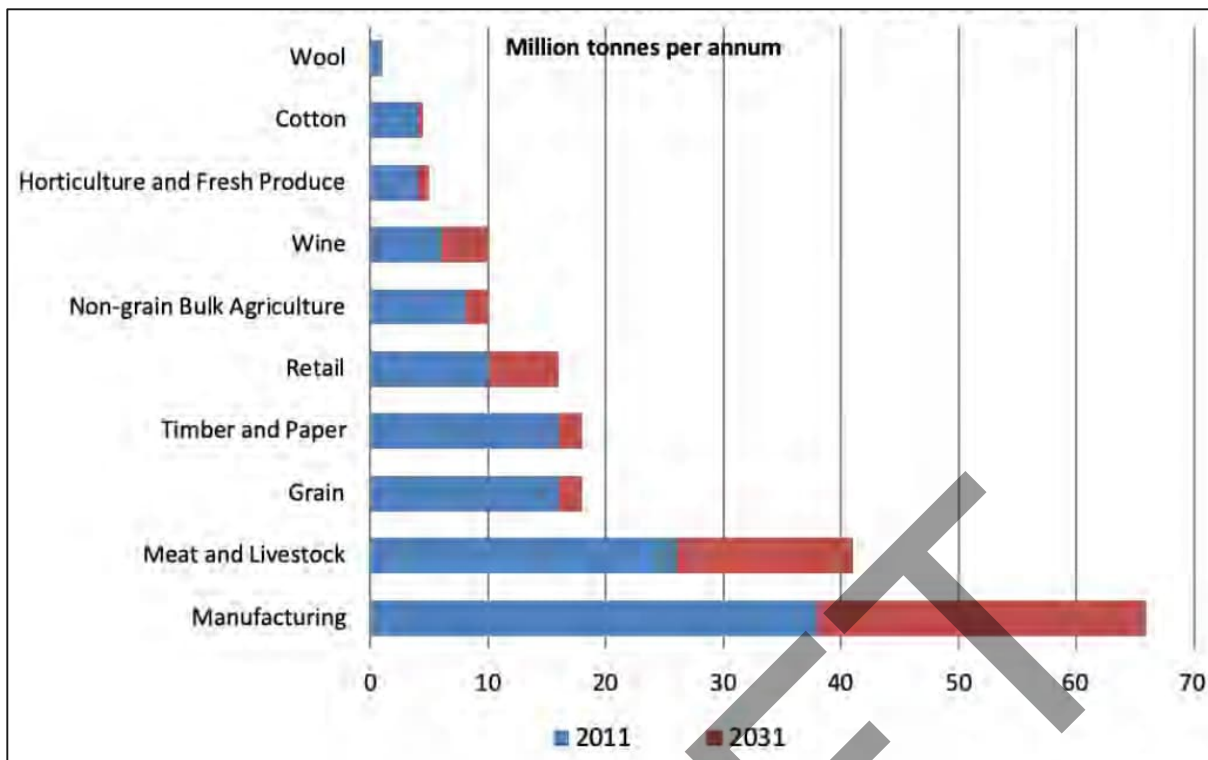


Figure 2-1: Commodity Movement Volume Growth 2011 - 2031

Source: Regional Freight Transport Plan, Riverina Eastern Regional Organisation of Councils November 2019

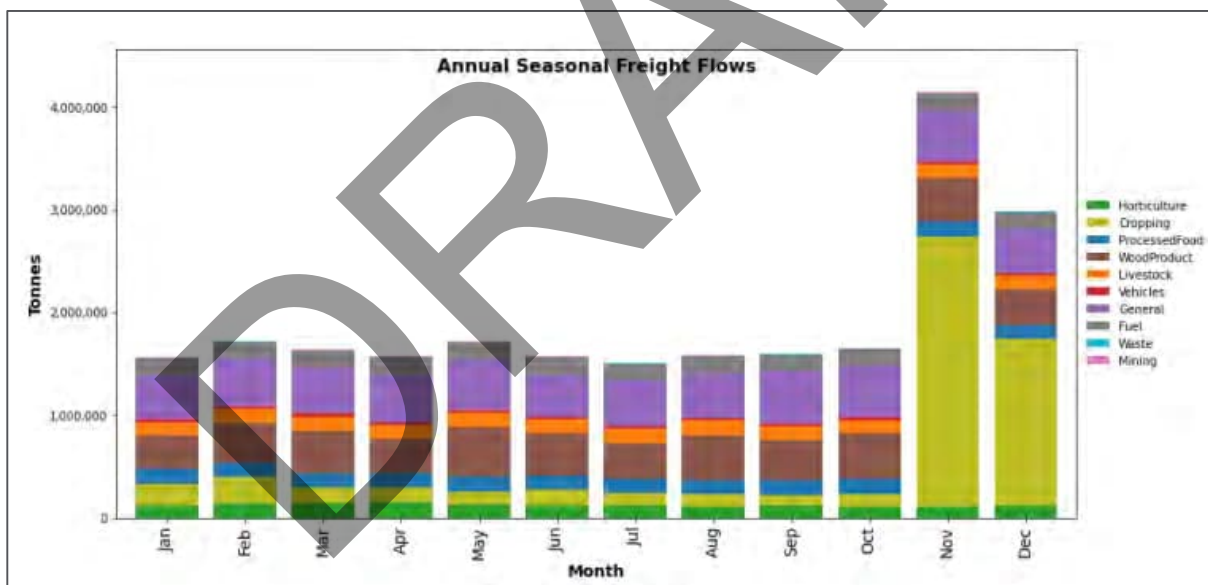


Figure 2-2: Seasonal Transport Flows in the Region for all Commodities

Source: Riverina Joint Organisation Transport Analytics, Final Report, June 2021

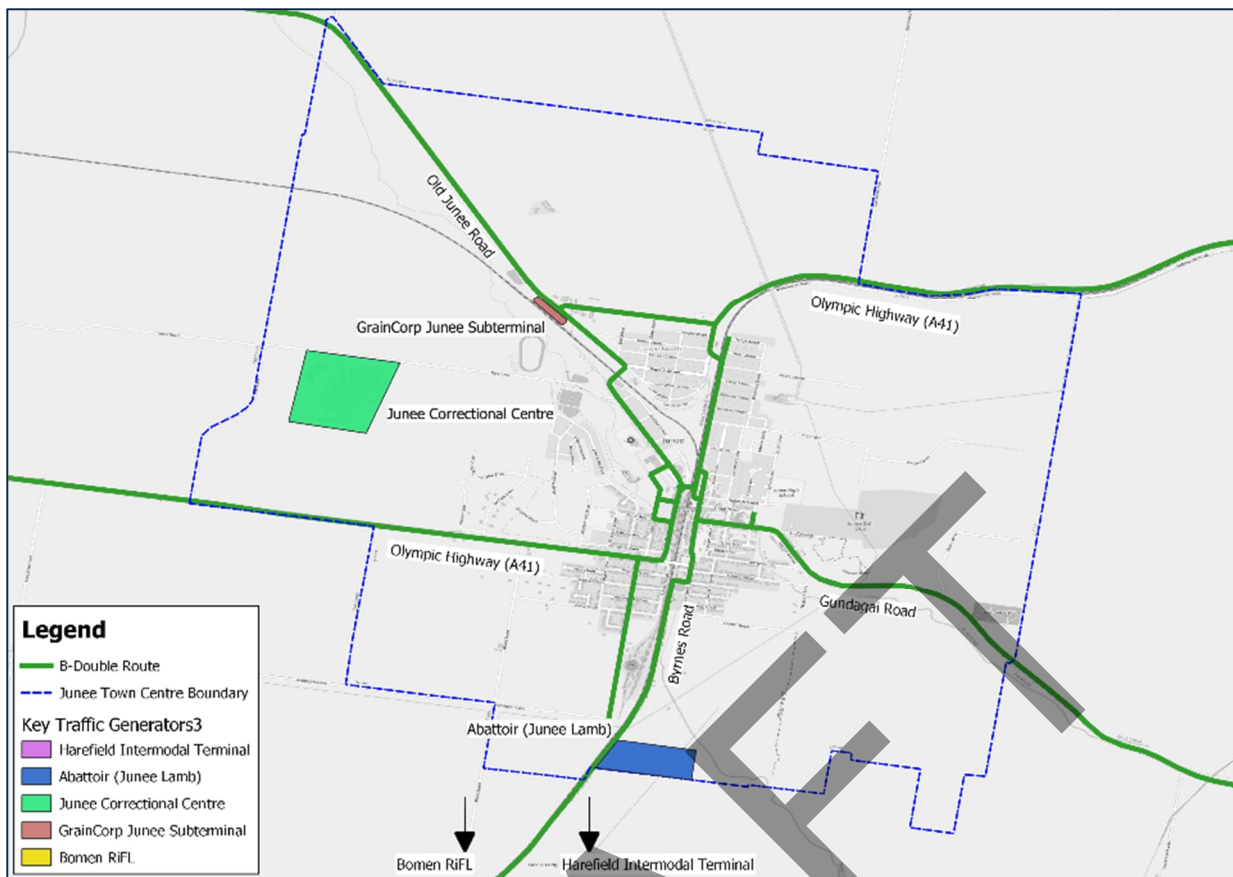


Figure 2-3: Existing Freight Route (B Double) and Key Freight Traffic Generators in the vicinity of Junee

2.2 Other Transport Network

2.2.1 Active Transport

Figure 2-4 shows existing key active transport links along in Junee. As shown in the figure, active transport paths are available only within the township of Junee, connecting the major activity centres and retail areas. Key paths run north-south along Main Street and Seignior Street, crossing over the Kemp Street bridge, and east-west through Endeavour Park, between Olympic Highway and Pretoria Avenue. There are also connections from these key paths to destinations such as Junee Showgrounds, Junee District Hospital and other destinations on the western side of Junee. Paths on the eastern side of Junee are limited, but provide connections to Junee High School, Junee Public School and Junee Recreation & Aquatic Centre.

A zebra crossing is located across Lorne Street, connecting Junee Public School and Junee Recreation & Aquatic Centre.

No pedestrian paths are provided outside Junee town.

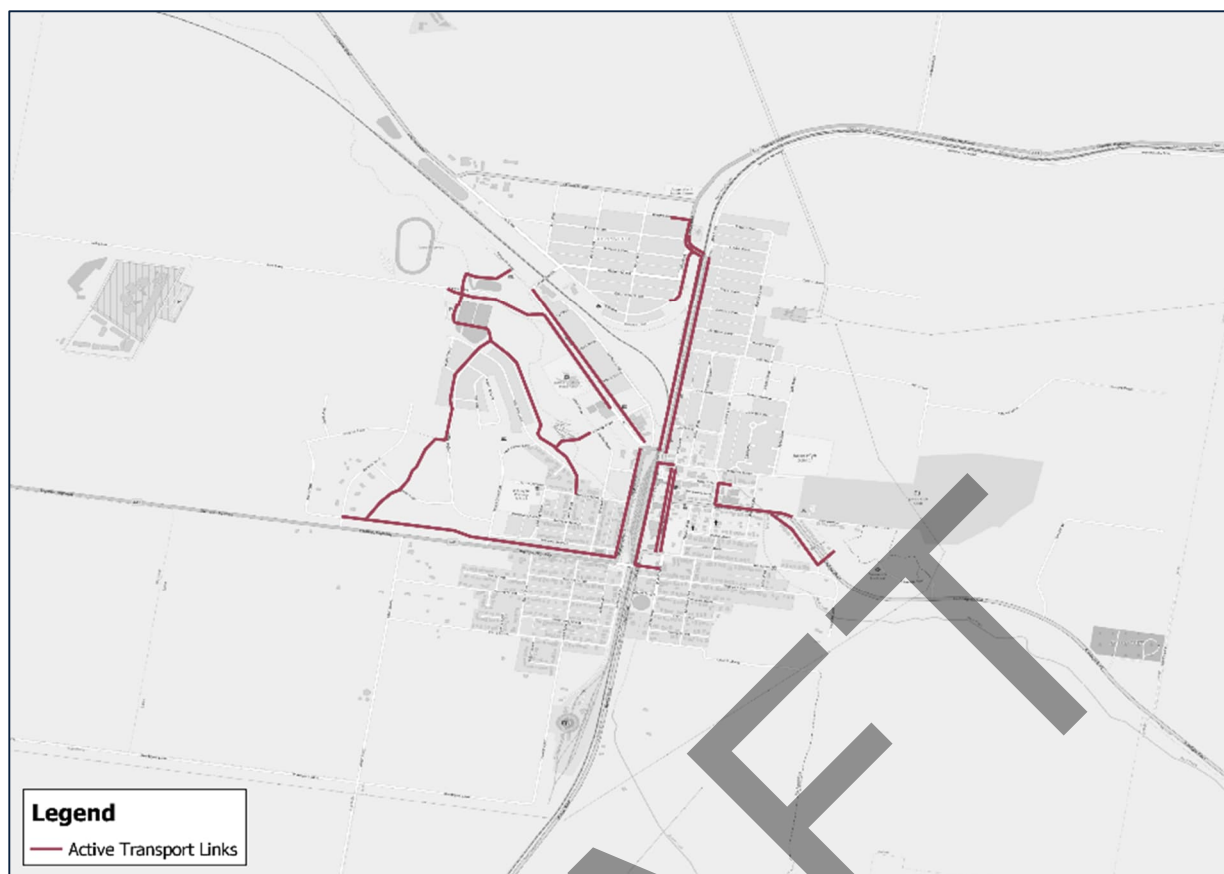


Figure 2-4: Existing Active Transport Links along Freight Routes in Junee

2.2.2 Public Transport

2.2.2.1 Public Bus

Five bus services operate within the Junee Town Centre, running between Junee and Wagga Wagga, with a varying number of stops in each route. Bus services run in both directions, each running from Monday to Friday. All buses are operated by Junee Buses. The following Table 2-1 lists bus service numbers, their respective routes, frequency, and start and end times.

Table 2-1: Existing Bus Services of Junee

Service No.	Bus Route	No. of Services	Start Time	End Time
921	Junee to Wagga Wagga via Harefield & Wallacetown	1 Service (Mon-Friday)	07:20	08:50
	Wagga Wagga to Junee via Wallacetown & Harefield		15:17	16:43
922	Junee to Wagga Wagga via Yathella & Wallacetown	1 Service (Mon-Friday)	07:21	09:06
	Wagga Wagga to Junee via Wallacetown & Yathella	2 Partial Services (Mon-Friday)	15:18	16:22
			17:33	18:31
923	Junee to Wagga Wagga via Byrnes Rd	1 Service (Mon-Friday)	14:05	14:50
	Wagga Wagga to Junee via Byrnes Rd		09:20	10:00
924	Junee to Wagga Wagga via Wallacetown & Hampden Ave	1 Service (Mon-Friday)	10:00	11:05

	Wagga Wagga to Junee via Hampden Ave & Wallacetown		12:47	13:56
925	Junee to Wagga Wagga via Brucedale Dr & Riverina Anglican	1 Service (Mon- Friday)	07:29	08:38
	Wagga Wagga to Junee via Riverina Anglican & Old Junee		15:20	16:51

Source: TfNSW

Junee Station is serviced by a coach stop located in Railway Square providing transfers between trains and regional coaches. There are also several bus stops located near Junee Station, with 10 bus stops located within a 400m radius of station, and 23 bus stops within an 800m radius of the station. These stops could be used to provide transfers between train services and local destinations. The bus stops closest to the station are shown in Figure 2-5.



Figure 2-5: Location of Bus Stops in the vicinity of Junee Train Station

2.2.2.2 School Bus Services

Six bus school bus services operate within Junee, each service runs in both directions with a single daily service during weekdays, except during school holidays. All services are operated by Junee Buses.

Two services operate strictly within Junee Town Centre (S221 and S222), with the remainder providing connections from the town centre to schools/areas outside. The following Table 2-2 lists bus service numbers, their respective routes, frequency and start and end stops/times. Figure 2-6 presents school bus routes in Junee. As shown in the figure, several school bus services run along the existing freight routes in and outside of Junee.

Table 2-2: Existing School Bus Services in Junee

Service No.	School Bus Route	Start Stop	Start Time	End Stop	End Time
S221	Bus 1 - Junee Anzac Ave to Junee Schools	Anzac Av at Joffre St	08:09	St Joseph's Primary School	08:44
	Bus 1 - Junee Schools to Junee Goulburn St	Junee North Public School	15:17	Goulburn St at George St	16:17
S222	Bus 2 - Junee Belmore St to Junee Schools	Junee Bowling Club, Belmore St	08:20	St Joseph's Primary School	08:55
	Bus 2 - Junee Schools to Junee Boundary St	Junee North Public School	15:22	Boundary St opp Elizabeth St	16:02
S223	Eurongilly to Junee Schools via Illabo	4957 Gundagai Rd	07:37	Junee Preschool, Peel St	08:57
	Junee Schools to Eurongilly via Illabo	Junee Public School	15:20	4957 Gundagai Rd	16:40
S224	Erin Vale to Junee Schools via Pikedale Rd	Hillview Lane at Canola Way	07:55	Junee Preschool, Peel St	08:57
	Junee Schools to Erin Vale via Pikedale Rd	Junee Preschool, Peel St	15:12	Goldfields Way opp Kilbirnie Lane	16:18
S225	Yathella to Junee Schools via Old Junee	76 Cochranes Rd	07:49	Junee North Public School, Queen St	08:49
	Junee Schools to Yathella via Old Junee	Junee Public School, Lorne St	15:20	76 Cochranes Rd	16:23
S226	Junee Reefs to Junee Schools via Marinna	Junee Reefs Ivor Hall	08:00	Junee Preschool, Peel St	08:49
	Junee Schools to Junee Reefs via Marinna	Junee Preschool, Peel St	15:13	Junee Reefs Ivor Hall	16:05

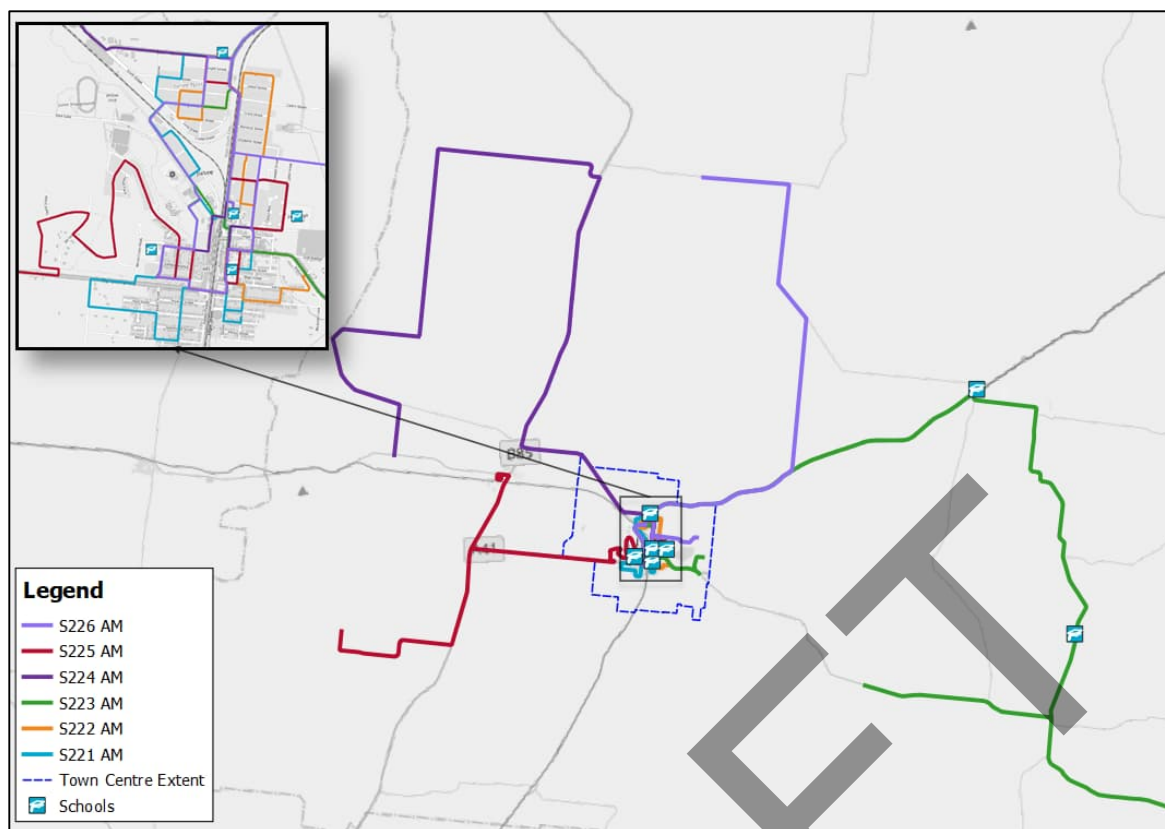


Figure 2-6: Existing School Bus Services and Routes in Junee

2.2.2.3 Rail

Junee Station is located on the Southern NSW Railway Line. It receives three services, each running in both directions. Two of these services run daily with the third running two times a week.

Information regarding train operations are based on the existing timetable information as published on the NSW Trainlink Website (Accessed March 28, 2022). The following Table 2-3 lists train service numbers, their respective routes, service frequency, and the arrival times at Junee Station.

Table 2-3: Junee Station Train Services

Service No.	Train Route	No. of Services	Arrival Time
621	Sydney (Central) to Melbourne (Southern Cross)	1 Service (Daily)	02:25
622	Melbourne (Southern Cross) to Sydney (Central)		00:48
623	Sydney (Central) to Melbourne (Southern Cross)	1 Service (Daily)	13:27
624	Melbourne (Southern Cross) to Sydney (Central)		13:51
641	Goulburn to Griffith	1 Service (Sat)	13:07
		1 Service (Wed)	17:53
642	Griffith to Goulburn	1 Service (Thu/Sun)	09:44

Source: TfNSW

Trains connect to regional coach lines at Junee, which provide access to Wagga Wagga and other towns between Junee and Canberra.

2.2.3 General Traffic

Olympic Highway is the key transport corridor through Junee running in an east-west direction and providing strategic connectivity to Junee with other regions. This is also a key freight route as shown in Figure 2-3. Olympic Highway becomes Seignior Street (west side of rail corridor) and Main Street (east side of rail corridor) after entering Junee and continues as the Olympic Highway after beyond the Junee township.

Old Junee Road is located on the north-west corner of Junee and connects Junee with Goldfields Way to the west. This is a key corridor for both freights and general traffic.

Byrnes Road runs from the south side of Junee to Wagga Wagga and provides connectivity to Harefield freight terminal, the Junee abattoir and the Bomen industrial area near Wagga Wagga.

Details of traffic flows on these key road corridors are discussed in Chapter 3 of this report.

2.3 Crash Data Analysis

Recent five-year crash data (2015-2019) for the Junee LGA was collected from TfNSW crash data site and was analysed to understand safety implications of the key freight corridors in the vicinity of Junee. Figure 2-7 shows location of crashes within Junee LGA boundary. As shown in the figure below, a significant amount of crashes occurred on the Olympic Highway, followed by Gundagai Road. No fatal crashes were recorded on Olympic Highway, however two fatal crashes were recorded on Gundagai Road between 2015 and 2019.

A total of 103 crashes was recorded in 5 years period (2015-2019), out of which 76 (73.8%) crashes involved some level of injuries. As shown in Figure 2-8, the number of serious injury crashes are the highest, followed by non-injury crashes and moderate injury crashes.

DRAFT

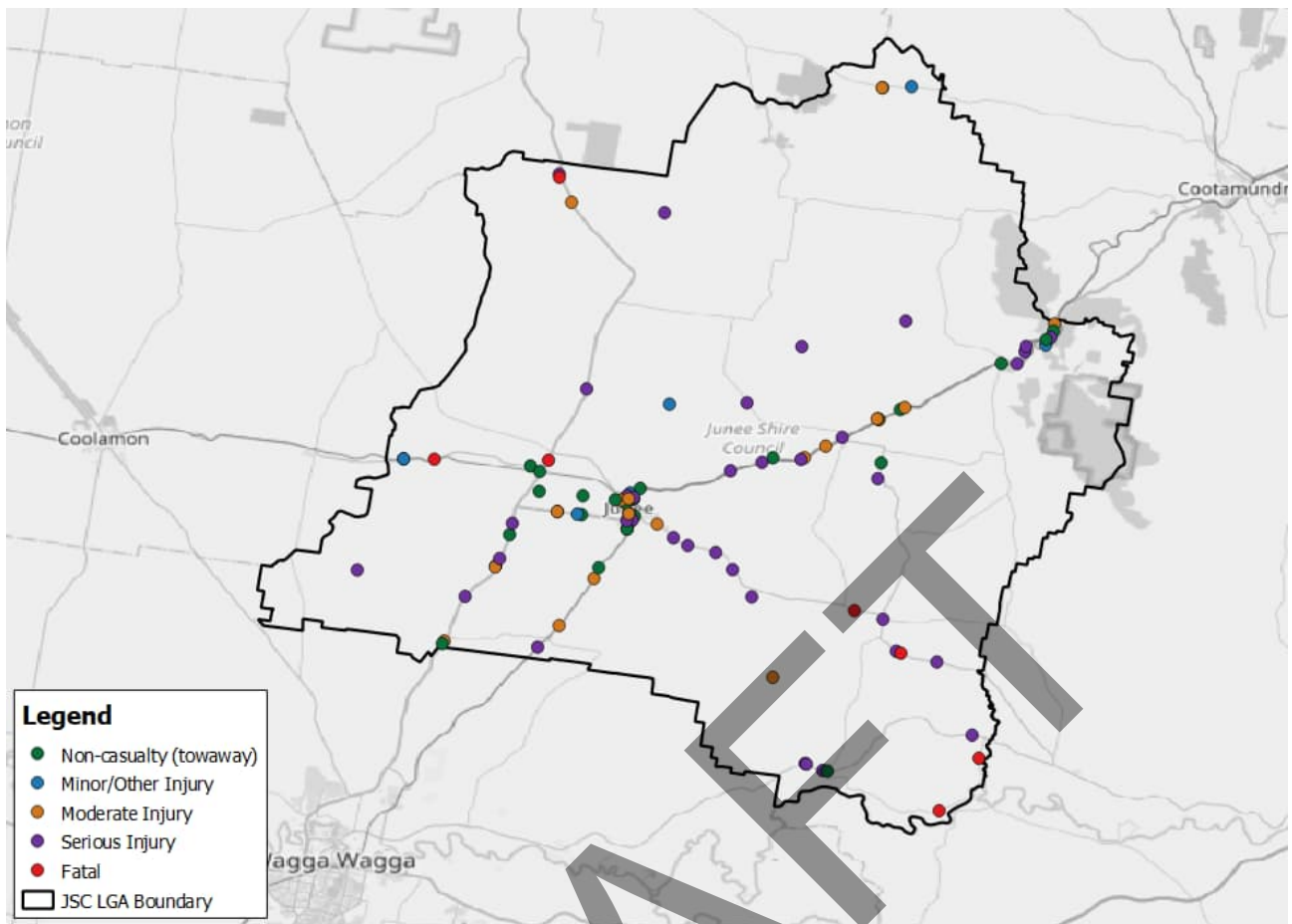


Figure 2-7: Location of Crashes within Junee LGA (5 years, 2015-2019)

Source: TfNSW

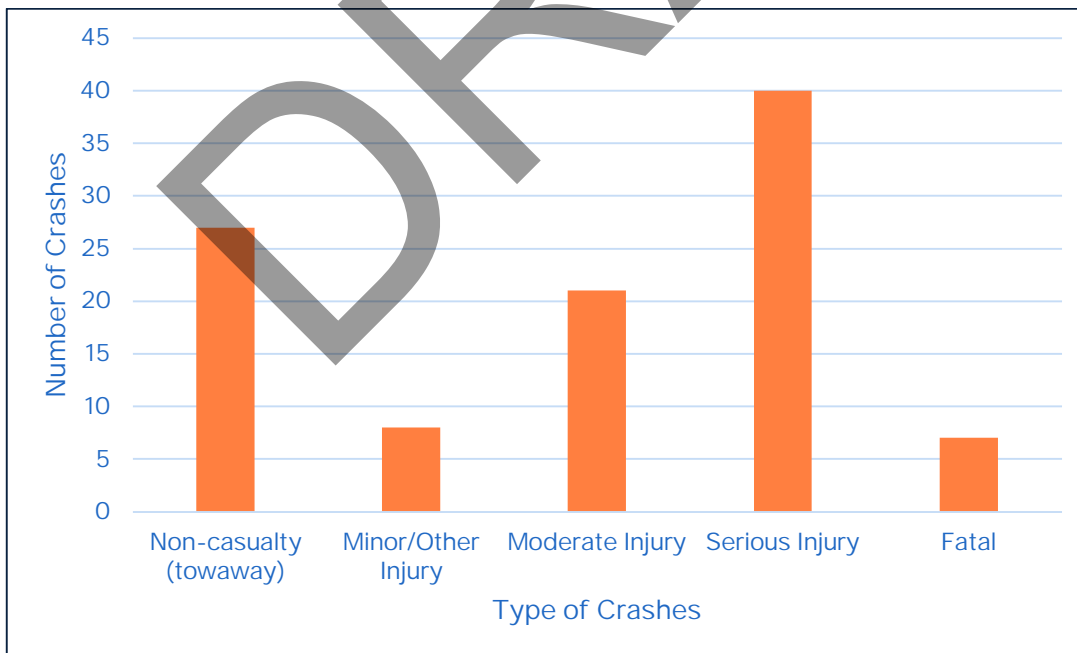


Figure 2-8: Distribution of Crashes by Injury Type (5 years, 2015-2019)

Figure 2-9 shows distribution of injury crashes by location. As shown, the majority of crashes occurred on two-way divided roads, including all seven fatal crashes, followed by T-junction and cross-intersection crashes.

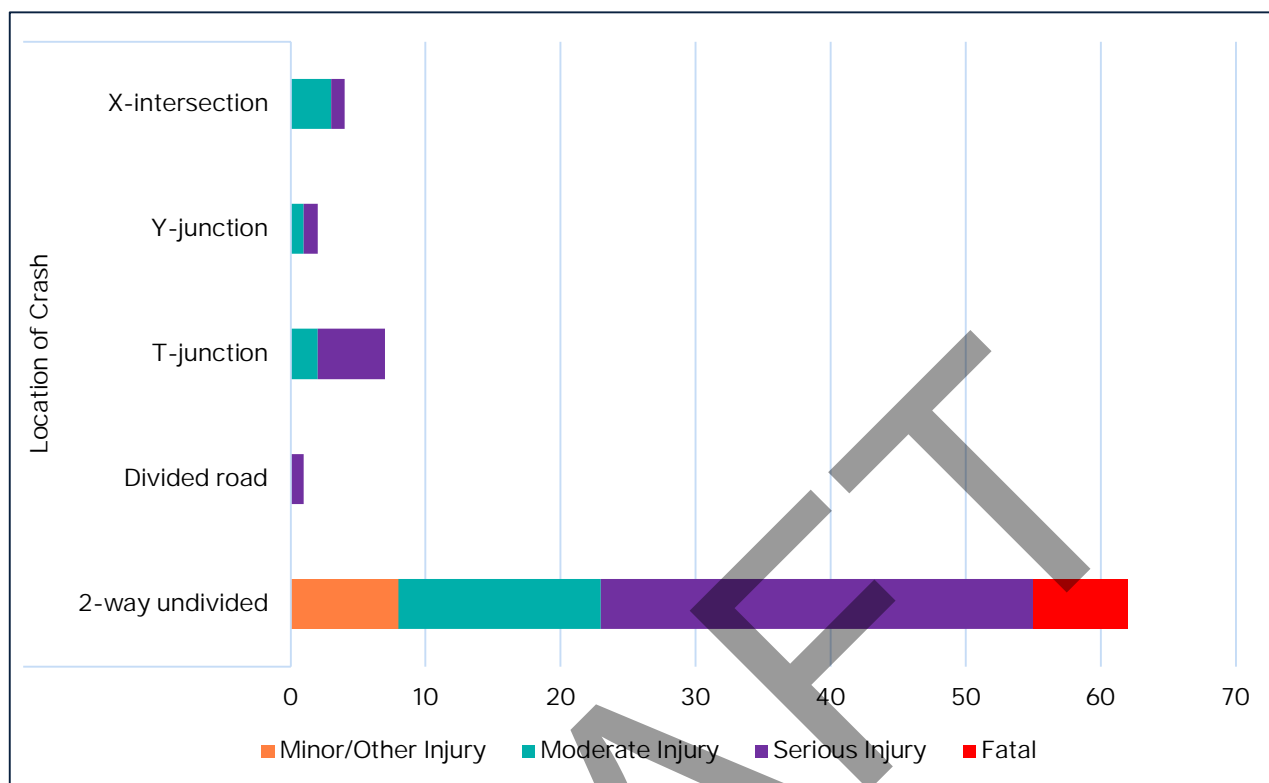


Figure 2-9 Distribution of Crashes by Location (Injury Crashes Only)

The crash severity index has been calculated for the injury crashes occurred within Junee Shire Council area and compared against the crash severity index of New South Wales. The crash severity index is typically calculated using a weighted method, with the highest weighting provided for fatal crashes and lowest weighting for minor/other injury crashes as shown in Table 2-4. Table 2-5 shows the calculated crash severity index for Junee Shire Council area and New South Wales. As shown, the crash severity index is higher within the Junee LGA as compared to the NSW average.

Table 2-4: Weightage of Injury Crashes

Injury	Rate
Fatal Crash	2.5
Serious Injury	2
Moderate Injury	1.5
Minor/Other Injury	1

Table 2-5: Crash Severity Index of Junee Shire Council and New South Wales

Description	Fatal Crashes	Serious injuries	Moderate injury crashes	Minor/Other Injury Crashes	Total	Crash Severity Index
JSC LGA	7	49	21	8	85	1.82
NSW State-wide	1,819	26,844	42,430	32,876	103,969	1.49

2.4 Key Network Constraints

The key constraints along the freight routes in the vicinity of Junee are:

Train Operation and Movements at Junee

Currently there are 13 rail services per day between Albury and Illabo which is anticipated to increase to 24 services by 2040 (ARTC 2021). It is also anticipated that the train services between Stockinbingal and Parkes would increase in future. It is understood that all of these train services would pass through Junee.

Junee railway station provides for train driver shift changes for several rail operators. This shift change currently requires the level crossing to be closed. The operational nature of the current level crossing activation together with future impacts associated with the Inland Rail project would likely affect the operation of Seignior Street, Broadway, Lorne Street and Main Street (due to increased level crossing closure).

The Junee rail station grounds are also used to shunt train rakes and reposition locomotive engines regularly for operational purposes. The Junee station has up to seven railroad sidings for this purpose and many of the movements require the activation of the level crossing. This is further impacted by the Griffith branch line approximately 300m north of the Junee Station on Broadway, trains from the branch that need to travel north to Sydney first must travel south to the Junee station, stop and reposition the engine from the southern end of the train rake to the northern end before the train travels north to Sydney. This operation activates the level crossing as well and consequently impacts the surrounding road operation. With respect to this movement (for train services between Sydney and Griffith and vice versa), a rail spur travelling from north to west previously facilitated this movement, however the spur has since been removed.

While the level crossing is activated, westbound traffic queues on Main Street northbound. There is currently 75m space for queueing here. Eastbound traffic has only 40m to queue before the queueing vehicles will interrupt the operation of the roundabout intersection of Broadway and Olympic Highway.

The Junee District Hospital is located approximately 500m west of the level crossing. While the crossing is activated, trips to and from the hospital would need to travel via the Olympic Highway underpass or Kemp Street bridge. While it is noted that this additional travel time and distance may increase emergency response times, Emergency Services have informed council that the alternative routes are acceptable.

The current intention for Kemp Street bridge is replacement on the existing alignment to facilitate the passage of double stacked trains (necessitating a higher clearance). This would require demolition of the existing bridge followed by construction of the new bridge (with tie-in works on both eastern and western approaches). During the construction period, extra reliance will be placed on the existing level crossing and underpass.

Figure 2-10 shows the existing level crossing arrangement.



Figure 2-10: Level crossing, looking east toward Main Street

Limited East-West Connectivity due to Existing Train Line

The existing rail tracks (both Southern Line and the Inland Rail) running through Junee bisects the town into two sections and creates a significant barrier for pedestrians, general traffic and freight movements. There are currently four crossing facilities available as shown in Figure 2-11 below.

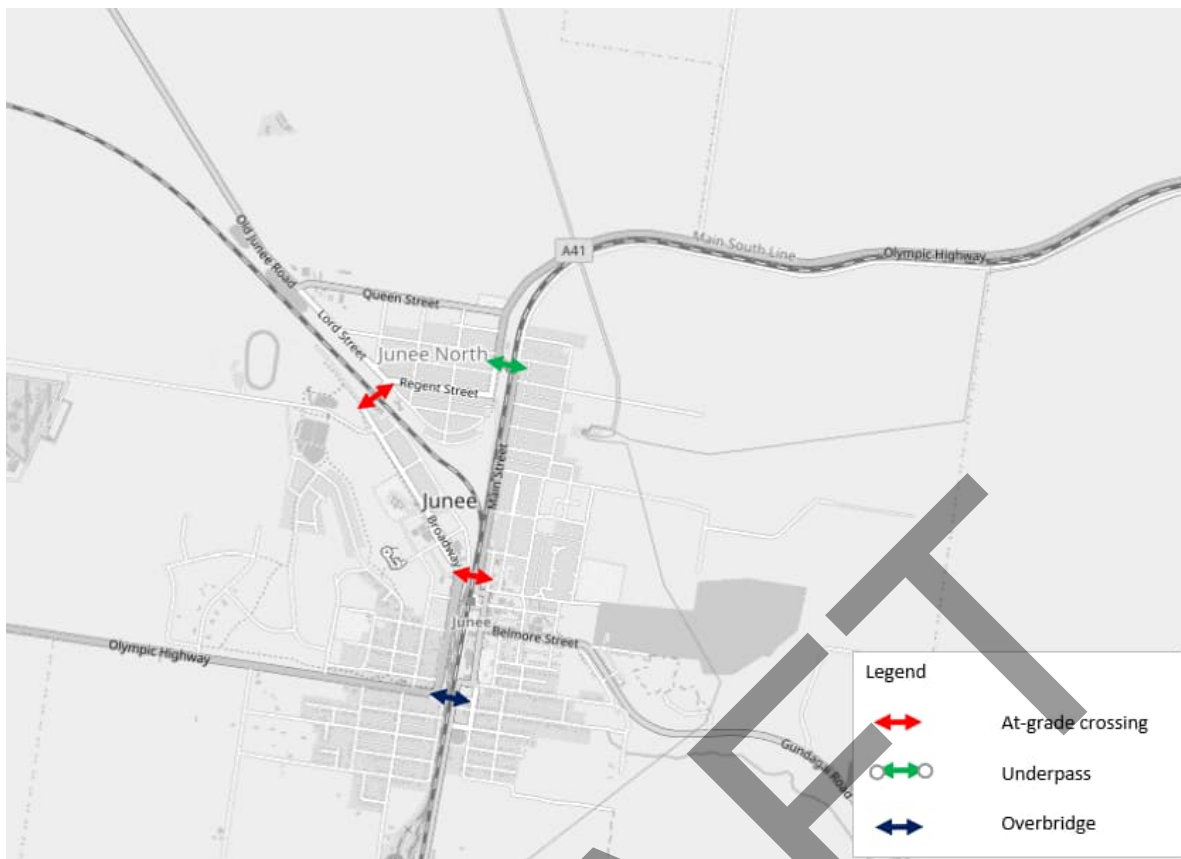


Figure 2-11: Existing Crossing Rail Crossing Facilities in Junee

In the future, the increased train movements through Junee would increase the duration of level crossing closures, with likely spill over impacts on the adjacent road network, including impacts on pedestrian and freight movements along Lorne Street, Humphreys Street, Broadway, Main Street and Seignior Street. Lorne Street, Humphreys Street and Broadway Street are also high pedestrian activity areas. Interruption of traffic flows on these roads due to increased closure the level crossing would likely create a safety risk for pedestrians.

The 4.6m low level underpass at the northern end of Main Street

This underpass has a clearance of 4.6m and limits high vehicle traffic from traversing that route. Rail operators maintain the bridge (over the underpass) and there are no plans to increase the clearance. The Inland Rail project is expected to change the rail arrangement above the underpass, but final construction details have not yet been confirmed. Over-height vehicles travelling east-west would follow Old Junee Road and Queen Street, while vehicles travelling north-south would use the level crossing and follow a circuitous route through the residential areas. Figure 2-12 shows the poor visibility and geometry on the northbound approach to the underpass.



Figure 2-12: Northbound approach to rail underpass

Figure 2-13 shows a semi-trailer passing through the underpass. Also of note is the narrow footpath and damage to the pedestrian fence, indicating that it has been hit by a vehicle at some point.



Figure 2-13: Heavy vehicle traversing underpass

The Kemp Street Bridge

This Bridge is proposed to be raised and upgraded to allow A-double vehicles with the development of the Inland Rail Project. The Bridge itself is a rail asset and the Inland Rail project is committed to upgrading the bridge to allow A-double vehicles. However, the A-double design for both approaches to the bridge is out of scope for the Inland Rail project and JSC is investigating possible options. Figure 2-14 shows a possible layout for the intersection of Kemp Street with Ducker Street, which would allow passage of an A-double vehicle (nominally of a 30m length).



Figure 2-14: Possible layout for intersection of Kemp Street and Ducker Street

Lord Street Bridge

Lord Street Bridge is an old brick bridge located on Lord Street between Prince Street and Earl Street that is in very poor condition (see Figure 2-15) and needs to be replaced/upgraded to accommodate B-doubles. The bridge is formally closed to heavy vehicles during harvest season. Council plans to replace this bridge in 2022/23.



Figure 2-15: Lord Street Bridge showing current dilapidated state

HL Robinson Bridge

The HL Robinson Bridge is located on Old Junee Road approximately 175m east of Goldfields Way. The bridge is currently design rated to carry B-double loads, but is not suitable for Road Trains or A-doubles. Raising the load restrictions would improve the transport of grain to the grain processing facilities on Queen Street and local transport operators have indicated a desire for vehicles larger than B-doubles to use this bridge to transport grain and other agricultural products. Figure 2-16 shows the HL Robinson Bridge and its proximity to the intersection with Goldfields Way.



Figure 2-16: HL Robinson Bridge, with intersection of Old Junee Road and Goldfields Way in background

High Pedestrian Activity Areas

There are a number of areas in Junee that have high numbers of pedestrians and other vulnerable road users, including the commercial centre, school zones and recreational areas. A key activity area is located on Lorne Street, between Belmore Street and Hill Street. Junee Public School is located on the eastern side of Lorne Street, while the Junee Recreation and Aquatic Centre is located on the western side. A zebra crossing runs between the two facilities and connects to the wider path network. On-street parking is provided on both sides of Lorne Street and the school bus stop is located on the eastern (southbound) side. It is expected that this area would be very busy at the start and end of each school day, and most of the day on weekends. Figure 2-17 shows the arrangement in this area.



Figure 2-17: Zebra Crossing over Lorne Street, looking south toward school bus stop

Peel Street, Lorne Street, Main Street and Broadway form much of the commercial centre of Junee. There is on-street parking, high pedestrian movements and limited visibility caused by adjacent building frontages.

Queen Street provides east-west connectivity between Olympic Highway and Old Junee Road and is the site of the grain transfer facility. However, Junee North Public School is located on the corner of Queen Street and Olympic Highway, so heavy vehicles using this route need to pass through the school zone and student crossing. Figure 2-18 shows an example of a large vehicle turning right from Olympic Highway (southbound) to Queen Street (westbound). Observations of this location during the site visit showed that heavy vehicles do not always stay lane-correct as they turn.



Figure 2-18: Heavy vehicle on Queen Street (westbound) entering school zone

3 Traffic Flow and Analysis

Traffic flow data has been analysed for key freight routes in the vicinity of Junee. A traffic survey company has been engaged to collect the traffic flow data. The traffic survey methodology and analysis of traffic data are discussed in the following section.

3.1 Traffic Survey and Data Collection

3.1.1 Methodology

A mid-block traffic survey was conducted on ten sites along key freight routes to collect 24-hours traffic flow data, including classification and speed. The data were collected for a period of 28-days from 14 October 2021 to 10 November 2021 to understand current traffic flows, including light and heavy vehicles along the routes. The peak cropping freight period occurs in November and December, as shown earlier in Figure 2-2, so the latter part of the survey is expected to cover the start of this peak.

3.1.2 Survey Location

Figure 3-1 shows the traffic survey locations in Junee. There are ten sites included for 24-hours traffic survey as shown in the figure below.

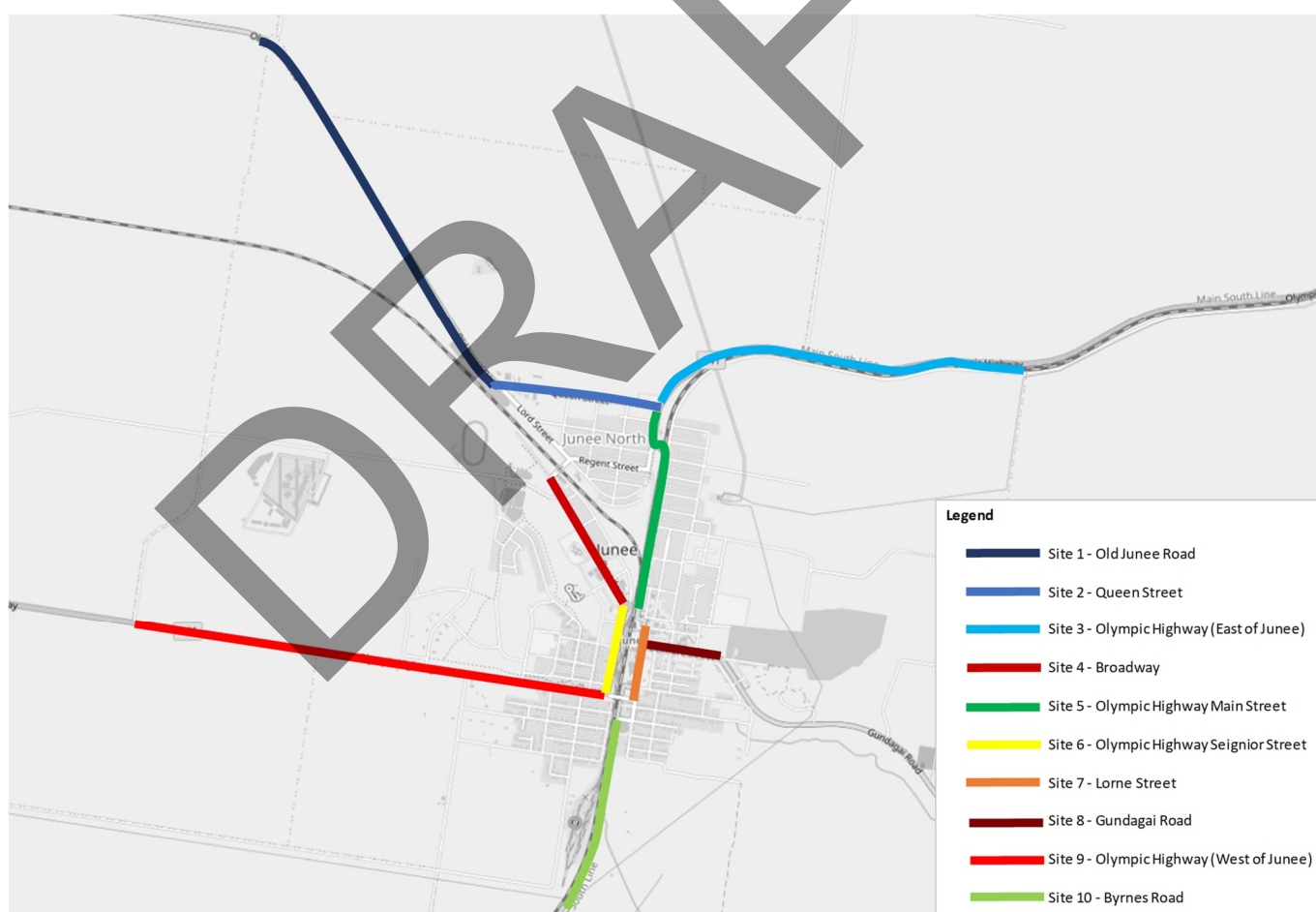


Figure 3-1: Location of Mid-Block Traffic Survey

3.2 Traffic Flow Analysis

The traffic survey data was analysed to understand the traffic flows on various freight routes in the vicinity of Junee. Table 3-1 shows the daily traffic flow data of a typical weekday. As shown in the table, Lorne Street has highest daily traffic flows of all survey sites, followed by Olympic Highway – Main Street and Olympic Highway – Seignior Street. Queen Street is observed to have the highest daily heavy vehicle flows, followed by Olympic Highway – East of Junee and Old Junee Road.

Table 3-1: Daily Traffic Flows (Typical Weekday) and Heavy Vehicle Percentages

Survey Site/Street	Daily Traffic Flows (Typical Weekday)			
	Total	Light Vehicles	Heavy Vehicles	% of HV
Site 1 - Old Junee Road	1,132	826	306	27.03%
Site 2 - Queen Street	786	533	253	32.19%
Site 3 - Olympic Highway (East of Junee)	2,002	1,460	542	27.07%
Site 4 - Broadway	2,690	2,305	385	14.31%
Site 5 - Olympic Highway Main Street	3,262	2,903	359	11.01%
Site 6 - Olympic Highway Seignior Street	2,950	2,694	256	8.68%
Site 7 - Lorne Street	4,162	3,702	460	11.05%
Site 8 - Gundagai Road	1,102	889	213	19.33%
Site 9 - Olympic Highway (West of Junee)	1,921	1,443	478	24.88%
Site 10 - Byrnes Road	2,840	2,358	482	16.97%

Source: Traffic Survey Data 2021

Detailed traffic data analysis for each survey site are presented in the sections below.

3.2.1 Old Junee Road (Site 1)

Figure 3-2 shows the distribution of daily traffic flows (average weekday and average all days) on Old Junee Road. As shown in the figure, peak traffic flows occurred between 2:30 pm and 3:30 pm.

Figure 3-3 shows the distribution daily traffic by vehicle classification for a typical weekday. 7.24% of vehicles recorded on Old Junee Road consist of 'Six Axle Articulated' and 'B Double' trucks.

Figure 3-4 shows the average speed and 85th percentile speed of all vehicles during a 'typical weekday', 'average weekday' and 'average all days' on Old Junee Road. Current posted speed limit of Old Junee Road is 100 kmph. As shown in the figure, the average speed and 85th percentile speed during a typical weekday, average weekday and average all day are at or below the current posted speed limit of this road. No significant variation in average speed and 85th percentile speed is observed for 'typical weekday', 'average weekday' and 'average all days' on Old Junee Road.

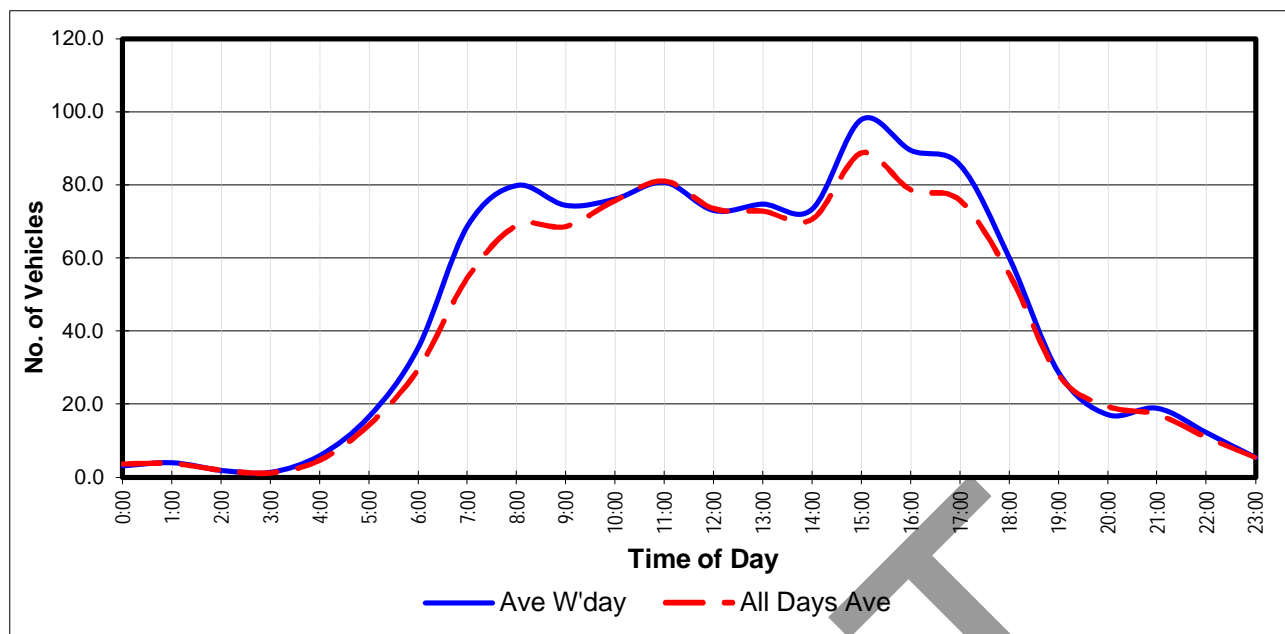


Figure 3-2: Average Weekday (24-Hours) and Average All Days (24-Hours) Traffic Flows on Old Junee Road (Both Directions)

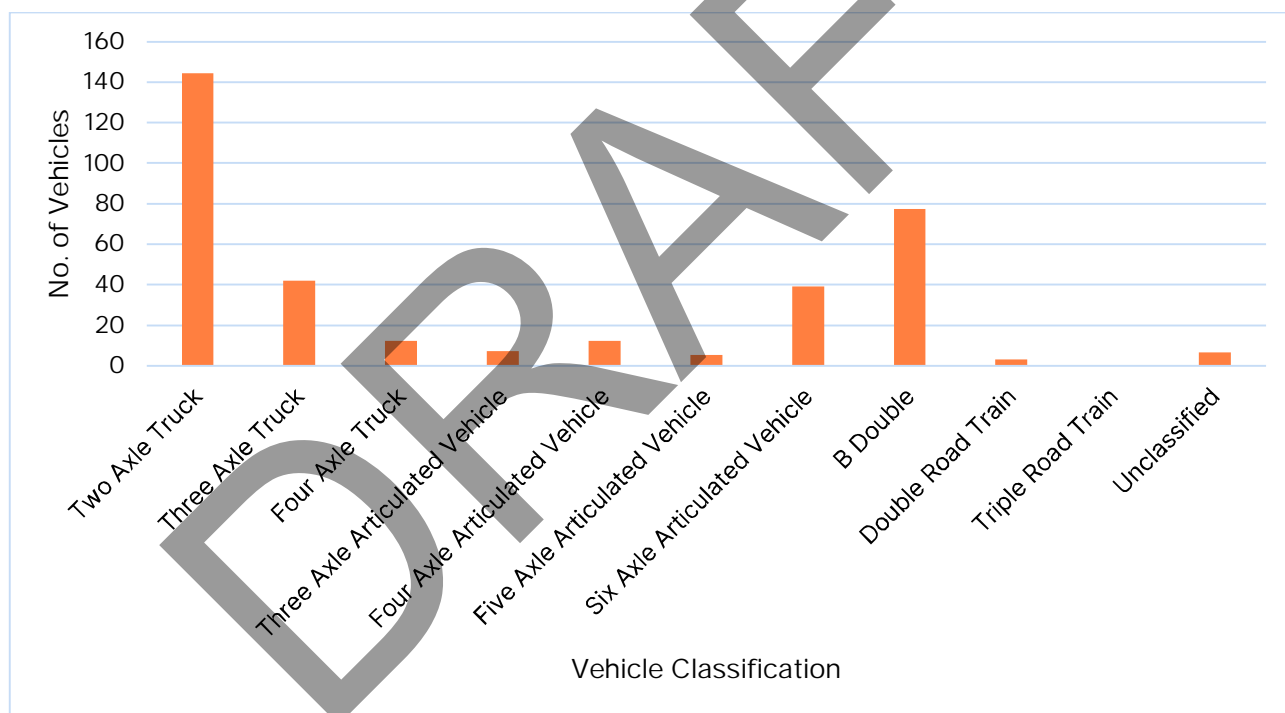


Figure 3-3: Distribution of Daily Vehicle Flows (Both Direction) by Vehicle Classification on Old Junee Road

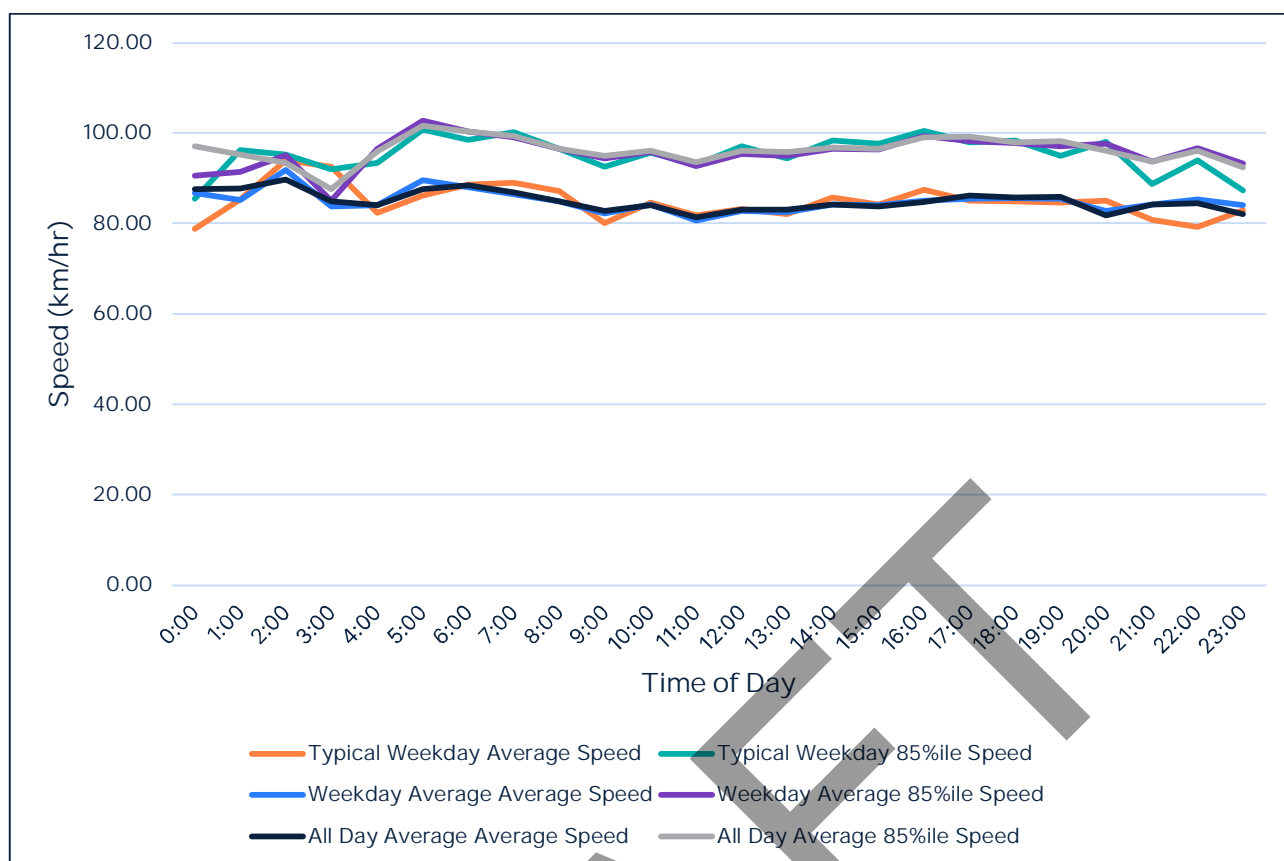


Figure 3-4: Average Speed and 85th Percentile Speed of Vehicles on Old Junee Road (Both Directions)

3.2.2 Queen Street (Site 2)

Figure 3-5 shows the distribution of daily traffic flows (average weekday and average all days) on Queen Street. As shown in the figure, peak traffic flows occurred between 7:30 am and 8:30 am (AM peak hour) and between 2:30 pm and 3:30 pm (PM peak hour), which coincide with the start and end of school.

Figure 3-6 shows the distribution of daily traffic by vehicle classification for a typical weekday. 17.7% of vehicles consist of 'Six Axle Articulated' and 'B Double' trucks on this road.

Figure 3-7 shows the average speed and 85th percentile speed of all vehicles during a 'typical weekday', 'average weekday' and 'average all days' on Queen Street. Current posted speed limit of Queen Street is 50 kmph. As shown in the figure, the average speed and 85th percentile speed of this road are above the current posted speed limit. No significant variation in average speed and 85th percentile speed is observed for 'typical weekday', 'average weekday' and 'average all days' on Queen Street, except for average and 85th percentile speed during typical weekday between 6 pm and 2 am.

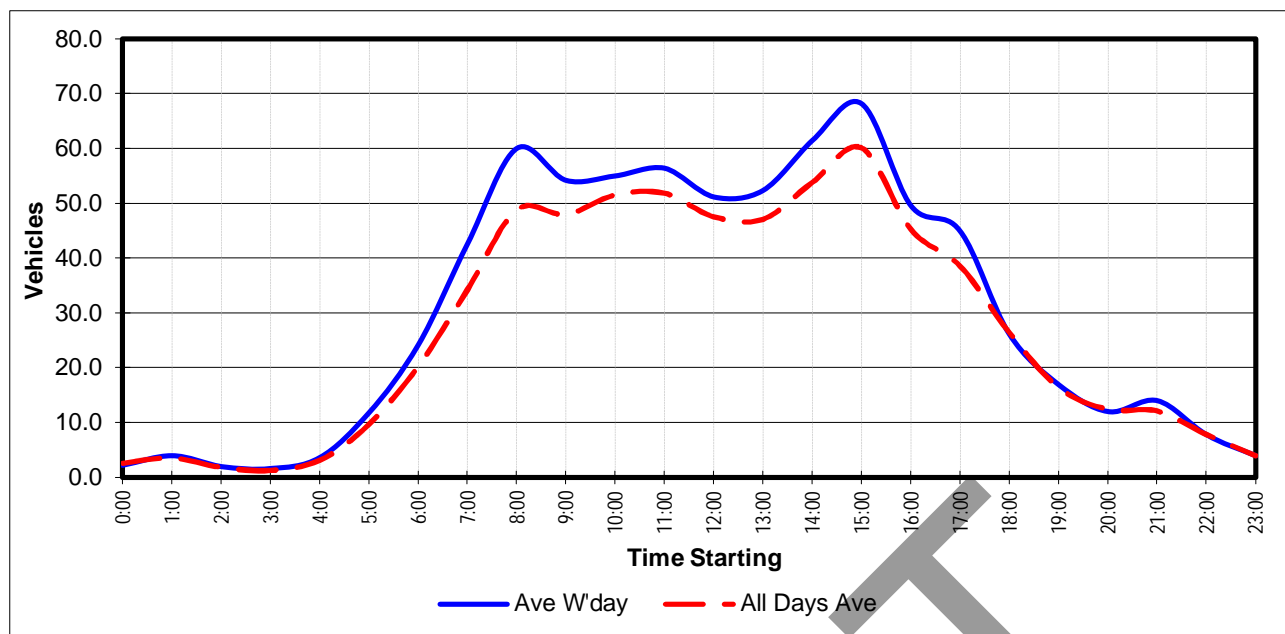


Figure 3-5: Average Weekday (24-Hours) and Average All Days (24-Hours) Traffic Flows on Queen Street (Both Directions)

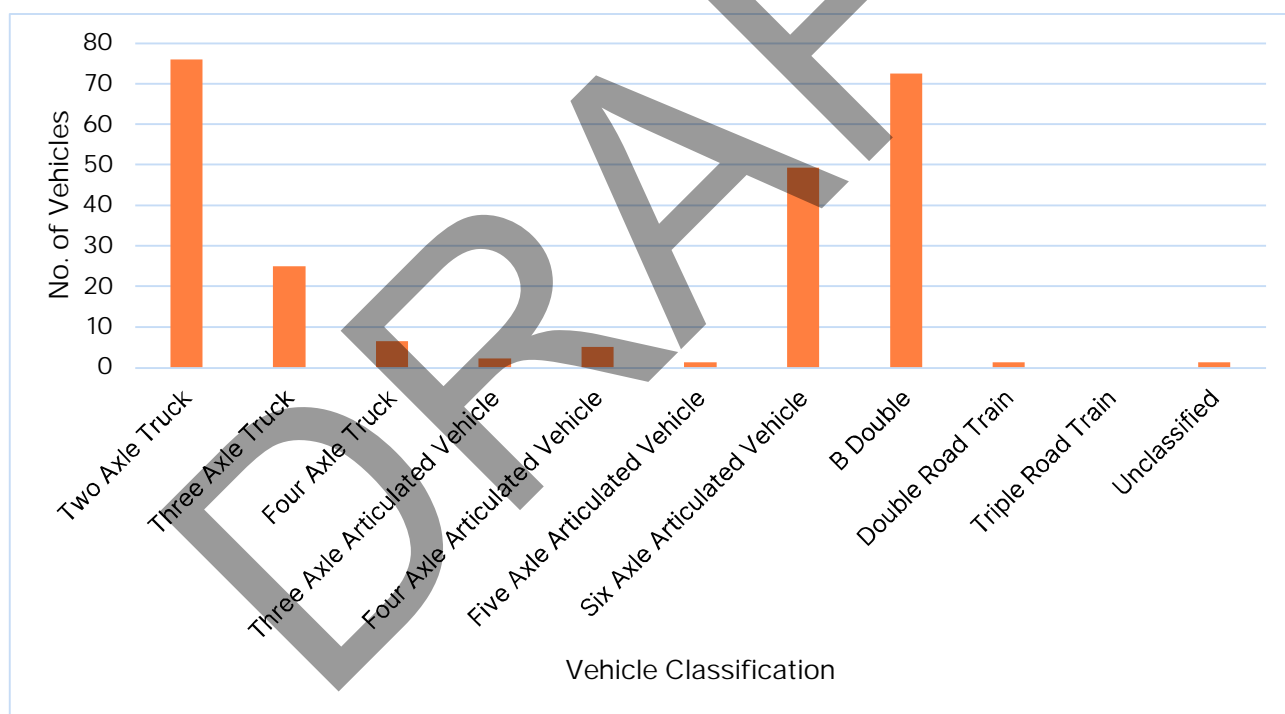


Figure 3-6: Distribution of Daily Vehicle Flows (Both Direction) by Vehicle Classification on Queen Street

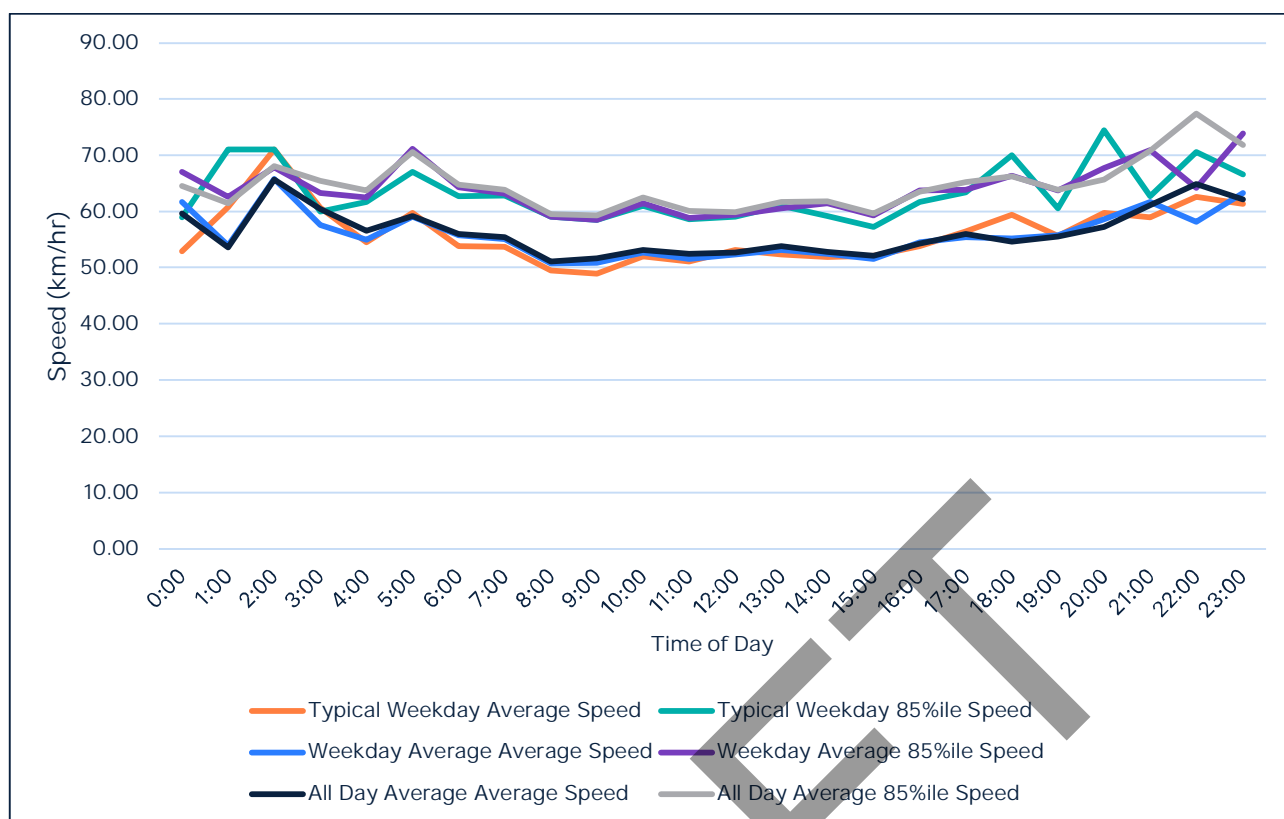


Figure 3-7: Average Speed and 85th Percentile Speed on Queen Street (Both Directions)

3.2.3 Olympic Highway – East of Junee (Site 3)

Figure 3-8 shows the distribution of daily traffic flows (average weekday and average all days) on Olympic Highway – East of Junee. As shown in the figure, peak traffic flows occurred between 3:30 pm and 4:30 pm.

Figure 3-8 shows the distribution of daily traffic by vehicle classification for a typical weekday. 5.5% of vehicles consist of 'Six Axle Articulated' and 'B Double' trucks on this road.

Figure 3-10 shows the average speed and 85th percentile speed of all vehicles during a 'typical weekday', 'average weekday' and 'average all days' on Olympic Highway – East of Junee. Current posted speed limit of Olympic Highway – East of Junee is 100 kmph. As shown in the figure, the average speed of vehicles travelling on this road is below the current posted speed limit, however the 85th percentile speed is above the current posted speed limit i.e. 85 percent of vehicles on this road are travelling at a speed beyond the current posted speed limit. No significant variation in average speed and 85th percentile speed is observed for 'typical weekday', 'average weekday' and 'average all days' on Olympic Highway – East of Junee, except for average and 85th percentile speed during typical weekday between 12 midnight and 4 am.

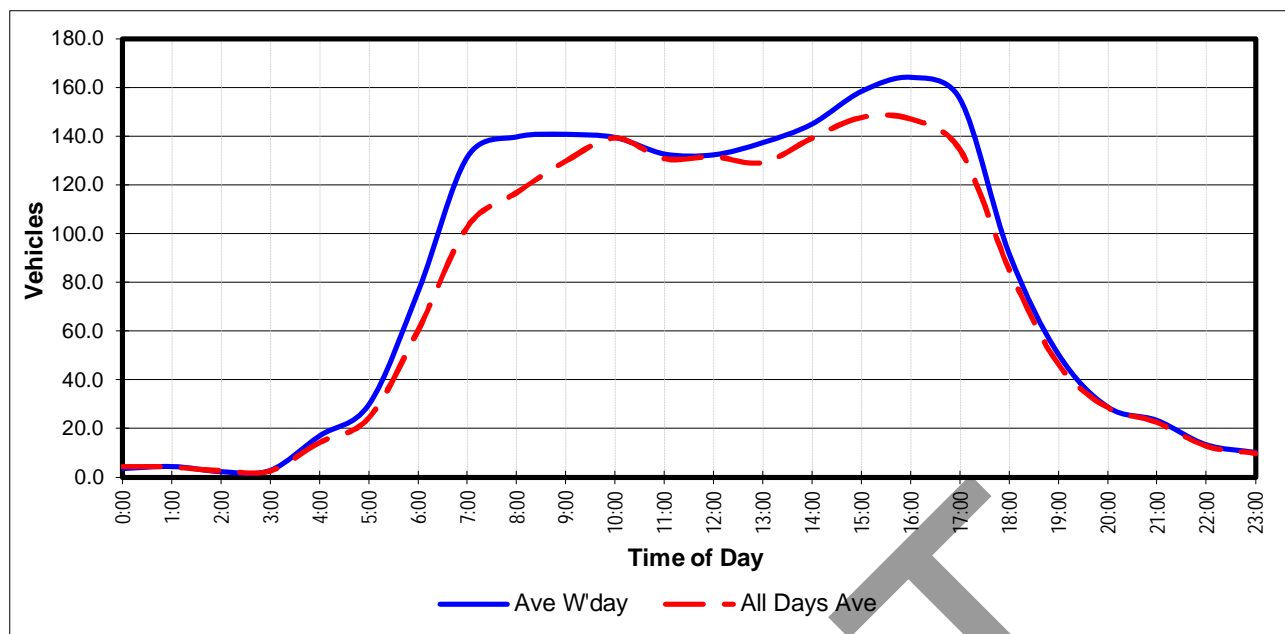


Figure 3-8: Average Weekday (24-Hours) and Average All Days (24-Hours) Traffic Flows on Olympic Highway – East of Junee (Both Directions)

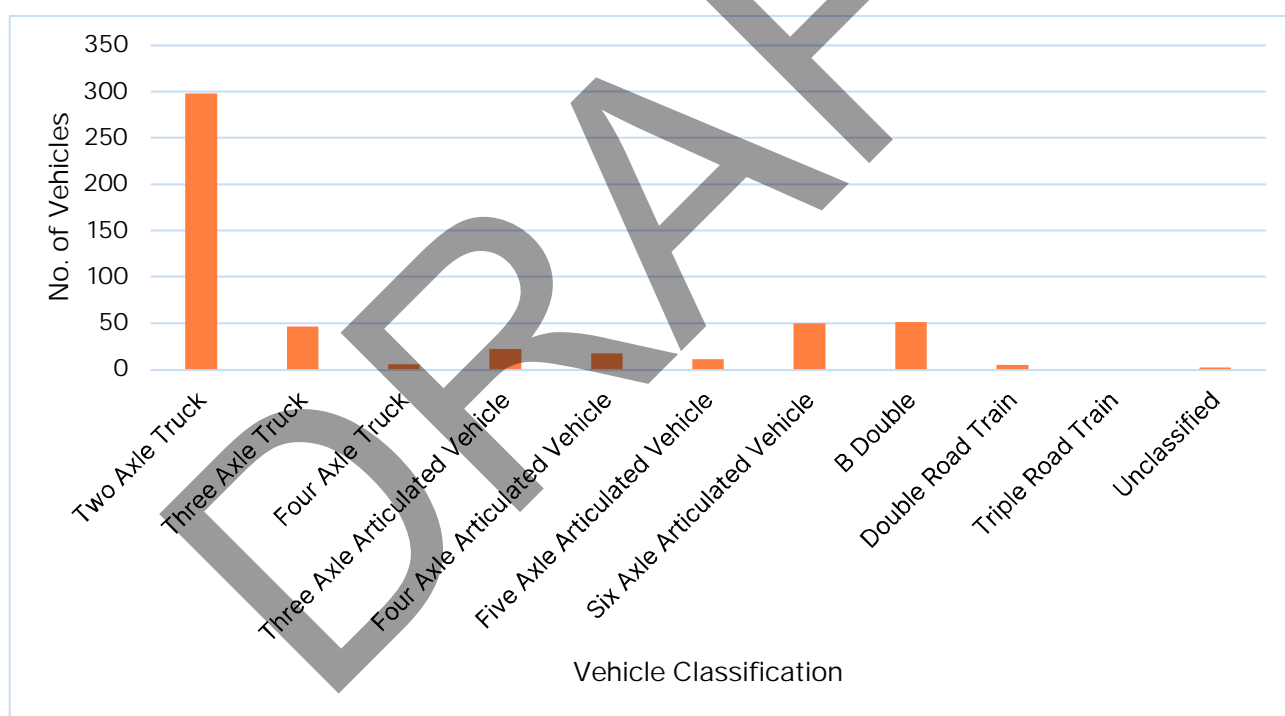


Figure 3-9: Distribution of Daily Vehicle Flows (Both Direction) by Vehicle Classification on Olympic Highway – East of Junee

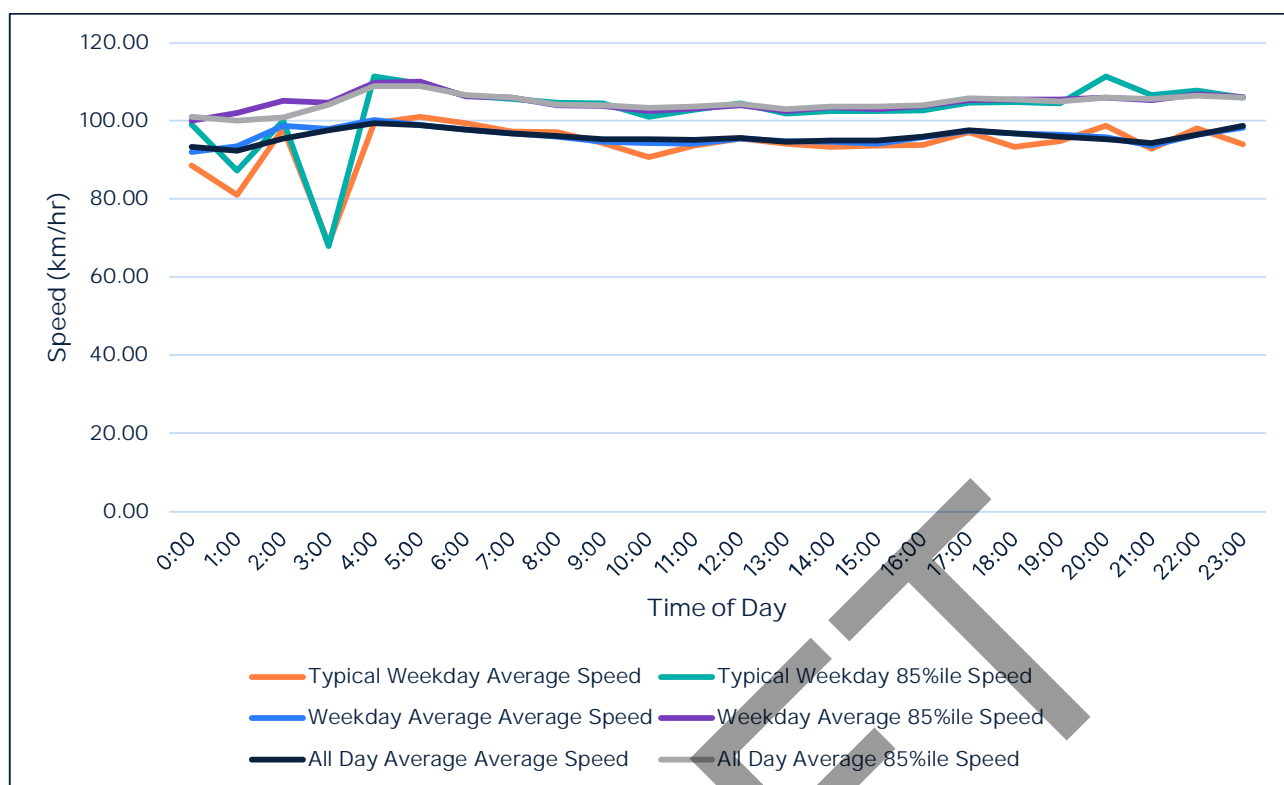


Figure 3-10: Average Speed and 85th Percentile Speed on Olympic Highway – East of Junee (Both Directions)

3.2.4 Broadway (Site 4)

Figure 3-11 shows the distribution of daily traffic flows (average weekday and average all days) on Broadway. As shown in the figure, peak traffic flows occurred between 3:00 pm and 4:00 pm.

Figure 3-12 shows the distribution daily traffic by vehicle classification for a typical weekday. Less than 1% of vehicles at this location are six-axle articulated or B Double.

Figure 3-13 shows the average speed and 85th percentile speed of all vehicles during a 'typical weekday', 'average weekday' and 'average all days' on Broadway. Current posted speed limit of Broadway is 50 kmph. As shown in the figure, the average speed of vehicles travelling on this road is at the current posted speed limit, however the 85th percentile speed is above the current posted speed limit i.e. 85 percent of vehicles on this road are travelling at a speed beyond the current posted speed limit. No significant variation in average speed and 85th percentile speed is observed for 'typical weekday', 'average weekday' and 'average all days' on Broadway.

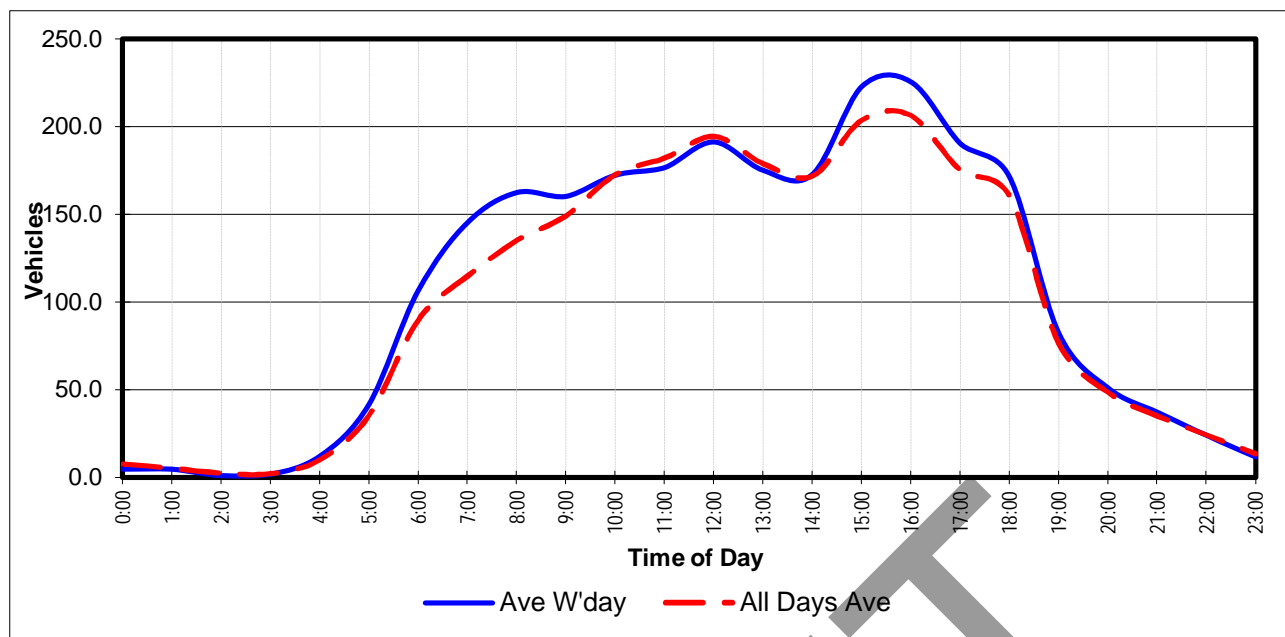


Figure 3-11: Average Weekday (24-Hours) and Average All Days (24-Hours) Traffic Flows on Broadway (Both Directions)

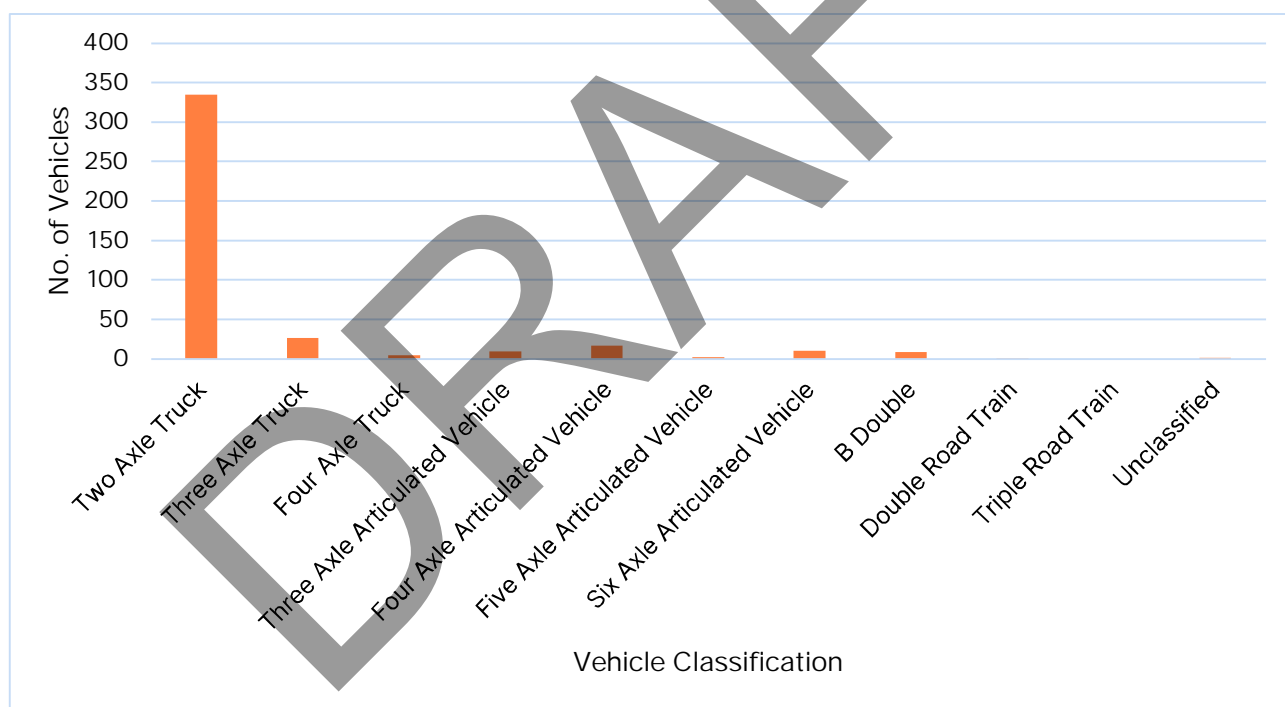


Figure 3-12: Distribution of Daily Vehicle Flows (Both Direction) by Vehicle Classification on Broadway

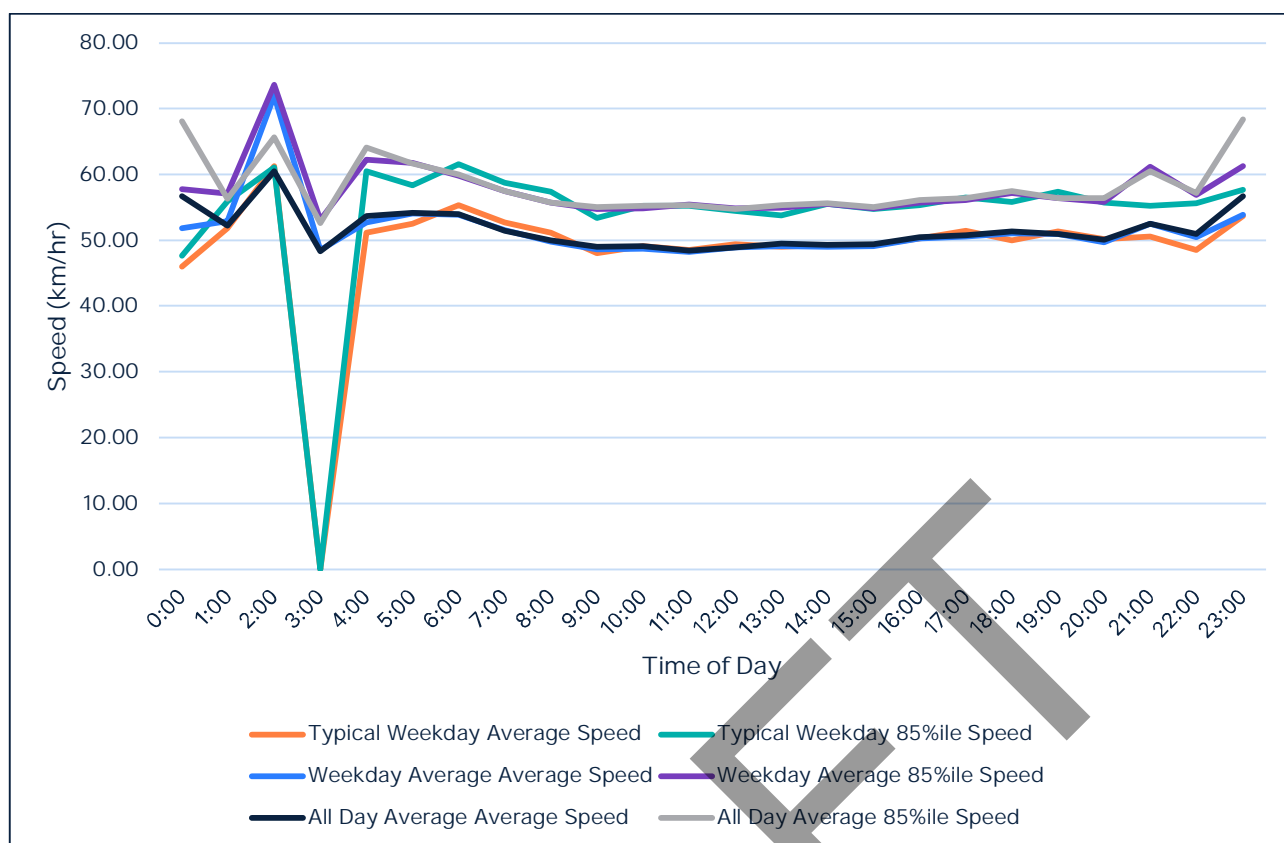


Figure 3-13: Average Speed and 85th Percentile Speed on Broadway (Both Directions)

3.2.5 Olympic Highway – Main Street (Site 5)

Figure 3-14 shows the distribution of daily traffic flows (average weekday and average all days) on Olympic Highway-Main Street. As shown in the figure, peak traffic flows occurred between 7:30 am and 8:30 am (AM peak hour) and between 2:30 pm and 3:30 pm (PM peak).

Figure 3-15 shows the distribution daily traffic by vehicle classification for a typical weekday. Less than 2% of vehicles at this location are six-axle articulated or B Double.

Figure 3-16 shows the average speed and 85th percentile speed of all vehicles during a 'typical weekday', 'average weekday' and 'average all days' on Olympic Highway-Main Street. Current posted speed limit of Olympic Highway – Main Street is 50 kmph. As shown in the figure, the average speed of vehicles travelling on this road is at the current posted speed limit, however the 85th percentile speed is above the current posted speed limit i.e. 85 percent of vehicles on this road are travelling at a speed beyond the current posted speed limit. No significant variation in average speed and 85th percentile speed is observed for 'typical weekday', 'average weekday' and 'average all days' on Olympic Highway-Main Street.

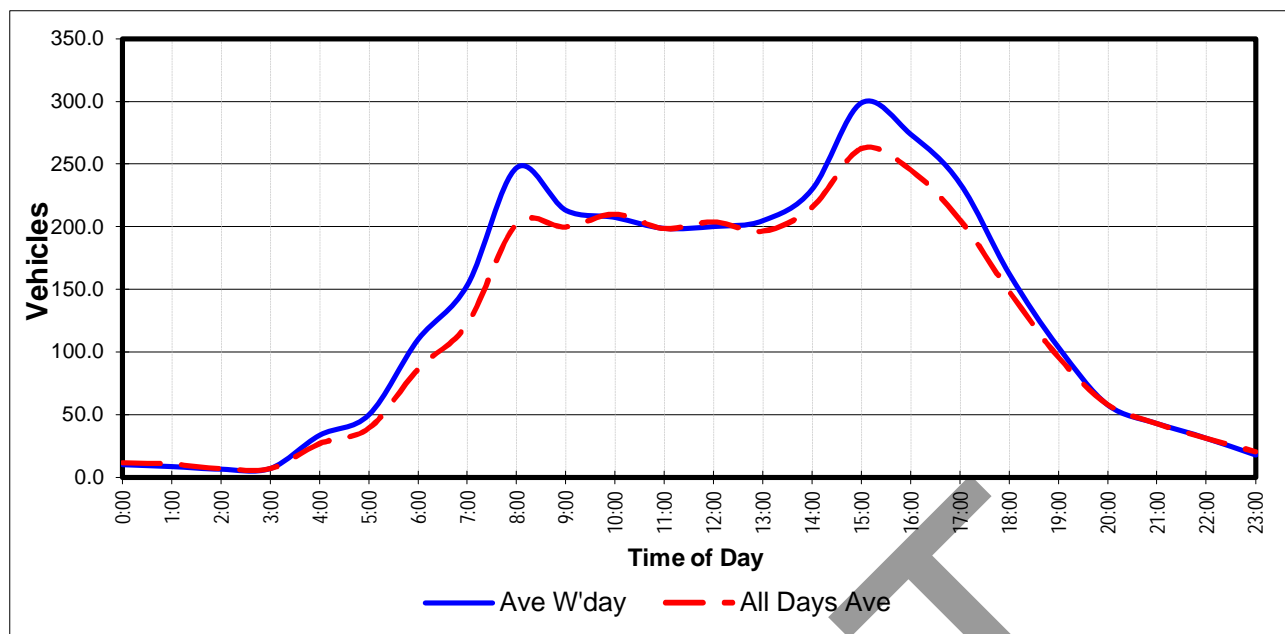


Figure 3-14: Average Weekday (24-Hours) and Average All Days (24-Hours) Traffic Flows on Olympic Highway – Main Street (Both Directions)

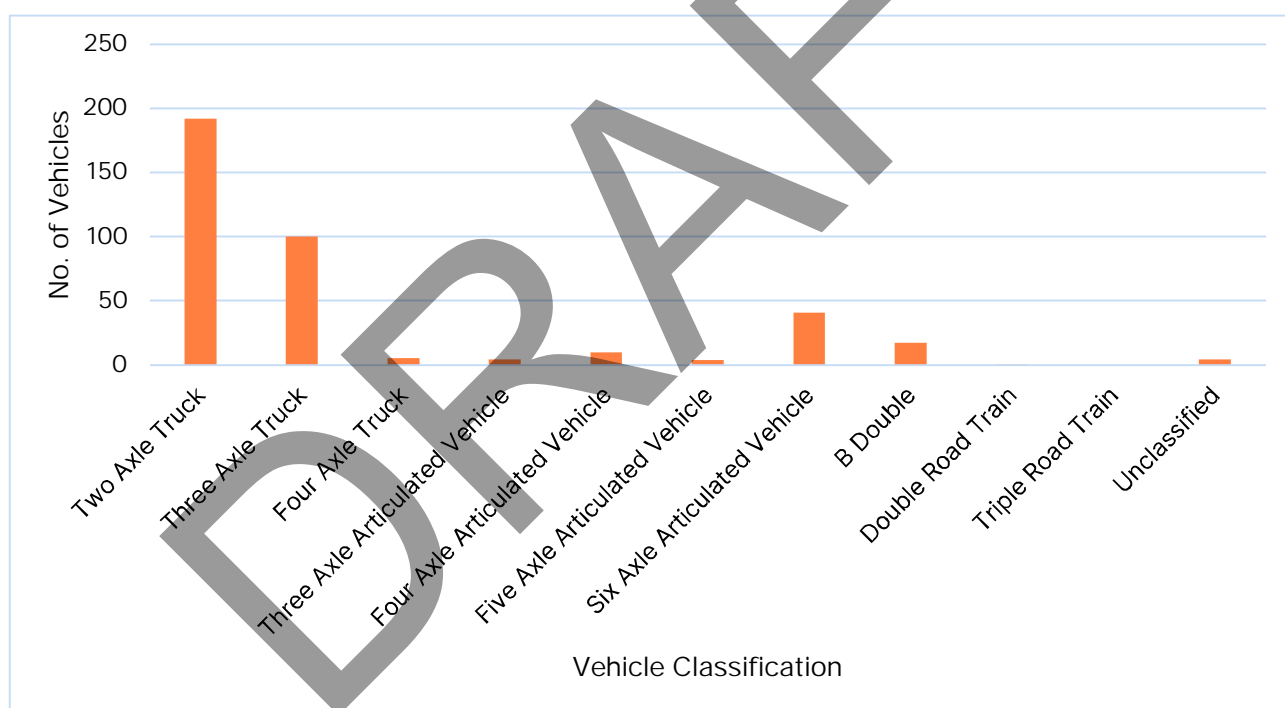


Figure 3-15: Distribution of Daily Vehicle Flows (Both Direction) by Vehicle Classification on Olympic Highway – Main Street



Figure 3-16: Average Speed and 85th Percentile Speed on Olympic Highway – Main Street (Both Directions)

3.2.6 Olympic Highway – Seignior Street (Site 6)

Figure 3-17 shows the distribution of daily traffic flows (average weekday and average all days) on Olympic Highway – Seignior Street. As shown in the figure, peak traffic flows occurred between 3:30 pm and 4:30 pm.

Figure 3-18 shows the distribution daily traffic by vehicle classification for a typical weekday. Less than 1% of vehicles at this location are six-axle articulated or B Double.

Figure 3-19 shows the average speed and 85th percentile speed of all vehicles during a 'typical weekday', 'average weekday' and 'average all days' on Olympic Highway – Seignior Street. Current posted speed limit of Olympic Highway – Seignior Street is 50 kmph. As shown in the figure, the average speed of vehicles travelling on this road is at the current posted speed limit, however the 85th percentile speed is above the current posted speed limit i.e. 85 percent of vehicles on this road are travelling at a speed beyond the current posted speed limit. No significant variation in average speed and 85th percentile speed is observed for 'typical weekday', 'average weekday' and 'average all days' on Olympic Highway – Seignior Street. Some variation in average speed and 85th percentile speed is observed between 12 midnight and 3:00 am.

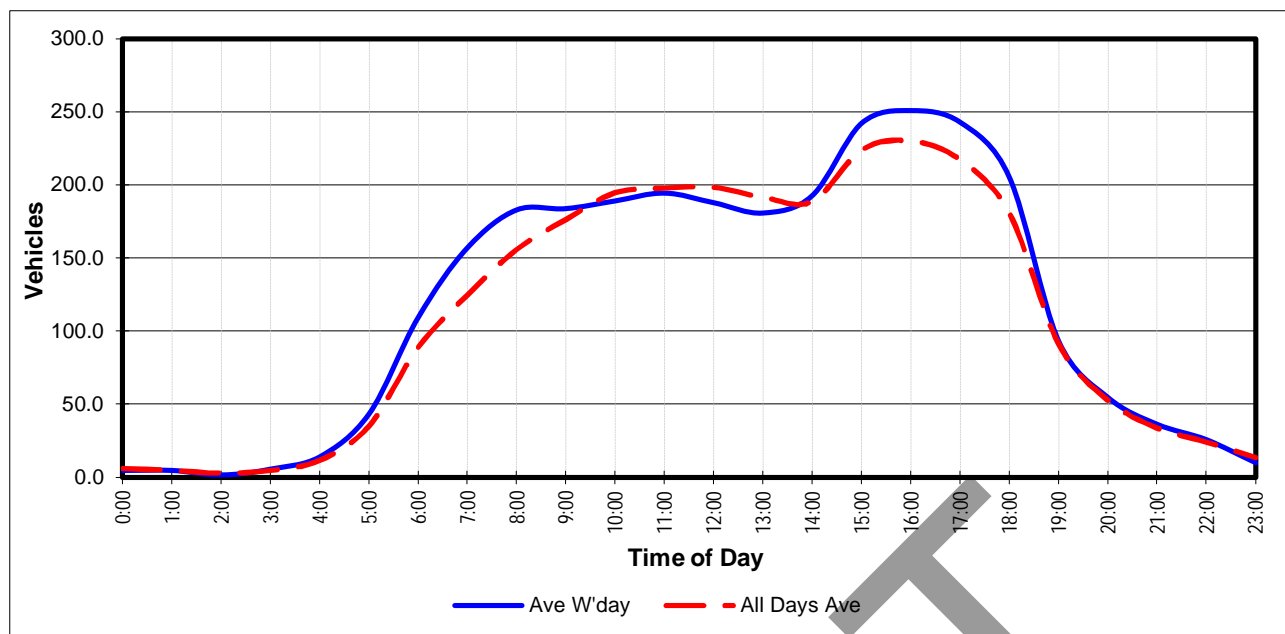


Figure 3-17: Average Weekday (24-Hours) and Average All Days (24-Hours) Traffic Flows on Olympic Highway – Seignior Street (Both Directions)

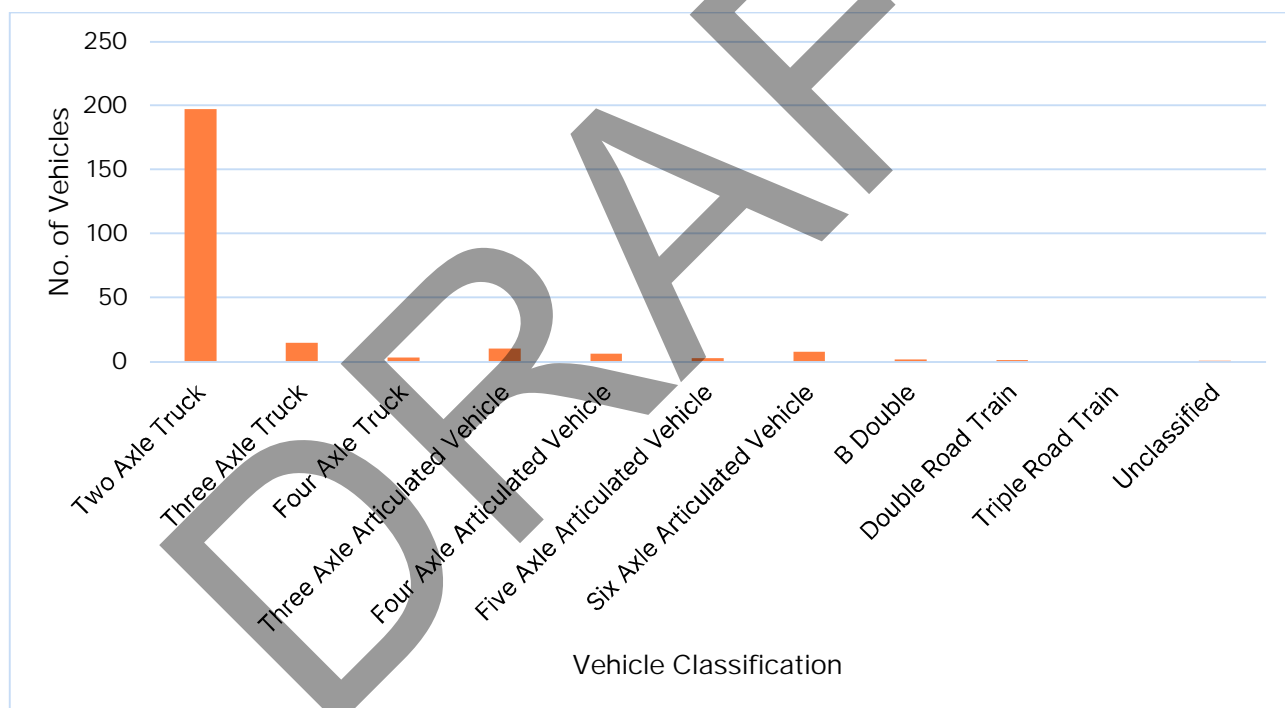


Figure 3-18: Distribution of Daily Vehicle Flows (Both Direction) by Vehicle Classification on Olympic Highway – Seignior Street

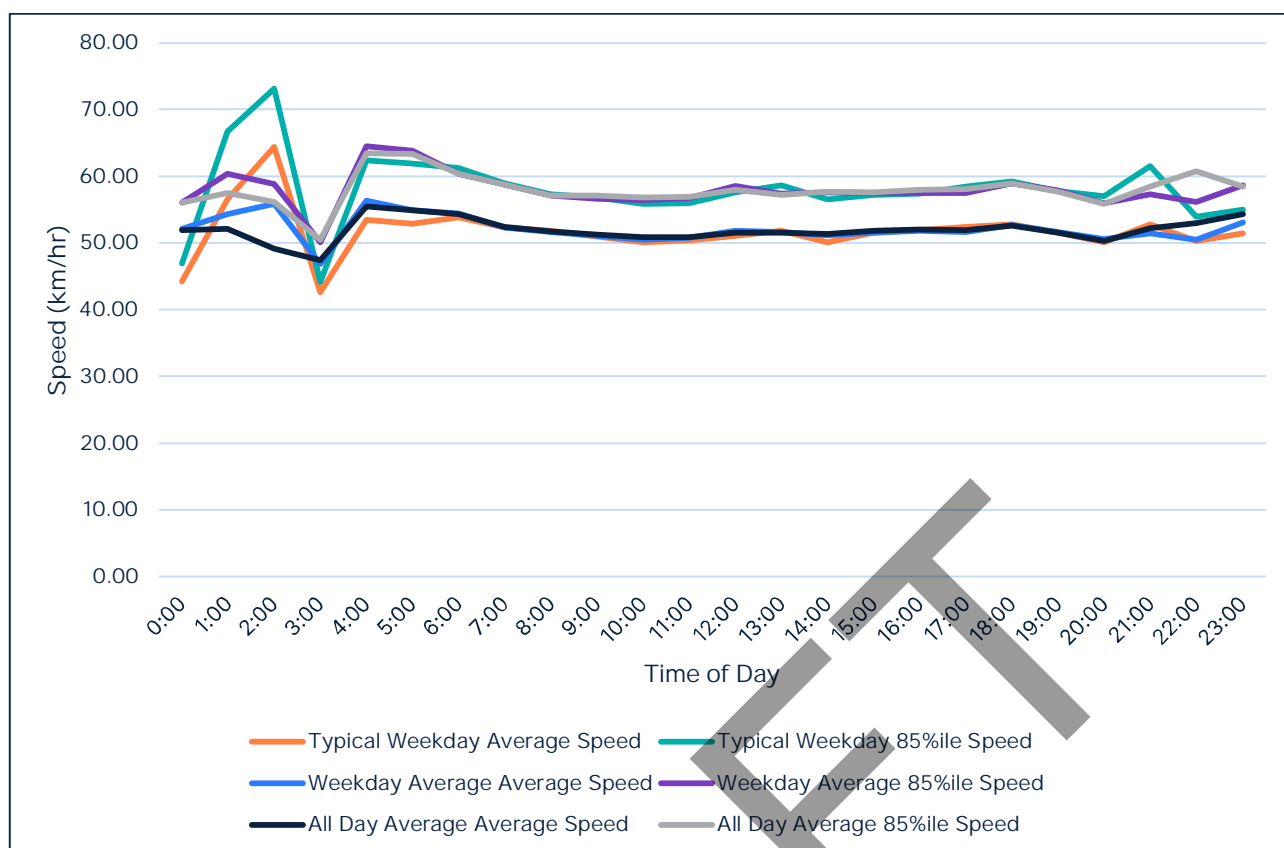


Figure 3-19: Average Speed and 85th Percentile Speed on Olympic Highway – Seignior Street (Both Directions)

3.2.7 Lorne Street (Site 7)

Figure 3-20 shows the distribution of daily traffic flows (average weekday and average all days) on Lorne Street. As shown in the figure, peak traffic flows occurred between 7:45 am and 8:45 am (AM peak) between 2:45 pm and 3:45 pm (PM peak).

Figure 3-21 shows the distribution daily traffic by vehicle classification for a typical weekday. Less than 2% of vehicles at this location are six-axle articulated or B Double.

Figure 3-22 shows the average speed and 85th percentile speed of all vehicles during a 'typical weekday', 'average weekday' and 'average all days' on Lorne Street. Current posted speed limit of Lorne Street is 50 kmph. As shown in the figure, the average speed of vehicles travelling on this road is at the current posted speed limit. It is however observed that 85 percent of vehicles on this road are travelling above the posted speed limit between 10 pm and 7 am. No significant variation in average speed and 85th percentile speed is observed for 'typical weekday', 'average weekday' and 'average all days' on Lorne Street.

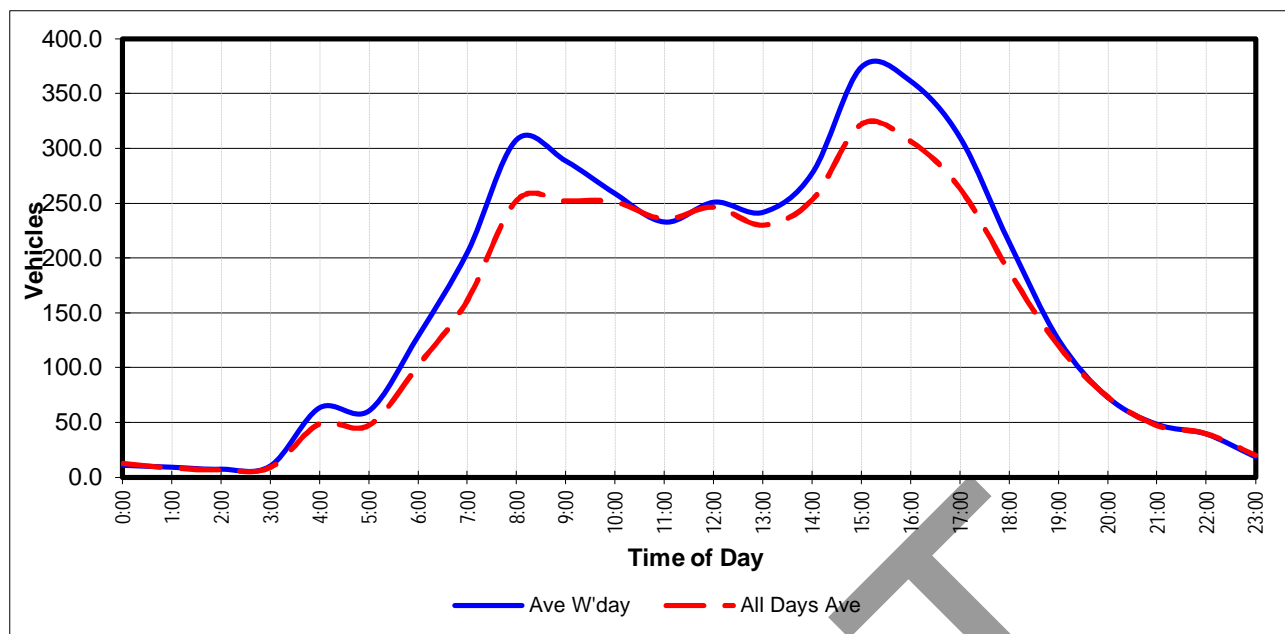


Figure 3-20: Average Weekday (24-Hours) and Average All Days (24-Hours) Traffic Flows on Lorne Street (Both Directions)

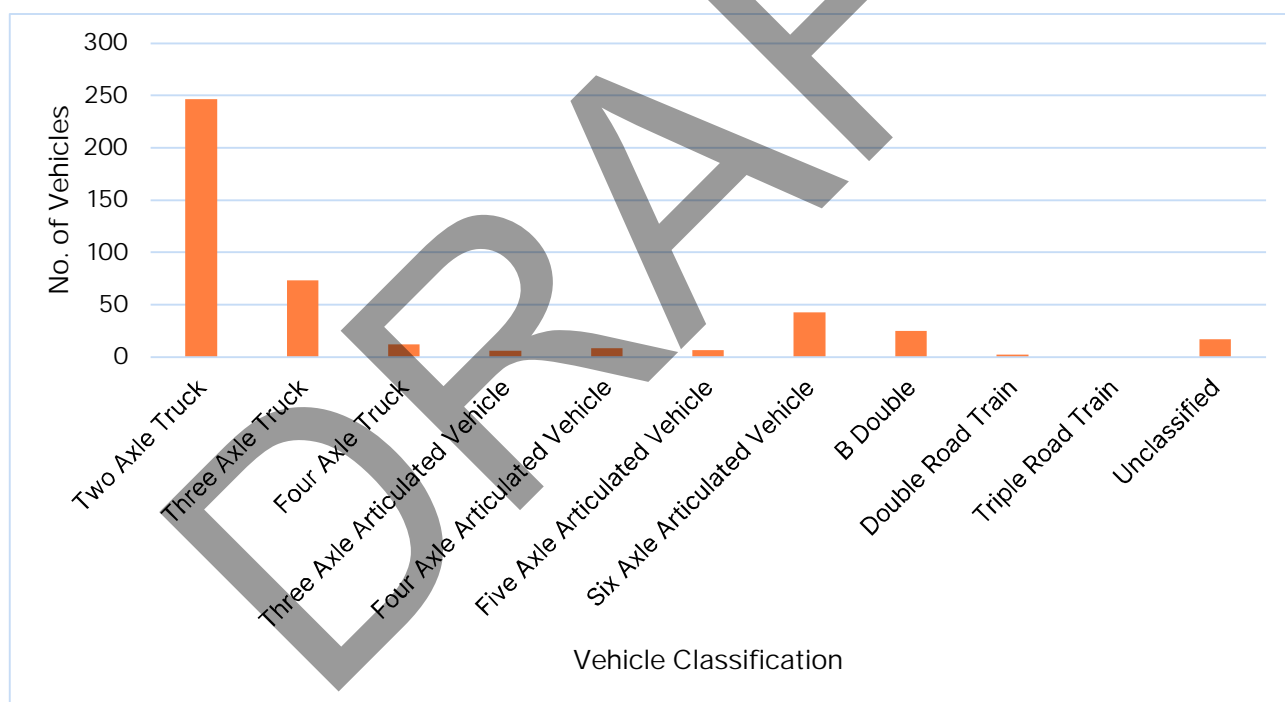


Figure 3-21: Distribution of Daily Vehicle Flows (Both Direction) by Vehicle Classification on Lorne Street

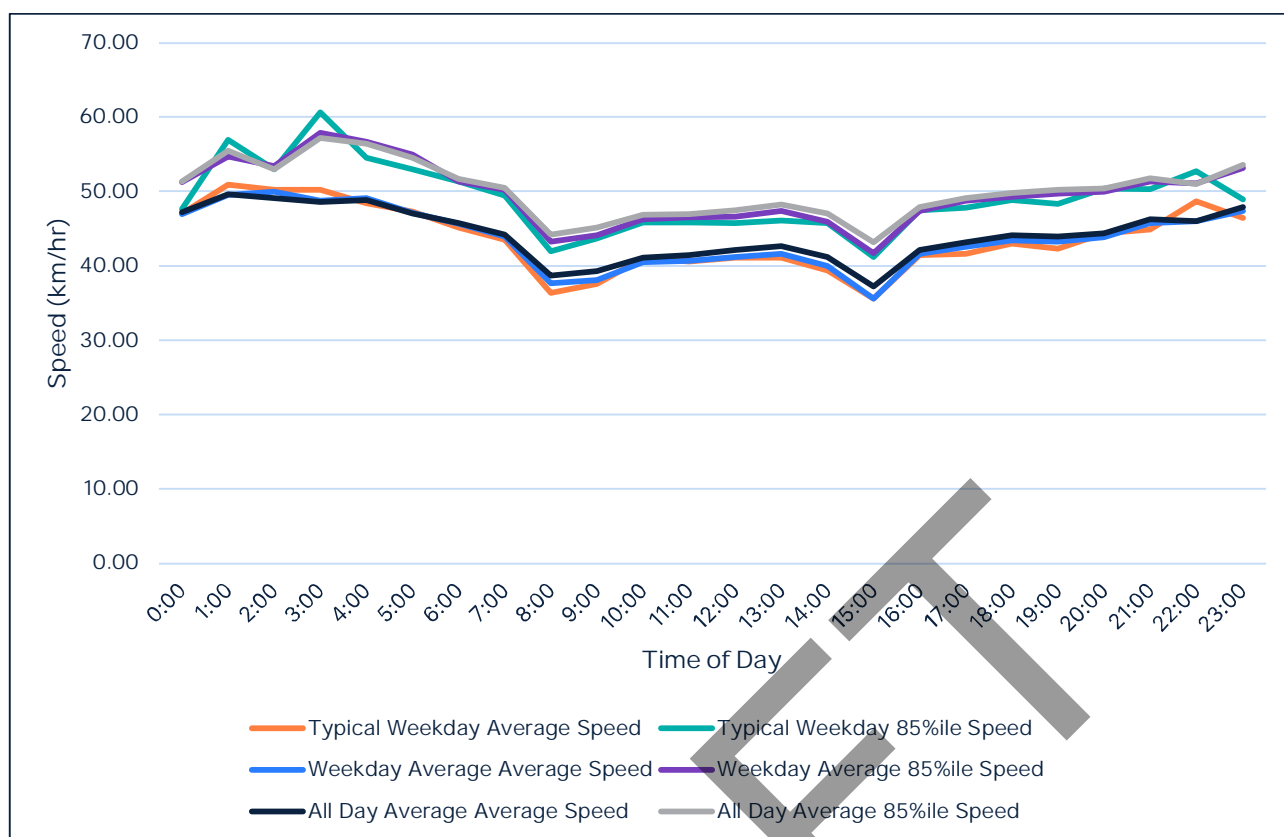


Figure 3-22: Average Speed and 85th Percentile Speed on Lorne Street (Both Directions)

3.2.8 Gundagai Road (Site 8)

Figure 3-23 shows the distribution of daily traffic flows (average weekday and average all days) on Gundagai Road. As shown in the figure, peak traffic flows occurred between 7:30 am and 8:30 am (AM peak) and between 3:00 pm and 4:00 pm (PM peak).

Figure 3-24 shows the distribution daily traffic by vehicle classification for a typical weekday. 3.90% of vehicles are 'Six Axle Articulated' and 'B Double' trucks on this road.

Figure 3-25 shows the average speed and 85th percentile speed of all vehicles during a 'typical weekday', 'average weekday' and 'average all days' on Gundagai Road. Current posted speed limit of Gundagai Road is 50 kmph. As shown in the figure, the average speed of vehicles travelling on this road is at the current posted speed limit, however the 85th percentile speed is slightly higher than the current posted speed limit. Some variation in speed profile was observed during early morning and late night.

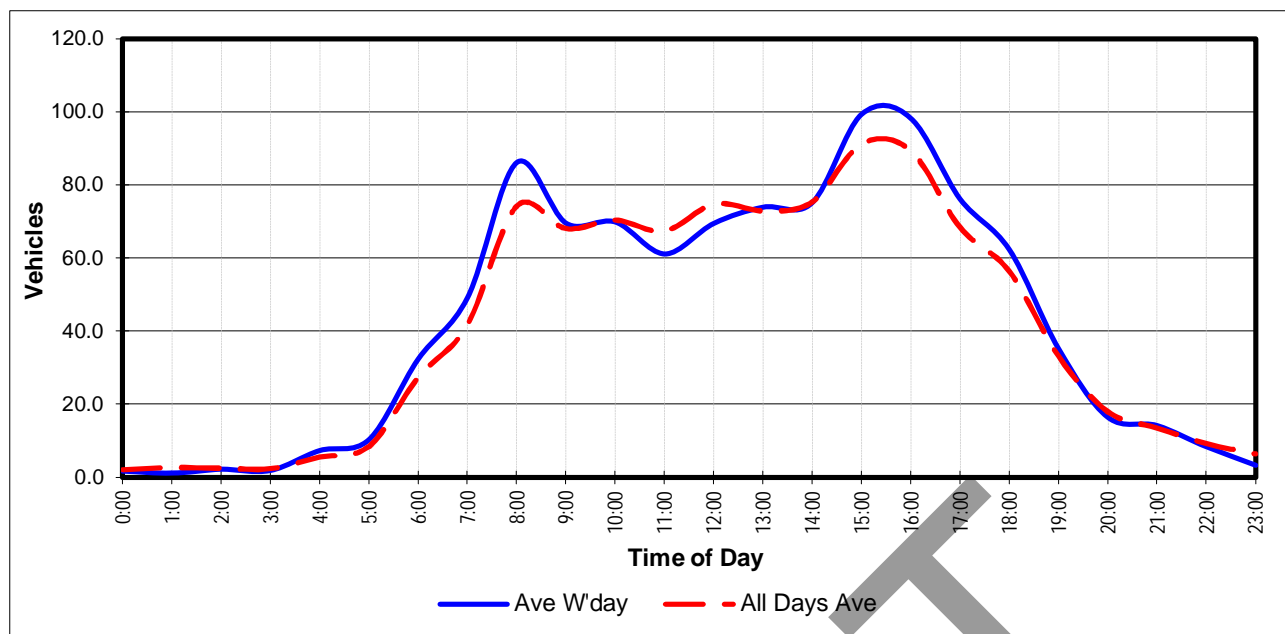


Figure 3-23: Average Weekday (24-Hours) and Average All Days (24-Hours) Traffic Flows on Gundagai Road (Both Directions)

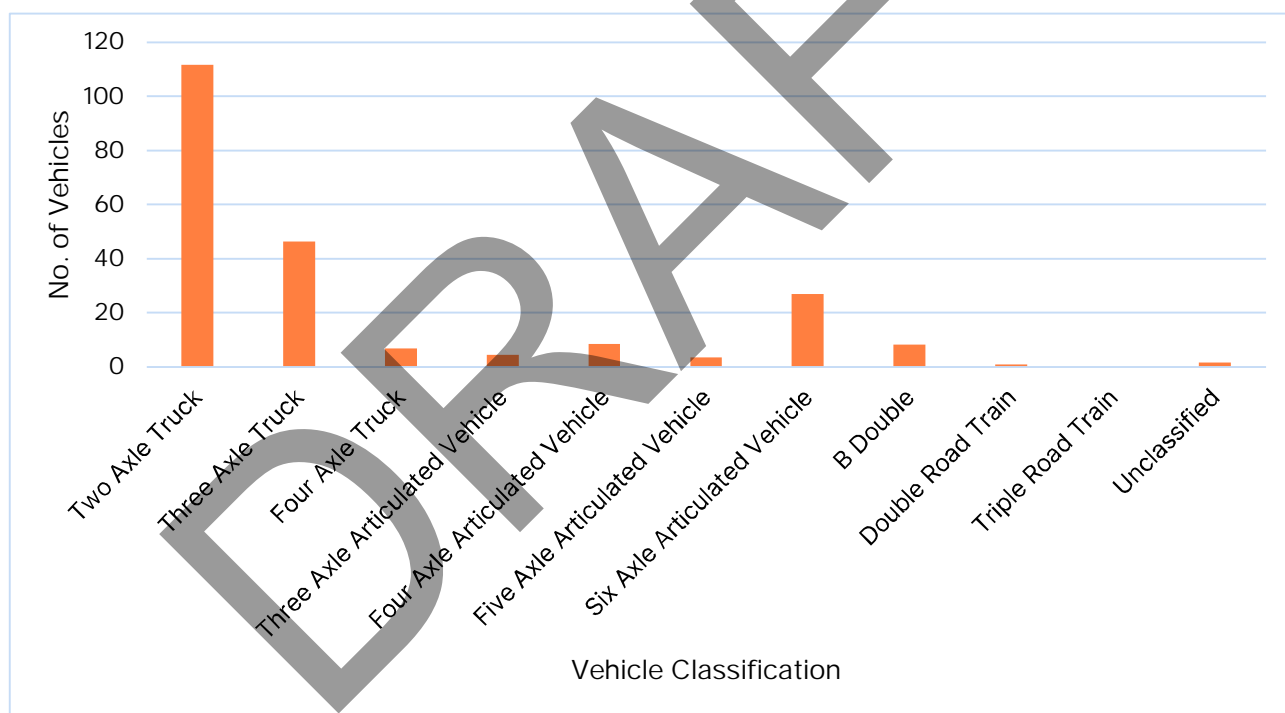


Figure 3-24: Distribution of Daily Vehicle Flows (Both Direction) by Vehicle Classification on Gundagai Road

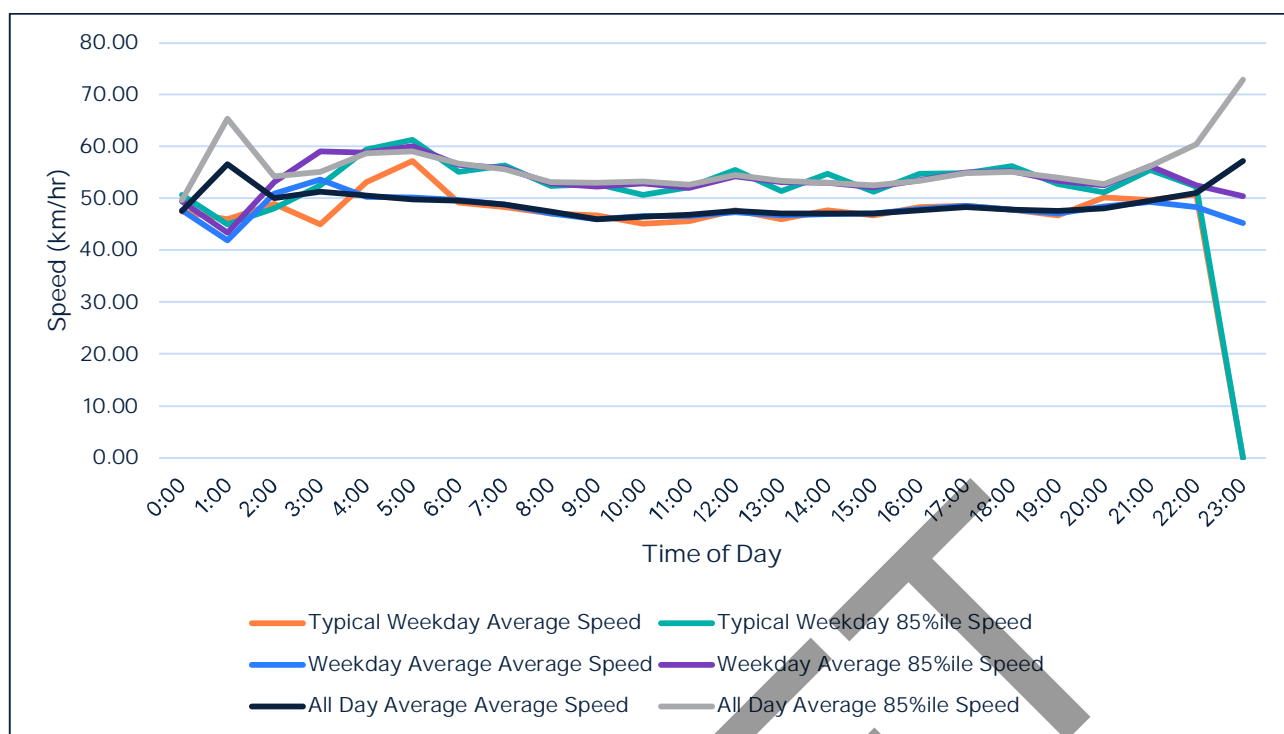


Figure 3-25: Average Speed and 85th Percentile Speed on Gundagai Road (Both Directions)

3.2.9 Olympic Highway – West of Junee (Site 9)

Figure 3-26 shows the distribution of daily traffic flows (average weekday and average all days) on Olympic Highway – West of Junee. As shown in the figure, peak traffic flows occurred between 7:30 am and 8:30 am (AM peak) and between 2:45 pm and 3:45 pm (PM peak).

Figure 3-27 shows the distribution daily traffic by vehicle classification for a typical weekday. Less than 1% of vehicles at this location are six-axle articulated or B Double.

Figure 3-28 shows the average speed and 85th percentile speed of all vehicles during a 'typical weekday', 'average weekday' and 'average all days' on Olympic Highway – West of Junee. Current posted speed limit of Olympic Highway – West of Junee is 80 kmph. As shown in the figure, the average speed of vehicles travelling on this road is at the current posted speed limit, however the 85th percentile speed is slightly higher than the current posted speed limit. No significant variation in average speed and 85th percentile speed is observed for 'typical weekday', 'average weekday' and 'average all days' on Olympic Highway – West of Junee, except for 3:00 am during which a sudden decrease of average speed and 85th percentile speed is observed during typical weekday.

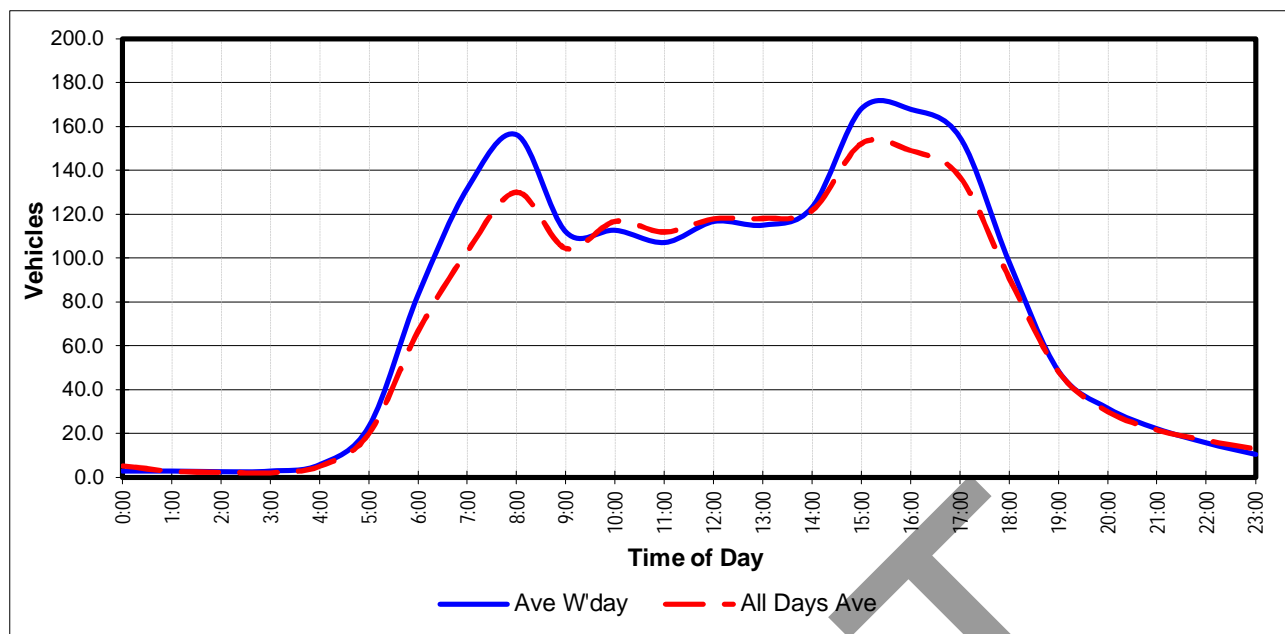


Figure 3-26: Average Weekday (24-Hours) and Average All Days (24-Hours) Traffic Flows on Olympic Highway – West of Junee (Both Directions)

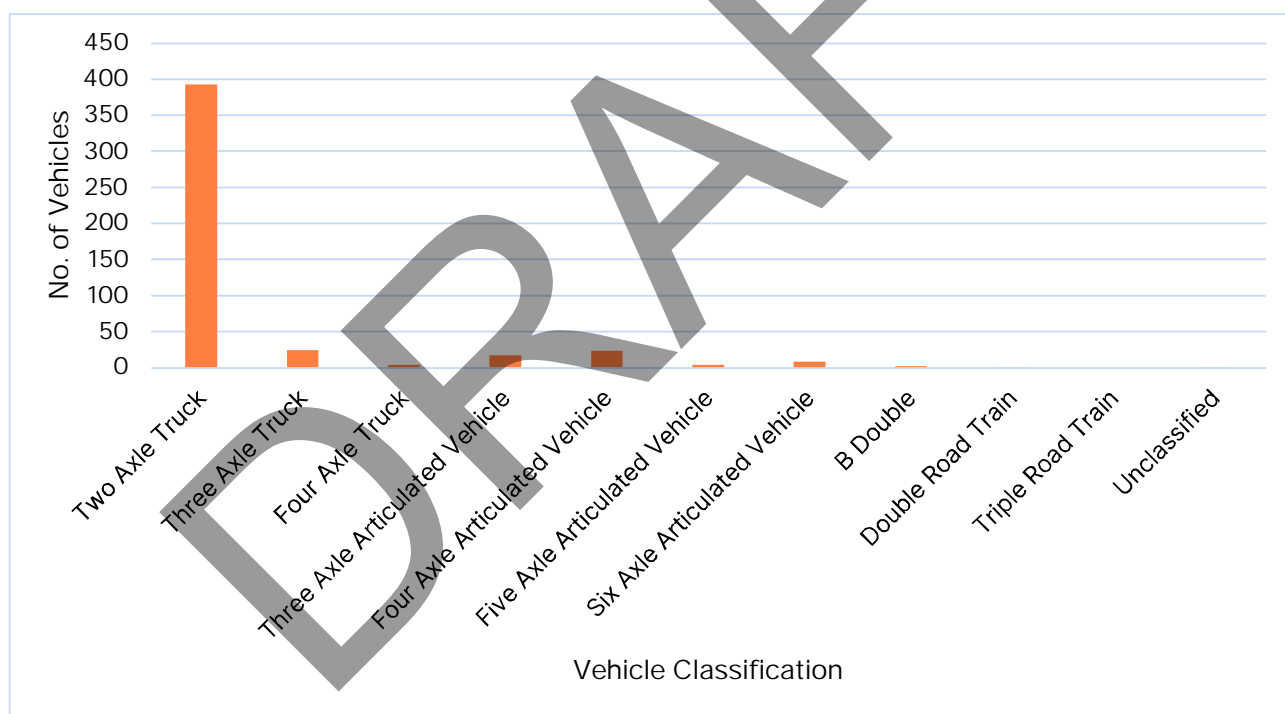


Figure 3-27: Distribution of Daily Vehicle Flows (Both Direction) by Vehicle Classification on Olympic Highway – West of Junee

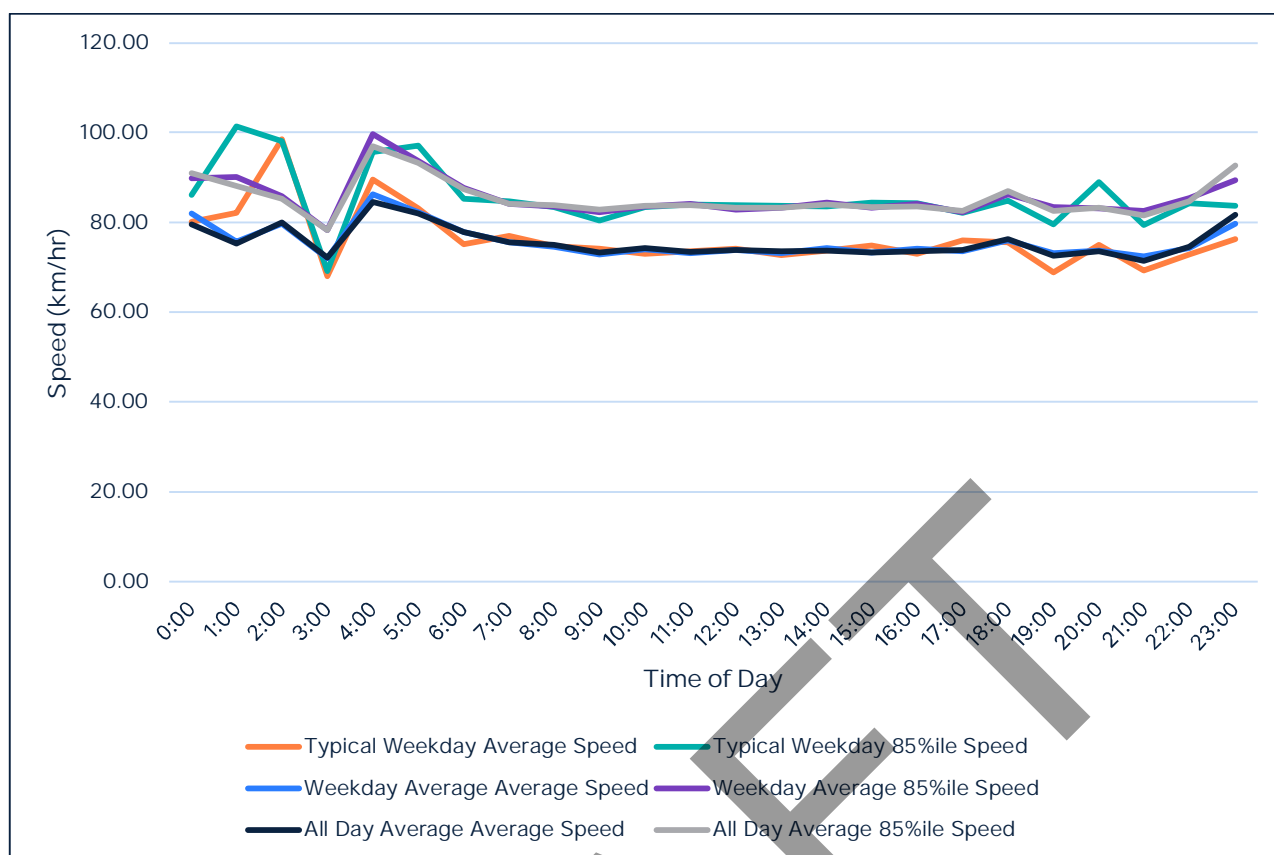


Figure 3-28: Average Speed and 85th Percentile Speed on Olympic Highway – West of Junee (Both Directions)

3.2.10 Byrnes Road (Site 10)

Figure 3-29 shows the distribution of daily traffic flows (average weekday and average all days) on Byrnes Road. As shown in the figure, peak traffic flows occurred between 7:00 am and 8:00 am (AM peak) and between 3:30 pm and 4:30 pm (PM peak).

Figure 3-30 shows the distribution daily traffic by vehicle classification for a typical weekday. Less than 3% of vehicles at this location are six-axle articulated or B Double.

Figure 3-31 shows the average speed and 85th percentile speed of all vehicles during a 'typical weekday', 'average weekday' and 'average all days' on Byrnes Road. Current posted speed limit of Byrnes Road is 50 kmph. As shown in the figure, the average speed and 85th percentile speed of this road are above the current posted speed limit. In general no significant variation in average speed and 85th percentile speed is observed for 'typical weekday', 'average weekday' and 'average all days' on Byrnes Road. However, some variation of 85th percentile speed was observed between 1:00 am and 5:30 am during typical weekday.

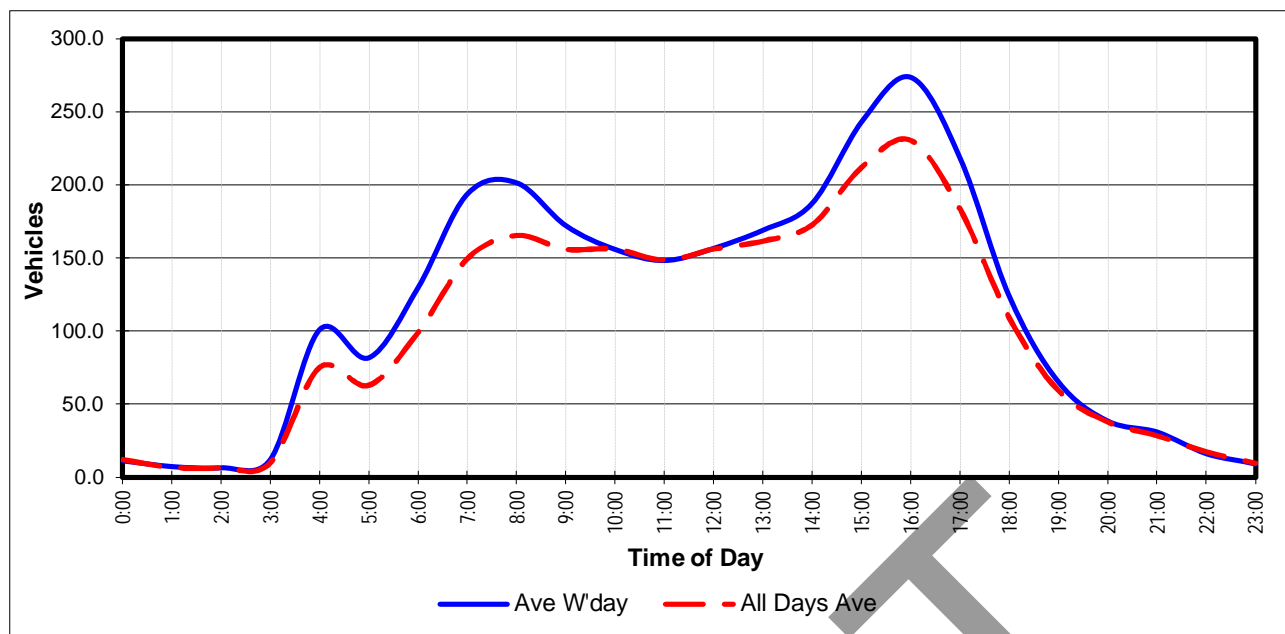


Figure 3-29: Average Weekday (24-Hours) and Average All Days (24-Hours) Traffic Flows on Byrnes Road (Both Directions)

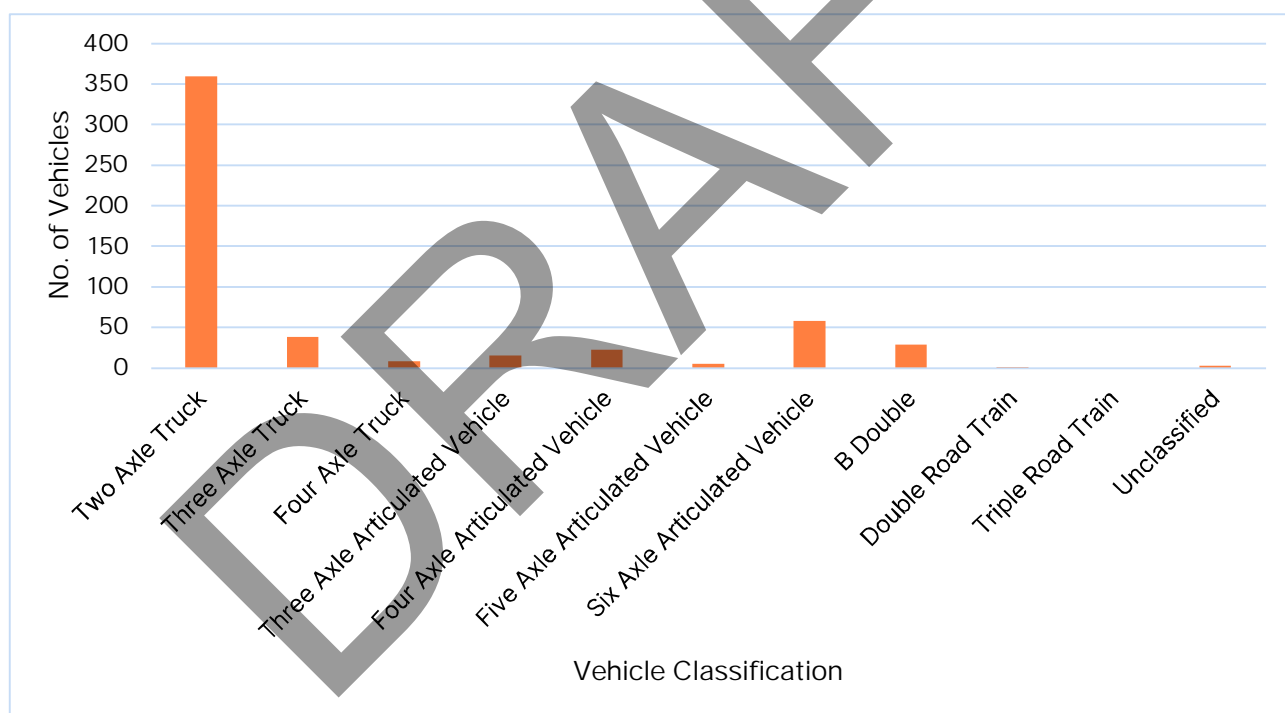


Figure 3-30: Distribution of Daily Vehicle Flows (Both Direction) by Vehicle Classification on Byrnes Road

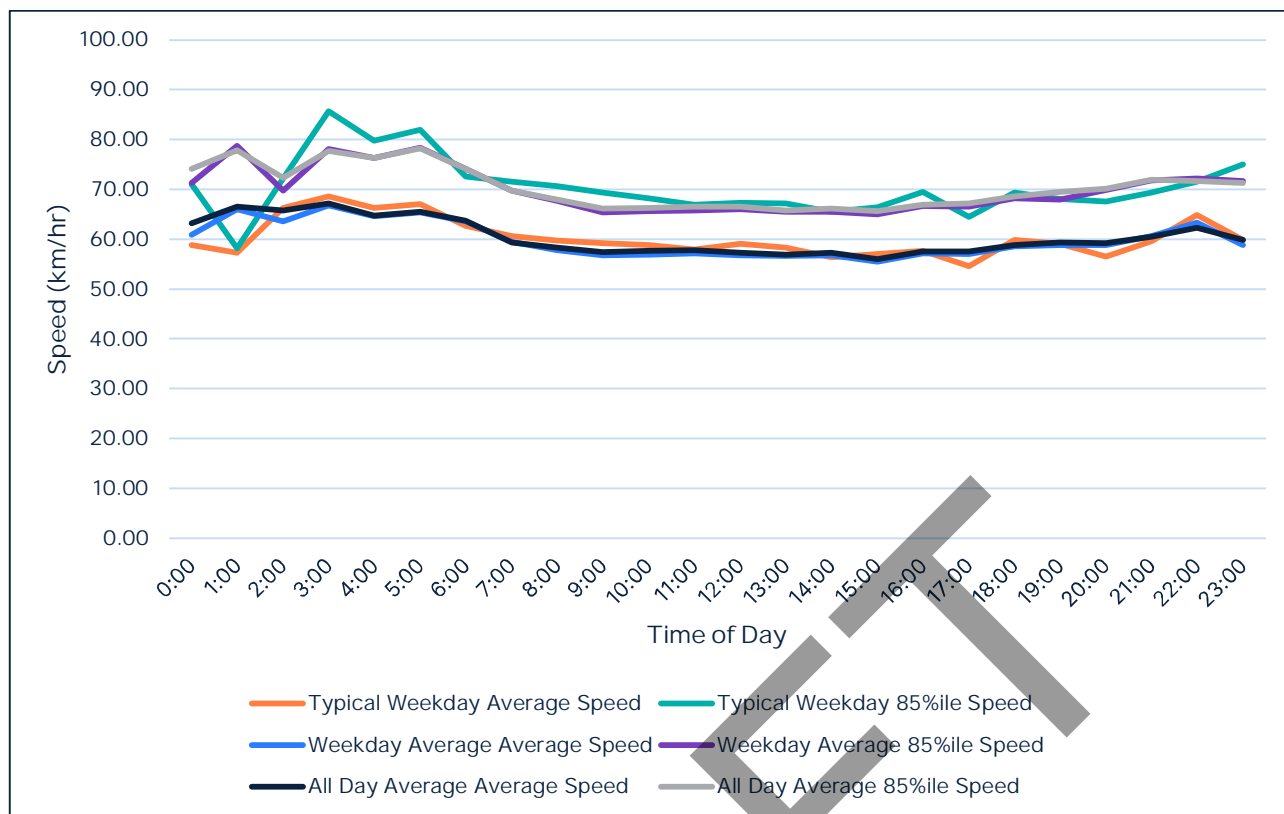


Figure 3-31: Average Speed and 85th Percentile Speed on Byrnes Road (Both Directions)

3.3 Traffic Growth and Annual Average Daily Traffic (AADT)

The population and employment projection data of Junee is not included in the Census of Population and Housing projection dataset for TfNSW travel zones (TZP16). However, the latest population and growth data was obtained from the website (<https://population.com.au/> accessed on November 1 2021) which estimated a population growth rate of 1.50% per year for Junee. It is assumed that the traffic volume in the area will follow a similar growth for the next 20-years.

It is also to be noted that traffic growth, especially growth of freight movements in the area may also depend on the extent of industrial growth and associated increase in employment in the area. As mentioned in Section 2 of the report, the need for freight movements along the freight routes in the vicinity of Junee is anticipated to be increased by 2031 due to growth of grain, meat and livestock, timber and horticulture industries. Considering this, two growth scenarios have been considered to forecast the daily traffic movements along the freight routes for a 20-year planning horizon:

- Low growth scenario: 1-3% annual traffic growth
- High growth scenario: 3-10% annual traffic growth

For the purposes of estimating the traffic forecast, three more interim growth scenarios have been considered based on the low growth and high growth scenario ranges, namely:

- 'Low' low growth scenario (1%), 'Medium/Average' low growth scenario (2%) and 'High' low growth scenario (3%)
- 'Low' high growth scenario (3%), 'Medium/Average' high growth scenario (6.5%) and 'High' high growth scenario (10%)

It is anticipated that with 1.50% annual population growth and approximately 2% industrial growth (i.e. 2% annual freight movement growth), Junee will experience traffic growth of approximately 3-3.5% annual growth over the 20-year planning horizon.

A one-year period traffic volume data for the study area road network is not available to estimate the AADT. Therefore, average of a week recent traffic survey data is used to estimate the average daily traffic flows along the surveyed road network. It is assumed that the Average Daily Traffic (ADT) would represent the AADT data. Table 3-2 shows the current AADT and forecasted AADT flows over a 20-year planning horizon for the key transport corridors in the vicinity of Junee study area, assuming uniform growth across the network and that there are no major changes to travel patterns and to connectivity in the road network.

The growth assumptions outlined here use the same growth rate between light and heavy vehicles. Further investigation would be required to determine whether these growth rates should be differentiated by vehicle type. Light vehicle growth around Junee will be largely driven by changes in local population. Heavy vehicles tend to travel through Junee (to and from different areas) and will more likely be driven from industrial and/or agricultural development in the broader region. Some heavy vehicle traffic will be correlated with the location and size of key freight generating precincts (e.g. abattoirs, grain receival silos and rail terminals) in Junee.

Table 3-2: AADT and Forecasted Daily Traffic Flows

Site/Street	Traffic Counts – AADT* (2021)	Forecast Traffic (20 years Growth)					
		Lower Growth (1-3%)			Higher Growth (3-10%)		
		Low (1%)	Medium (2%)	High (3%)	Low (3%)	Medium (6.5%)	High (10%)
Site 1 - Old Junee Road	1,006	1,228	1,355	1,817	1,817	3,545	6,768
Site 2 - Queen Street	649	792	874	1,172	1,172	2,287	4,366
Site 3 - Olympic Highway (East of Junee)	1,769	2,159	2,383	3,195	3,195	6,233	11,901
Site 4 - Broadway	2,397	2,925	3,228	4,329	4,329	8,446	16,126
Site 5 - Olympic Highway Main Street	2,852	3,480	3,841	5,151	5,151	10,049	19,187
Site 6 - Olympic Highway Seignior Street	2,653	3,237	3,573	4,792	4,792	9,348	17,848
Site 7 - Lorne Street	3,502	4,273	4,717	6,325	6,325	12,340	23,560
Site 8 - Gundagai Road	983	1,199	1,324	1,775	1,775	3,464	6,613
Site 9 - Olympic Highway (West of Junee)	1,689	2,061	2,275	3,051	3,051	5,951	11,363
Site 10 - Byrnes Road	2,431	2,966	3,274	4,391	4,391	8,566	16,355

* Seven Days Average Daily Traffic Flow

4 Infrastructure Review

4.1 Gap Assessment Overview

In consultation with Junee Shire Council, an overview assessment of the urban road network in Junee identified 14 locations where there are existing safety or operational concerns related to the movement of freight and its interaction with other road users. To assist the prioritisation of these locations, an assessment framework was developed considering both the “freight” and “urban” context of each of the priority sites to discern the locations’ relative priority:

- Freight context:
 - Respective freight corridor role within Junee.
 - Daily heavy vehicle (HVs) movements including articulated HVs.
 - Freight accessibility impacts.
 - Impact on freight movements.
- Urban context:
 - Road safety impacts.
 - Accessibility impacts.
 - Amenity impacts.
 - Infrastructure impacts.

The location of these 14 priority areas is provided in Figure 4-1, with the prioritisation framework presented below in Table 4-1.

DRAFT

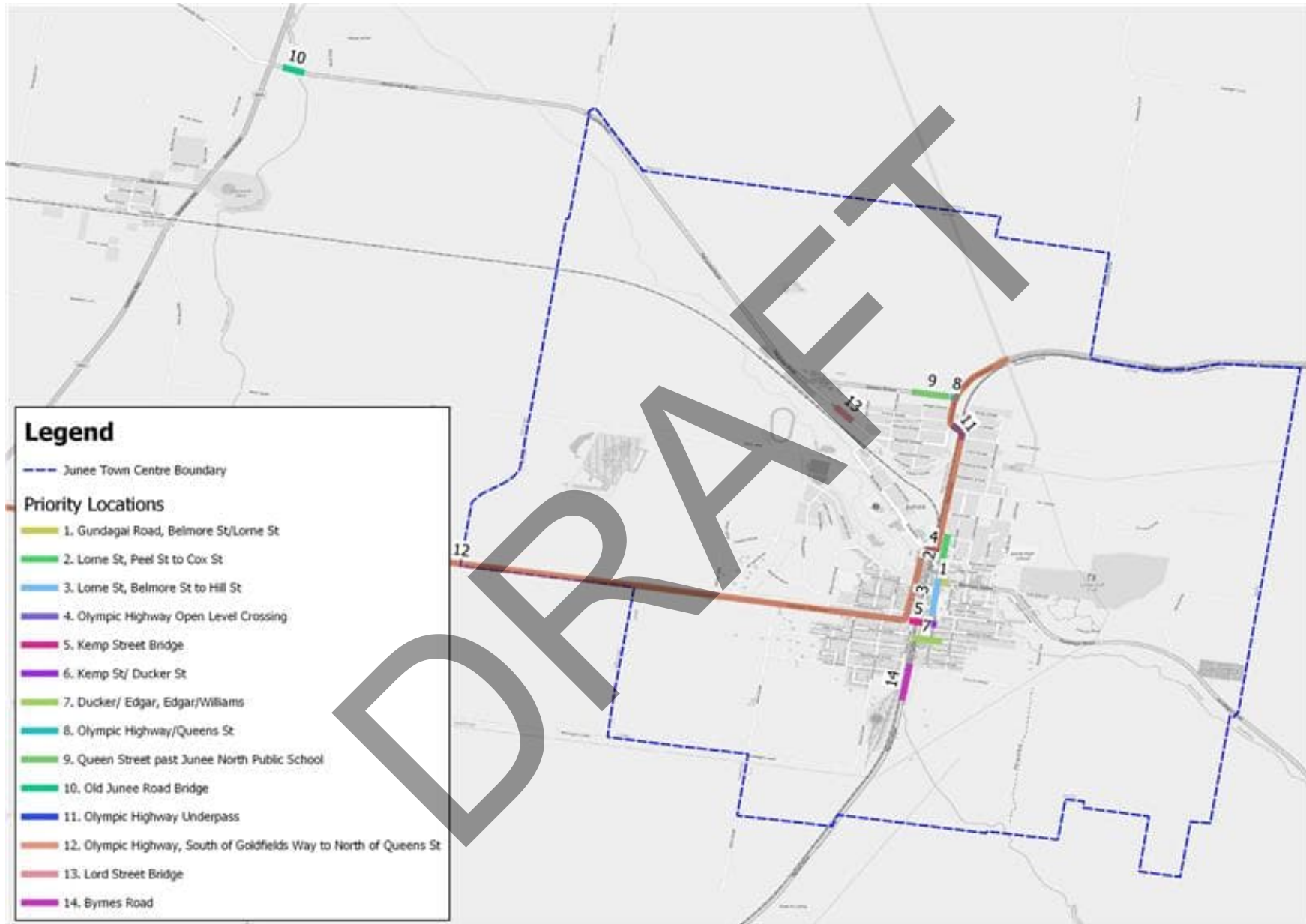


Figure 4-1: Priority locations for safety and operational concerns in Junee

Table 4-1: Priority locations of safety and operational constraints to the operation of freight movements in Junee

ID	Location	Freight Context				Urban Context				Overall Priority
		Freight corridor	Daily HV Movements on corridor	Freight Accessibility Impacts	Impact on freight movements	Road Safety Impacts	Accessibility Impacts	Amenity Impacts	Infrastructure impacts	
1	Gundagai Road (Belmore Street)/Lorne Street intersection	<ul style="list-style-type: none"> East-west freight corridor B-Double route 	<ul style="list-style-type: none"> 215 HVs 54 articulated 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Friction associated with HV movements through town centre 	<ul style="list-style-type: none"> HV passage (turning movements) in Junee town centre Mixing of HV and pedestrians 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Noise and vehicle emissions in town centre environment 	<ul style="list-style-type: none"> Pavement wear (including from turning HVs at intersection) 	High
2	Lorne Street, Peel Street to Cox Street	<ul style="list-style-type: none"> North-south (collector) freight corridor through Junee B-Double route 	<ul style="list-style-type: none"> 439 HVs 91 articulated 	<ul style="list-style-type: none"> Existing intersection geometries do not support safe and efficient passage of HVs 	<ul style="list-style-type: none"> Friction associated with HV movements through town centre 	<ul style="list-style-type: none"> HV passage through Junee town centre Mixing of HV and pedestrians Existing intersection geometries do not support safe and efficient passage of HVs (at Cox Street) 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Noise and vehicle emissions in town centre environment 	<ul style="list-style-type: none"> Pavement wear 	High
3	Lorne Street (Belmore Street to Hill Street)	<ul style="list-style-type: none"> North-south (collector) freight corridor through Junee B-Double route 	<ul style="list-style-type: none"> 439 HVs 91 articulated 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Friction associated with HV movements past Junee Public School (including through school zone) 	<ul style="list-style-type: none"> Mixing of HVs, pedestrians (including primary school children) and parked/manoeuvring vehicles 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Noise and emissions in school environment 	<ul style="list-style-type: none"> Pavement wear 	High
4	Olympic Highway Open Level Crossing (OLC)	<ul style="list-style-type: none"> Through town freight corridor B-Double route 	<ul style="list-style-type: none"> 378 HVs 76 articulated 	<ul style="list-style-type: none"> OLC closures can delay HV passage 	<ul style="list-style-type: none"> OLC closures can delay HV passage 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> OLC closures can delay LV and active travel passage OLC closures can impact emergency service access 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	High
5	Kemp Street Bridge	<ul style="list-style-type: none"> Freight link from Olympic Highway to Byrnes Road (including abattoir access) B-Double route 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Load limited bridge, requiring freight vehicles to divert through town centre 	<ul style="list-style-type: none"> Additional HV movements through Junee town centre (incl. longer trips) 	<ul style="list-style-type: none"> Increased passage of HVs through town centre 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Bridge earmarked for replacement by ARTC Inland Rail project 	High
6	Kemp Street/Ducker Street intersection	<ul style="list-style-type: none"> Freight link from Olympic Highway to Byrnes Road 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Will exhibit increased HV movements following 	<ul style="list-style-type: none"> Related project (Kemp Street bridge) will allow increased HV 	<ul style="list-style-type: none"> Existing intersection geometry does not permit safe 	<ul style="list-style-type: none"> Existing intersection geometry will not permit passage 	<ul style="list-style-type: none"> Existing intersection geometry will likely lead to 	<ul style="list-style-type: none"> Existing intersection will likely exhibit increased 	High

		Freight Context				Urban Context				
ID	Location	Freight corridor	Daily HV Movements on corridor	Freight Accessibility Impacts	Impact on freight movements	Road Safety Impacts	Accessibility Impacts	Amenity Impacts	Infrastructure impacts	Overall Priority
		(including abattoir access)		replacement of Kemp Street Bridge (by ARTC)	movements along Kemp Street (and through Decker Street intersection)	passage of opposing vehicles (particularly HVs)	of some HV types (e.g. high productivity vehicles)	increased amenity impacts (e.g. excessive HV braking/turning) in a residential area.	deterioration (e.g. pavement wear, mounting of kerbs by HVs, etc)	
7	Intersections of Ducker/Edgar, Edgar /William	<ul style="list-style-type: none"> Freight link from Olympic Highway to Byrnes Road (including abattoir access) 	<ul style="list-style-type: none"> 539 HVs 133 articulated 	<ul style="list-style-type: none"> Will exhibit increased HV movements following replacement of Kemp Street Bridge (by ARTC) 	<ul style="list-style-type: none"> Related project (Kemp Street bridge) will allow increased HV movements along Kemp Street (and Ducker and Edgar Street intersections) 	<ul style="list-style-type: none"> Existing intersection geometries do not support safe and efficient passage of HVs 	<ul style="list-style-type: none"> Existing intersection geometries do not support safe and efficient passage of HVs 	<ul style="list-style-type: none"> Existing intersection geometry will likely lead to increased amenity impacts (e.g. excessive HV braking/turning) in a residential area. 	<ul style="list-style-type: none"> Existing intersection will likely exhibit increased deterioration (e.g. pavement wear, mounting of kerbs by HVs, etc) 	High
8	Olympic Highway/Queen Street	<ul style="list-style-type: none"> Heavy vehicle bypass of Junee (from north to south) 	<ul style="list-style-type: none"> 240 HVs 132 articulated 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> HVs not staying lane correct whilst undertaken turn towards public school (increasing crash risk). 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Pavement wear 	High
9	Queen Street past Junee North Public School	<ul style="list-style-type: none"> Heavy vehicle bypass of Junee (from north to south) 	<ul style="list-style-type: none"> 240 HVs 132 articulated 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Friction associated with HV movements past Junee North Public School (including through school zone) 	<ul style="list-style-type: none"> Mixing of HVs, pedestrians (including primary school children) and parked/manoeuvring vehicles 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Noise, emissions past school environment 	<ul style="list-style-type: none"> Pavement wear 	High
10	HL Robinson Bridge	<ul style="list-style-type: none"> Heavy vehicle bypass of Junee (from north to south) 	<ul style="list-style-type: none"> 343 HVs 145 articulated 	<ul style="list-style-type: none"> Existing bridge does not accommodate desired vehicle loads 	<ul style="list-style-type: none"> Potential bridge closure would direct HVs through Junee urban area 	<ul style="list-style-type: none"> Potential bridge closure would direct HVs through Junee urban area 	<ul style="list-style-type: none"> Potential bridge closure would direct HVs through Junee urban area 	<ul style="list-style-type: none"> Potential bridge closure would direct HVs through Junee urban area 	<ul style="list-style-type: none"> Pavement wear in Junee town centre (should bridge be closed) Bridge deterioration 	High
11	Olympic Highway underpass	<ul style="list-style-type: none"> Olympic Highway through Junee 	<ul style="list-style-type: none"> 378 HVs 76 articulated 	<ul style="list-style-type: none"> Low clearance requires some HVs to travel via Broadway Street 	<ul style="list-style-type: none"> Low clearance requires some HVs to travel via Broadway Street (additional travel distance) 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Risk of HV strike on rail overbridge 	Medium

		Freight Context				Urban Context				
ID	Location	Freight corridor	Daily HV Movements on corridor	Freight Accessibility Impacts	Impact on freight movements	Road Safety Impacts	Accessibility Impacts	Amenity Impacts	Infrastructure impacts	Overall Priority
12	Olympic Highway, south of Goldfields Way to north of Queen Street	<ul style="list-style-type: none">Olympic Highway through Junee	<ul style="list-style-type: none">378 HVs76 articulated	<ul style="list-style-type: none">Nil	<ul style="list-style-type: none">Slow travel time (travel in urban area) with intermittent impact of OLC closure.	<ul style="list-style-type: none">Mixing of through HV movements with local LV movements within an urban area	<ul style="list-style-type: none">Nil	<ul style="list-style-type: none">Noise, emissions in an urban environment	<ul style="list-style-type: none">Pavement wear	Medium
13	Lord Street Bridge	<ul style="list-style-type: none">Local freight interconnector	<ul style="list-style-type: none">N/A	<ul style="list-style-type: none">Load limited bridge	<ul style="list-style-type: none">Some HVs restricted due to load limit on bridge	<ul style="list-style-type: none">N/A	<ul style="list-style-type: none">N/A	<ul style="list-style-type: none">N/A	<ul style="list-style-type: none">Bridge deterioration	Medium
14	Byrnes Road	<ul style="list-style-type: none">Freight corridor link to Harefield	<ul style="list-style-type: none">539 HVs133 articulated	<ul style="list-style-type: none">Nil	<ul style="list-style-type: none">Road surface is poor, with narrow shoulders	<ul style="list-style-type: none">Narrow seal width and rough surface increases crash risk	<ul style="list-style-type: none">N/A	<ul style="list-style-type: none">N/A	<ul style="list-style-type: none">Accelerated pavement wear due to poor surface and narrow shoulders	Medium

From Table 4-1, ten (10) high priority locations and four (4) medium priority locations were identified, these included:

- High priority sites:
 - Intersection of Belmore Street/Lorne Street
 - Lorne Street/Peel Street corridor through the Junee town centre
 - Lorne Street (Belmore Street to Hill Street) past the Junee Public School
 - Olympic Highway level crossing
 - Kemp Street Bridge
 - Intersection of Kemp Street and Ducker Street
 - Intersections of Ducker Street/Edgar Street/William Street
 - Intersection of Olympic Highway/Queen Street
 - Queen Street past the Junee North Public School
 - HL Robinson Bridge
- Medium priority sites:
 - Olympic Highway underpass
 - Olympic Highway (south of Goldfields Way to north of Queen Street)
 - Lord Street bridge
 - Byrnes Road

A brief narrative of the identified high and medium priority sites is provided below.

4.2 High Priority Sites

4.2.1 Belmore Street – Lorne Street intersection

Issue: The intersection needs better delineation and channelisation.

Heavy vehicle volumes: 215 Heavy Vehicles, including 54 Articulated

As Gundagai Road/Belmore Street approaches the town centre (at Lorne Street), there are a number of adjacent land uses that are accessed by light vehicles and pedestrians from Belmore Street. Cars undertaking parking manoeuvres and pedestrians crossing the road conflict with through heavy vehicle movements, reducing safety and amenity. Better delineation, median refuges, pedestrian crossing facilities and a reduced speed limit through town would improve the safety and amenity of the town centre along Belmore Street and its intersection with Lorne Street.

4.2.2 Peel Street/Lorne Street (Belmore Street to Cox Street)

Issue: Heavy vehicle movements reduce pedestrian safety and amenity.

Heavy vehicle volumes: 439 Heavy Vehicles, including 91 Articulated

A large number of heavy vehicles travel through the Junee town centre (along Lorne and Peel streets) with ensuing road safety and amenity impacts. A reduced through town speed limit, and upgraded pedestrian facilities would improve the safety and amenity of the town centre. Pedestrian facilities could include wider footpaths, median islands and kerb blisters to reduce crossing distances.

4.2.3 Lorne Street (Belmore Street to Hill Street)

Issue: Heavy vehicles pass through the school zone, which is also used by school buses, parked cars and pedestrians crossing between the school and the recreation centre.

Heavy vehicle volumes: 439 Heavy Vehicles, including 91 Articulated

Lorne Street is classified as a regional road. This section of Lorne Street (passing Junee Public School and the Junee Recreation & Aquatic Centre), has one of the highest daily volumes of heavy vehicles in the study area. Furthermore, the pedestrian crossing between the school and recreation centre is considered to be the busiest pedestrian area in Junee, mainly consisting of school-age pedestrians. Lorne Street also has a pick-up/set-down area and school bus stop. The conflict between heavy vehicles and other road users at this location increases road safety risk. Opportunities for separating heavy vehicles and school-based traffic should be investigated immediately to improve the safety and operations of both the freight corridor and access to the adjacent school, and recreation and aquatic centre.



Figure 4-2: Lorne Street near the school crossing at Junee Public School (looking south)

4.2.4 Olympic Highway – Level Crossing

Issue: Train driver changes at Junee Station block the level crossing for extended periods of time.

Heavy vehicle volumes: 378 Heavy Vehicles, including 76 Articulated

The Olympic Highway caters for a large number of heavy vehicles through Junee, but trains often block the level crossing while undertaking a change in train drivers. As train volumes and lengths increase in the future, it is expected that these blockages will become longer and more frequent. Providing information signage advising of

boom gate closure would inform motorists of the potential to use alternative routes to bypass the level crossing (e.g. travel via the Kemp Street bridge), which could reduce the impact of these closures.

Options to relocate the train driver area from Junee train station could also be explored, which would require consultation with ARTC.



Figure 4-3: Olympic Highway level crossing (looking north)

4.2.5 Kemp Street bridge

Issue: The bridge has a very low load limit.

Heavy vehicle volumes: Unknown. Load limits on the bridge should preclude heavy vehicle movements.

Kemp Street bridge is currently load limited prohibiting the passage of most heavy vehicles. This bridge is expected to be upgraded by the Inland Rail project to provide increase clearance for higher trains. As part of the project, load limits would be removed on the bridge enabling use by heavy vehicles including high productivity vehicles. The intersection of Kemp Street and Ducker Street (on the eastern side of the bridge) would need to be upgraded to allow heavy vehicle swept paths for vehicles turning to the south (towards the abattoir). Noting the passage of heavy vehicle through an urban area, reduced speed limits could be considered to improve road safety and reduce amenity impacts.



Figure 4-4: Kemp Street Bridge (looking east)

4.2.6 Kemp Street – Ducker Street intersection

Issue: Intersection geometry restricts heavy vehicle movements.

Heavy vehicle volumes: Unknown. Load limits on the bridge preclude heavy vehicle movements.

After the Kemp Street bridge is replaced (as part of the Inland Rail project), a large increase in heavy vehicles is expected to use the bridge. The intersection of Kemp Street and Ducker Street does not currently provide sufficient width for turning heavy vehicles' swept paths. Junee Shire Council has prepared a preliminary layout for the intersection's upgrade, which should be coordinated with the replacement of the Kemp Street bridge.

4.2.7 Edgar/William/Ducker Streets

Issue: Intersection geometry restricts heavy vehicle movements.

Heavy vehicle volumes: 539 Heavy Vehicles, including 133 Articulated

Currently, vehicles travelling to and from Junee via Byrnes Road turn from Edgar Street onto William Street and then to Ducker Street/Lorne Street, or turn from Edgar Street onto Hill Street and then onto Lorne Street. The geometry of either of these corridors do not support heavy vehicle turning movements. At a minimum, intersection geometries should be upgraded to ensure safe turning movements for heavy vehicles in the urban environment.

Alternatively, eastbound heavy vehicles travelling over the Kemp Street Bridge could be directed to the intersection of Ducker and Hill Street, to then travel south along the William Street corridor. This would reduce the number of residences impacted by heavy vehicle noise and emissions.

Council has also noted that these local roads have also been recently classified as regional roads by TfNSW, reflecting the increased heavy vehicle demands on these road corridors.



Figure 4-5: Intersection of Edgar Street (Byrnes Road) and William Street (looking south)

4.2.8 Queen Street – Olympic Hwy intersection

Issue: The intersection of Queen Street with Olympic Highway has poor geometry and sightlines.

Heavy vehicle volumes: 240 Heavy Vehicles, including 132 Articulated

Vehicles turning out of Queen Street onto the Olympic Highway have poor visibility of northbound traffic on the highway. In addition, heavy vehicles often do not stay lane correct as they turn from the north towards Junee North Public School (increasing crash risk). Upgrades to the intersection's geometry and sight lines should be considered.



Figure 4-6: Intersection of Queen Street and Olympic Highway (looking east)

4.2.9 Queen Street, near Junee North Public School

Issue: Many heavy vehicles pass through the Junee North Public School zone, conflicting with buses, parked cars and pedestrians.

Heavy vehicle volumes: 240 Heavy Vehicles, including 132 Articulated

Queen Street is used as a bypass for some heavy vehicles not wishing to pass through Junee, and also for trucks travelling to and from the grain terminal. These heavy vehicles pass through the Junee North Public School pick-up/set-down area and bus stop directly in front of the school. The conflicts between buses, pedestrians, parking cars and heavy vehicles leads to an increased risk of a crash.

Relocating the school access away from Queen Street (such as a side road access immediately west of the school site) would significantly reduce the road safety risk associated with heavy vehicle movements along Queen Street.

Junee Shire Council have also noted the potential for future residential development occurring on the southern side of the Queen Street corridor (opposite the school). To minimise the friction and potential amenity impacts associated with the road freight corridor, the proposed residential development should consider the following:

- Alternate access be provided onto Knight Street.
- Provision of a setback to reduce amenity impacts.

4.2.10 HL Robinson Bridge

Issue: The bridge accommodates B-doubles, but there is a desire to service larger vehicles.

Heavy vehicle volumes: 343 Heavy Vehicles, including 145 Articulated

The HL Robinson Bridge has been assessed as being satisfactory for HML Semi Trailer and B-doubles up to 26m but is not suitable for Road Trains or A-doubles and needs to be upgraded/replaced to accommodate these higher productivity vehicles.



Figure 4-7: HL Robinson Bridge (looking west)

4.3 Medium Priority Sites

4.3.1 Olympic Highway underpass

Issue: Underpass has low height limit, which restricts heavy vehicle moments.

Heavy vehicle volumes: 378 Heavy Vehicles, including 76 Articulated

The Olympic Highway carries a large number of heavy vehicles through Junee, but passes through an underpass with limited clearance. Higher vehicles must find a different route through Junee, most likely via Old Junee Road or Broadway Street. SMEC understands that lowering the road surface is considered difficult, but may be necessary to ensure that higher vehicles have a viable route through Junee (should Old Junee Road be closed).



Figure 4-8: Olympic Highway underpass (looking west)

4.3.2 Olympic Highway

Issue: Heavy vehicles pass through Junee town centre travelling along Olympic Highway.

Heavy vehicle volumes: 378 Heavy Vehicles, including 76 Articulated

The Olympic Highway carries a large number of heavy vehicles through Junee, but many of these vehicles could bypass the town centre by using Goldfields Way, Old Junee Road and Queen Street instead. Signage could be installed along Olympic Highway south of Goldfields Way (for northbound vehicles) and north of Queen Street (for southbound vehicles) to provide this information. Issues around Junee North Public School and HL Robinson Bridge should be addressed before additional heavy vehicles are encouraged to use this route. A reduced speed limit through the town centre may also act as an incentive for through heavy vehicles to shift to the heavy vehicle bypass of Junee (via Old Junee Road), and should be considered.



Figure 4-9: Olympic Highway west of Kemp Street intersection (looking west)

4.3.3 Lord Street Bridge

Issue: The bridge is located on a B-double route, but does not support B-double loads.

Heavy vehicle volumes: Unknown. Load limits on the bridge preclude heavy vehicle movements.

Lord Street bridge (of brick construction) is currently in very poor condition and needs to be replaced/upgraded to accommodate B-doubles.

Junee Shire Council have indicated a potential culvert solution for replacement of the existing bridge in 2022/23, which may be more economically viable than a new bridge.



Figure 4-10: Lord Street bridge (looking east)

4.3.4 Byrnes Road

Issue: Byrnes Road has poor surface and worn delineation.

Heavy vehicle volumes: 539 Heavy Vehicles, including 133 Articulated

Byrnes Road carries the largest number of heavy vehicles in the study area, but the road is in poor condition with worn delineation and unformed shoulders. These issues should be addressed to improve safety for light and heavy vehicles travelling along the corridor. Widening of the road formation as well as pavement reconstruction would improve the safety and condition of the corridor. Byrnes Road has also been recently classified as a regional road by TfNSW, reflecting the increased heavy vehicle demands on the corridor.



Figure 4-11: Byrnes Road (looking south)

4.4 Freight Network Context

When considering the 14 identified priorities within the Junee urban area, the overarching context of the priority locations was considered within both the freight and urban context, but also the “existing” and “future” state of freight movements within Junee.

Junee's road freight network is characterised by several key freight corridors which either travel through the Junee urban area, or on Junee's urban fringe. Key road freight corridors include:

- Route 1: The Olympic Highway corridor through Junee (including the level crossing).
- Route 2: The heavy vehicle bypass of Junee via Goldfields Way, Old Junee Road and Queen Street.
- Route 3: Gundagai Road (Gundagai to Junee).
- Route 4: Byrnes Road (Edgar Street); and
- Route 5: The internal (internal to Junee) “road freight connectors” from Cox Street (from the intersection of Olympic Highway) to Byrnes Road including Peel Street, Lorne Street, Ducker Street, William Street, as well as the Kemp Street bridge connection from the Olympic Highway.

The indicative location of these key freight corridors in the Junee area is provided below in Figure 4-12.

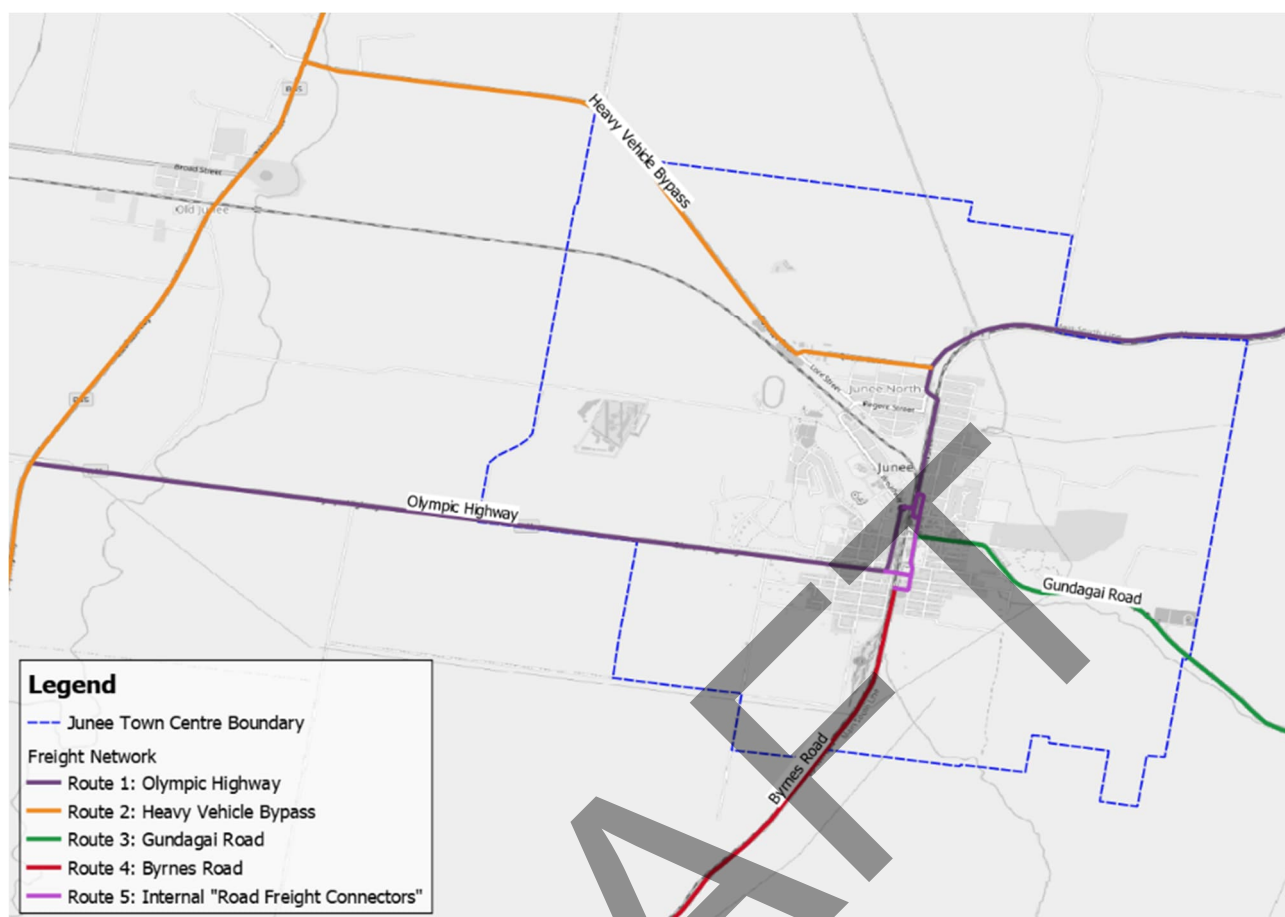


Figure 4-12: Junee Road freight network (key corridors)

When considering the “existing” and “future” state of the road freight network in Junee, it is noted that the Inland Rail project will have a significant impact. Inland rail (projected for opening in 2027) will see a rise in the number of daily double-stacked freight trains through Junee to 20 daily freight trains.

The increase in the length and frequency of freight trains will realise extended and more frequent closures of the Olympic Highway level crossing (with ensuing delays), as well as an increased reliance on alternate crossings of the rail corridor (including the Kemp Street).

The introduction of double-stacked trains will also require the replacement of the existing load limited Kemp Street bridge (projected opening year mid-2025), which will improve the standard of an alternate crossing of the rail corridor (with the bridge being able to accommodate most heavy vehicle types).

As such, the Inland Rail project (including the replacement of the Kemp Street bridge) will likely see a change in light and heavy vehicle movements within the Junee area including (but not limited to):

- Increased reliance (and traffic volumes) on the heavy vehicle bypass of Junee for north-south through movements on the Olympic Highway, with ensuing impacts on:
 - The condition of the HL Robinson Bridge.
 - The safety of the Queen Street and the Olympic Highway intersection (noting existing intersection geometry deficiencies).
 - The safety of Queen Street through the school zone at Junee North Public School (including the school crossing).
- Increased reliance (and traffic volumes) on the internal “road freight connectors” within Junee, with ensuing impacts on the:

- The safety and amenity of the Junee town centre including the Peel Street/Lorne Street corridor.
- The safety of Lorne Street through the school zone at Junee Public School (including pedestrian crossing and parking vehicles).
- The Ducker, Edgar and William Street corridors, with increased heavy vehicle movements from the Kemp Street bridge.

DRAFT

5 Potential Mitigation Measures

5.1 Development of Mitigation Measures

In identifying potential mitigation measures, priority sites were reviewed and considered against several key criteria to ensure Junee Shire Council was well positioned to progress the development of priority sites. This included:

- Considering mitigation measures within the context of the integrated nature of the road network in Junee (e.g. connected priority sites within the Junee town centre).
- Identification of indicative improvement types to address the priority sites.
- When considering priority sites, consideration of the scale of safety and operational issues when considering potential mitigation measures (i.e. appropriateness of proposed mitigation measures).
- Consideration of the “feasibility” of proposed works, in terms of “scale”.
- Consideration of timing of potential mitigation works (e.g. short (0-5 years), medium (5-10 years) or long term (>10 years)).
- Consideration of the indicative capital cost of works, and likely “value for money” that proposed mitigation measure would likely provide.
- Identification of respective road authorities (i.e. Junee Shire Council for local roads and Transport for NSW (TfNSW) for state-controlled roads). Where mitigation measures are identified on state roads, further consultation would be recommended with TfNSW.
- Consideration of potential funding programs (e.g. NSW State and Federal Government grants) pending the type and capital value of the mitigation measures.
- To align with the TfNSW Future Transport 2056 Strategy, priority sites and potential mitigation measures were viewed through each of the Future Transport 2056 “Guiding Principles” which included (to ensure strategic alignment):
 - Customer focused:
 - Flexible services are an integral part of the transport system helping to deliver reliability
 - A transport system that adapts to and embraces new technology.
 - Successful places:
 - The appropriate movement and place balance is established enabling people and goods to move efficiently through the network whilst ensuring local access and vibrant places.
 - Supporting centre with appropriate transport services and infrastructure.
 - A strong economy:
 - Changes in land use, population and demand, including seasonal changes, are served by the transport systems.
 - Economic development is enabled by regional services and infrastructure.
 - Safety and performance:
 - A safe transport system for every customer with zero deaths or serious injuries on the network by 2056.
 - A transport system that is resilient to significant weather events including floods, fog and bus fires.

- Accessible services:
 - Accessibility to employment and services such as health, education, retail and cultural activities within Regional Cities and Centres.

A summary of potential mitigation measures for each of the identified priority sites is provided below in Table 5-1 below, with indicative location of mitigation measure provided in Figure 5-1.

DRAFT

Table 5-1: Potential mitigation measures of priority sites

ID	Priority	Key Freight Corridor	Priority Site Location	Problem description and types	Future Transport Customer Outcomes Sought	Potential improvement type / scope	Indicative feasibility of proposed works	Road Authority	Potential timing of improvements	Indicative capital value range ¹	Indicative Value for Money	Potential Fundings Sources
1	High	Internal road freight connectors	Intersection of Belmore Street/Lorne Street (Junee town centre)	Conflict of HV movements within Town Centre environment (incl. pedestrian movements).	<ul style="list-style-type: none"> Successful places Safety and performance 	<ul style="list-style-type: none"> Upgraded pedestrian crossings Upgraded intersections (medians) Improved delineation and signage Reduced speed limits within "town centre" 	High – works are of a minor nature	Local (JSC)	Short-term	\$0.5M – \$2M	High	JSC NSW: Fixing Local Roads
2	High	Internal road freight connectors	Lorne Street, Peel Street and Cox Street (Junee town centre)	Conflict of HV movements within Town Centre environment (incl. pedestrian movements).	<ul style="list-style-type: none"> Successful places Safety and performance 	<ul style="list-style-type: none"> Upgraded pedestrian crossings Upgraded intersections Improved delineation and signage Reduced speed limits within "town centre" Potential change in road priorities (to support HV movements) at Cox Street/Peel Street 	High – works are of a minor nature	Local (JSC)	Short-term	\$0.5M – \$2M	High	JSC NSW: Fixing Local Roads
3	High	Internal road freight connectors	Lorne Street (Belmore Street to Hill Street)	Conflict of HV movements through a school zone (and adjacent aquatic centre)	<ul style="list-style-type: none"> Successful places Safety and performance A strong economy 	<ul style="list-style-type: none"> Relocation of school entrance (and parking) to Stewart Street 	High – works are of a minor nature	Local (JSC)	Short-term	\$0.5M – \$2M	High	JSC NSW: School Zone Infrastructure Sub Program
4	High	Olympic Highway	Olympic Highway Open Level Crossing (OLC)	Lengthy OLC closure times (due to train driver changeover)	<ul style="list-style-type: none"> Safety and performance A strong economy 	<ul style="list-style-type: none"> Potential variable message signs (VMS) at key detour points Relocation of train driver changeover facilities away from level crossing (e.g. towards Harefield) 	High – installation of VMS to alert of potential detour around OLC	State (TfNSW)	Short-term	<\$0.5M	High	TfNSW
							Uncertain – relocation of driver changeover facilities (requires consultation with ARTC)	N/A – ARTC	Medium-term	Unknown	Unknown	ARTC
5	High	Internal road freight connectors	Kemp Street bridge	<ul style="list-style-type: none"> HV load limit, impacting freight productivity. Low bridge clearance for double-stacked trains (Inland Rail) 	<ul style="list-style-type: none"> Safety and performance A strong economy 	<ul style="list-style-type: none"> Replace bridge 	Major capital works (funded by ARTC)	Local (JSC)	Short-term	Unknown – Funded by ARTC	High	ARTC

ID	Priority	Key Freight Corridor	Priority Site Location	Problem description and types	Future Transport Customer Outcomes Sought	Potential improvement type / scope	Indicative feasibility of proposed works	Road Authority	Potential timing of improvements	Indicative capital value range ¹	Indicative Value for Money	Potential Fundings Sources
6	High	Internal road freight connectors	Intersection of Kemp Street/Ducker Street	<ul style="list-style-type: none"> Intersection geometry restrict HV movements Kemp Street Bridge upgrade (by ARTC) would facilitate larger/heavier HV movements through this intersection 	<ul style="list-style-type: none"> Safety and performance A strong economy 	<ul style="list-style-type: none"> Upgraded intersections (for improved HV passage) 	High – works are of a minor nature	Local (JSC)	Short-term	\$0.5M – \$2M	High	JSC NSW State: Fixing Country Roads Federal: Heavy Vehicle Safety and Productivity Program
7	High	Internal road freight connectors	Ducker to William streets: <ul style="list-style-type: none"> Ducker Street/Edgar Street intersection Edgar Street/William Street intersection 	<ul style="list-style-type: none"> Intersection geometries restrict HV movements Kemp Street Bridge upgrade (by ARTC) would facilitate larger/heavier HV movements through these local roads 	<ul style="list-style-type: none"> Safety and performance A strong economy 	<ul style="list-style-type: none"> Upgraded intersections (for improved HV passage) Improved delineation and signage Potential change in road priorities (to support HV movements) 	High – works are of a minor nature	Local (JSC)	Short-term	\$0.5M – \$2M (per intersection)	High	JSC NSW State: Fixing Country Roads Federal: Heavy Vehicle Safety and Productivity Program
8	High	HV bypass of Junee	Olympic Highway / Queen Street intersection	Poor lane discipline and sight lines through intersection	<ul style="list-style-type: none"> Safety and performance A strong economy 	<ul style="list-style-type: none"> Upgraded intersection to improve lane discipline, sight lines and reduce vehicle speeds 	High – works are of a minor nature	State (TfNSW)	Short-term	\$2M - \$5M	High	TfNSW Federal: Heavy Vehicle Safety and Productivity Program
9	High	HV bypass of Junee	Queen Street near Junee North Public School	Heavy vehicle passage through school zone, with school crossing and parked cars (school drop off)	<ul style="list-style-type: none"> Successful places Safety and performance A strong economy 	<ul style="list-style-type: none"> Potential relocation of staff, pick up areas (including bus) off Queen Street onto vacant land immediately west of school site. 	Moderate – would require acquisition of adjacent lands for parking areas	Local (JSC)	Short-term	\$2M - \$5M	High	JSC NSW State: School Zone Infrastructure Sub Program
10	High	HV bypass of Junee	HL Robinson Bridge	Load limits on bridge do not accommodate desired usage	<ul style="list-style-type: none"> Safety and performance A strong economy 	<ul style="list-style-type: none"> Bridge strengthening and/or replacement 	Moderate	Local (JSC)	Short-term	\$15M-\$25M	High	NSW State: Fixing Country Roads Federal: Bridge Renewal Program
11	Medium	Olympic Highway	Olympic Highway underpass	Rail overbridge clearance restricts movement of some heavy vehicles and loads	<ul style="list-style-type: none"> Safety and performance A strong economy 	<ul style="list-style-type: none"> Regrading of the highway (and approaches) under the railway overbridge 	Medium – some approach and drainage works would be required.	State (TfNSW)	Medium-term	\$5M-\$15M	High	TfNSW
12	Medium	Olympic Highway	Olympic Highway (south of Goldfields)	Decreased amenity from slow moving	<ul style="list-style-type: none"> Successful places 	<ul style="list-style-type: none"> Reduced speed limits through town centre 	High – works are of a minor nature	State (TfNSW)	Short-term	\$0.5M – \$2M	High	TfNSW

ID	Priority	Key Freight Corridor	Priority Site Location	Problem description and types	Future Transport Customer Outcomes Sought	Potential improvement type / scope	Indicative feasibility of proposed works	Road Authority	Potential timing of improvements	Indicative capital value range ¹	Indicative Value for Money	Potential Fundings Sources
			Way to North of Queen Street)	heavy vehicle travel through the Junee town centre, with intermittent impact of OLC closures.	<ul style="list-style-type: none">Safety and performanceA strong economy	<ul style="list-style-type: none">Traffic calming measures						
13 ²	Medium	N/A – local road	Lord Street Bridge	Load limited bridge	<ul style="list-style-type: none">Safety and performanceA strong economy	<ul style="list-style-type: none">Bridge strengthening and/or replacement	Moderate	Local (JSC)	Short-term	\$5M-\$15M	Medium	NSW State: Fixing Country Roads Federal: Bridge Renewal Program

1: Indicative capital value costs have been provided as a means to consider the scale of proposed mitigation measures, and do not negate the need to develop format cost estimates, following further planning and development of potential mitigation measures.

2: JSC have advised funding for Lord Street Bridge upgrade

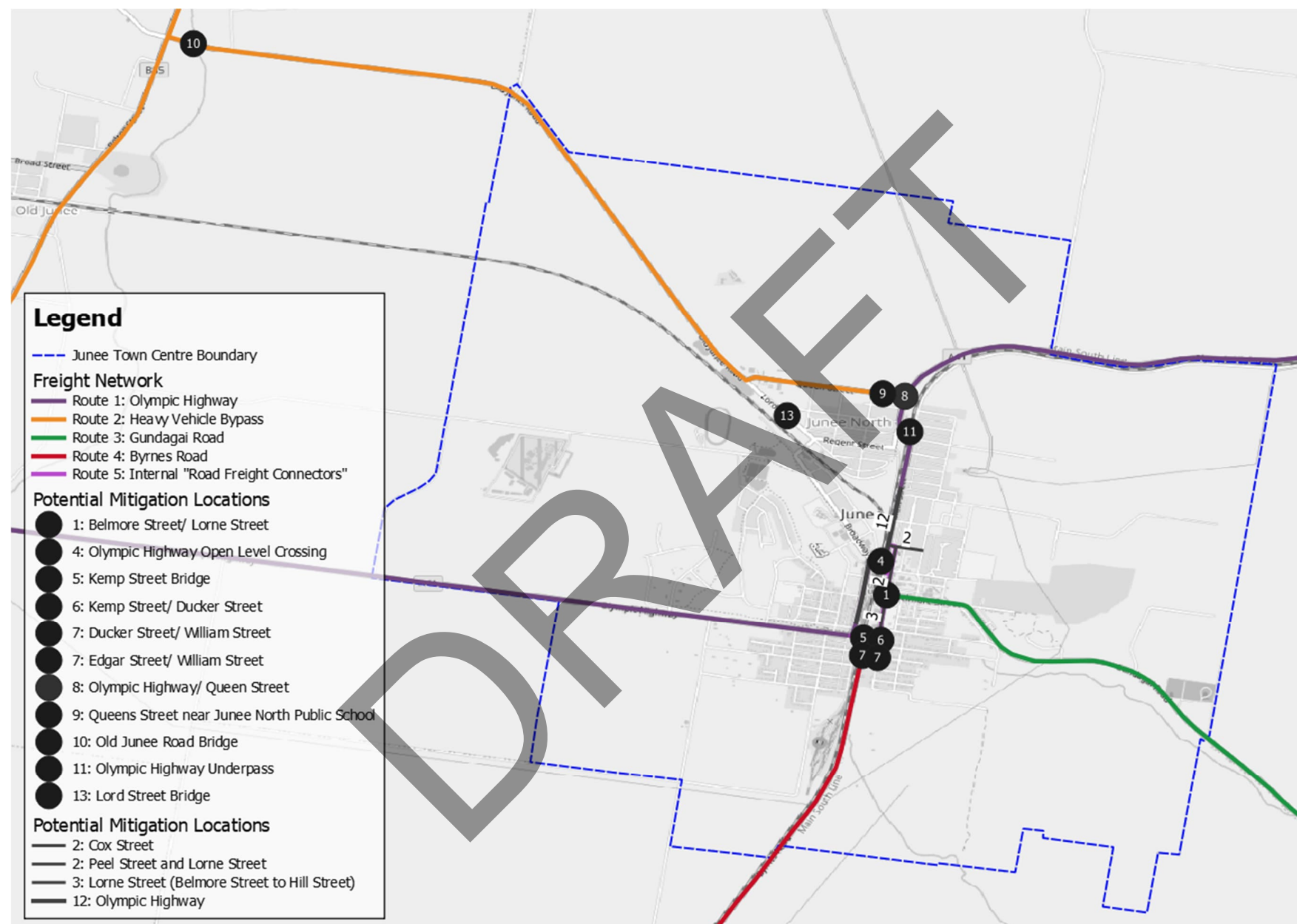


Figure 5-1: Location of proposed mitigation measures

6 Summary

The Inland Rail project will have a significant impact on Junee, which will see a rise in the number of daily double-stacked freight trains through Junee to 20 daily freight trains.

The introduction of double-stacked trains will also require the replacement of the existing load limited Kemp Street bridge (projected opening year mid-2025), which will improve the standard of an alternate crossing of the rail corridor (with the bridge being able to accommodate most heavy vehicle types).

As such, the Inland Rail project (including the replacement of the Kemp Street bridge) will likely see a change in light and heavy vehicle movements within the Junee area including due in part to the number and duration of level crossing closures, including:

- Increased reliance (and traffic volumes) on the heavy vehicle bypass of Junee (Old Junee Road) for north-south through movements on the Olympic Highway; and
- Increased reliance (and traffic volumes) on the internal "road freight connectors" within Junee.

This Freight and Transport Plan has identified key freight corridors within the Junee urban area (and immediate approaches) and relevant constraints on each of these corridors.

Several of these freight corridors have existing constraints on the passage of heavy vehicles, including load limits on the HL Robinson Bridge and Kemp Street Bridge, whilst other constraints will be further exacerbated by the impacts of the Inland Rail project, such as increased heavy vehicle volumes associated with the replacement of the Kemp Street Bridge, or the detour of vehicles (including heavy vehicles) associated with additional and extended level crossing closures of the Olympic Highway.

Importantly for Junee Shire Council, there are significant opportunities to reduce the impact of heavy vehicles on Junee, such as through increased reliance on the heavy vehicle bypass of Junee along Old Junee Road.

Minor works to reduce friction between heavy vehicles, the Junee town centre and public schools could be ameliorated through program of minor works such as traffic calming, as well as relocation of school access points away from the respective freight corridors of Lorne Street and Queen Street.

Noting the interconnectedness of the Junee freight network with the Junee urban area, SMEC has identified merit in Junee Shire Council in proceeding with a "program" approach of mitigation measures which focus on high priority areas of "conflict" between each respective freight corridor and key places, or infrastructure constraints, which are summarised in Table 6-1 (by freight corridor) and shown in Figure 6-1.

Table 6-1: Short-term proposed mitigation measure summary

Key Freight Corridor	Summary ID	Place or Infrastructure constraints	Potential Improvement Type/Scope
Internal road freight connectors	S1	Junee CBD (Belmore Street, Lorne-Peel Street)	<ul style="list-style-type: none"> Upgraded pedestrian crossings. Upgraded intersections. Improved delineation and signage. Reduced speed limits within "town centre". Potential change in road priorities (to support HV movements) at Cox Street/Peel Street.
	S2	Junee Public School - Lorne Street (Belmore Street to Hill Street)	<ul style="list-style-type: none"> Potential relocation of school entrance (and parking) to Stewart Street.
	S3	Various intersections: <ul style="list-style-type: none"> Kemp Street / Ducker Street Ducker Street/William Street William Street/Edgar Street 	<ul style="list-style-type: none"> Upgraded intersections (for improved HV passage). Improved delineation and signage. Potential change in road priorities (to support HV movements).
Olympic Highway	S4	Open Level Crossing	<ul style="list-style-type: none"> Variable message signs (VMSs) at key decision points to detour traffic around the level crossing.
	S5	Junee CBD (Olympic Highway)	<ul style="list-style-type: none"> Reduced speed limits within "town centre". Traffic calming measures.
HV bypass of Junee	S6	Queen Street / Olympic Highway	<ul style="list-style-type: none"> Intersection geometry restrict HV movements. Kemp Street Bridge upgrade (by ARTC) would facilitate larger/heavier HV movements through this intersection.
	S7	Junee North Public School	<ul style="list-style-type: none"> Potential relocation of staff, pick up areas (including bus) off Queen Street onto vacant land immediately west of school site.
	S8	HL Robinson Bridge (load limit)	<ul style="list-style-type: none"> Bridge strengthening and/or replacement.

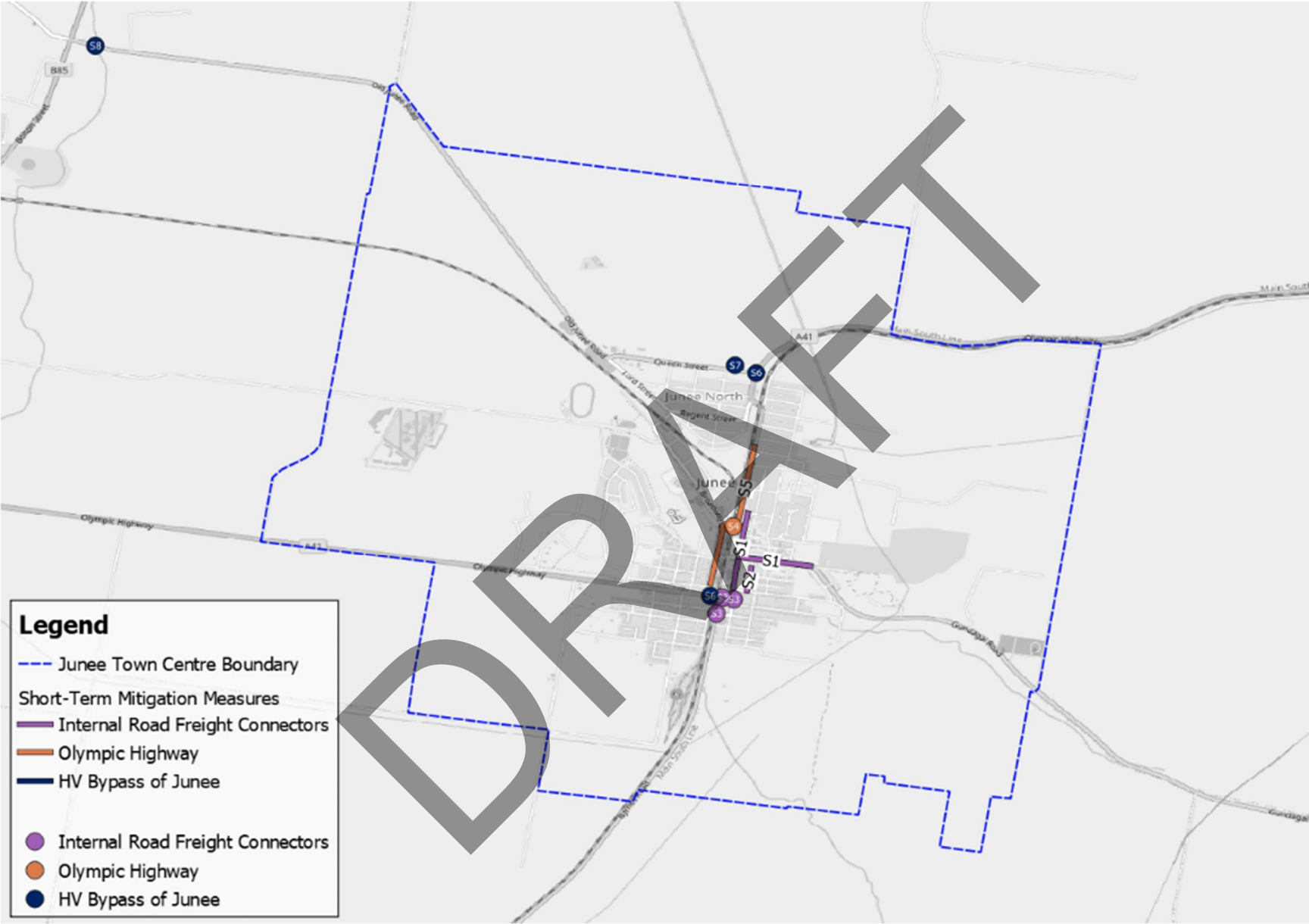


Figure 6-1: Location of short-term proposed mitigation measures

7 Implementation Plan

SMEC has identified a suite of potential mitigation measures for the Junee urban area and immediate approaches, as well as a proposed implementation plan to developing and delivery mitigation measures considering the interconnected nature of the road network (and freight movements), for each of the freight corridors in Junee.

To further progress proposed prioritised mitigation measures, Junee Shire Council (JSC) proposes to undertake a period of stakeholder consultation including with both residents, and agencies including Transport for NSW (TfNSW), ARTC and the NSW Department of Education. The outcomes of the consultation will further confirm the relative priority of proposed mitigation measures, but also provide further context to enable further planning and development of each of the mitigation measures.

Noting the scale of potential mitigation measures, potential funding sources have been identified for each of the mitigation measures, and it is recommended that should JSC progress any mitigation measure for funding, that they be presented as part of a broader “program” of improvements along each of the freight corridors, with clear linkages to either “place” or “infrastructure” constraints.

The potential impact of existing constraints, and the future Inland Rail project should also be considered with respect to the indicative timing of proposed mitigation measures, e.g. existing load limits of the HL Robinson Bridge, as against constraints which are likely to be exacerbated by Inland Rail.

Key next steps for the project’s implementation could include:

- Stakeholder consultation of the draft Junee Freight and Transport Plan (this report), including with residents and stakeholders (e.g. TfNSW, ARTC, NSW Department of Education) to confirm the respective priorities of proposed mitigation measures.
- Design (including options) of proposed mitigation measures.
- Assessment of constraints (environmental, property, heritage, etc) for each proposed mitigation measure.
- Development of a multi-criteria analysis framework to identify the preferred option for each mitigation measure.
- Preparation of cost estimates (of the preferred option for each mitigation measure).
- Economic analysis of the preferred option for each mitigation measure.
- Review of grant program guidelines to confirm eligibility of proposed mitigation measures; and
- Preparation of funding submissions against grant programs for prioritised mitigation measures.

DRAFT

Redefining exceptional

Through our specialist expertise, we're challenging
boundaries to deliver advanced infrastructure solutions.

www.smecc.com