regional roads victoria

8 Traffic and transport

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Tables

Figures

8.1 Overview

This chapter provides an assessment of the traffic and transport impacts associated with the project. The chapter has been informed by the traffic and transport impact assessment prepared for the project and provided in EES Appendix M: *Traffic and transport impact assessment*.

The objective of the traffic and transport impact assessment was to characterise the existing conditions and traffic patterns of the study area, and to identify the potential impacts from the introduction of a bypass and any required mitigation measures. To achieve this, the traffic and transport impact assessment considered:

- the impacts on local traffic from the construction of a bypass
- the future performance of the road network within the study area, such as traffic volumes and travel times compared to the existing network conditions
- accessibility and safety for a range of vehicles and modes of transport.

The traffic and transport impact assessment identified multiple key benefits of the project, including:

- reduction of eastbound and westbound traffic volumes travelling through the Beaufort town centre, including a reduction of heavy/commercial vehicles
- reduction of travel times for eastbound and westbound through traffic
- enhanced safety and connectivity of the local road network for vehicles, pedestrians and bicycles.

The chapter also identifies measures through design and construction activities to manage potential impacts relating to traffic and transport.

8.2 EES evaluation objective

The evaluation objective set in the scoping requirements relevant to the traffic and transport assessment is:

> ***Road efficiency, capacity and safety:*** *To provide for an effective Western Highway bypass of Beaufort, to improve travel efficiency, road safety, and capacity, as well as improved amenity and local transport network in Beaufort.*

This chapter discusses the key issues identified in the scoping requirements relevant to traffic and transport and outlined in Table 8.1 below.

Table 8.1 EES key issues – Traffic and transport

Key issues
Impacts from through traffic (including heavy vehicles) in Beaufort.
Effective integration of the proposed project with local transport networks including public transport.
Identify and compare expected or modelled transport performance of identified alignment alternatives, in terms of travel times, capacity, traffic volumes, road safety and accessibility.

Specific aspects to be addressed were also detailed in the scoping requirements. These are detailed in Table 8.2 below.

Table 8.2 EES requirements – Traffic and transport

EES requirements
Priorities for characterising the existing environment
Characterise traffic and road conditions (times, capacity, volumes, road safety) for the "no project scenario."
Characterise existing transport patterns —private vehicles, commercial/freight heavy vehicles, pedestrians, bicycles and public transport— to identify influences on capacity, travel times, safety and accessibility and planned future land uses.
Design and mitigation measures
Potential design solutions, appropriate for a rural town such as Beaufort, to optimise linkages with the existing local road network and maintain or enhance access (or vehicles, pedestrians, bicycle and public transport).
Address potential risk areas to road safety, such as wildlife corridors, and outline any specific measures to avoid, minimise and mitigate road safety issues.
Identify proposed north-south road access to public and private land.
Identify proposed access to public land in the event of wildfire, should existing access tracks be severed.
Assessment of likely effects
Assessment, including modelling projections, of the effects on traffic volumes and travel time outcomes.
Assessment of the effects on the accessibility, safety and connectivity for commercial vehicles, local car users, public transport, pedestrians and cyclists.
Assessment of the possible timing and implications of the bypass on traffic network performance.
Describe the implications of each alternative in meeting the proposed project's transport objectives.

8.3 Legislation and policy

Relevant legislation and government policies related to traffic and transport are outlined in Table 8.3.

Table 8.3 Relevant state legislation and policies

Legislation/policy	Description	Relevance to project
State		
Transport Integration Act 2010	The *Transport Integration Act 2010* sets out the charter for Victoria's transport agencies, including RRV, to manage the road system in a manner which supports a sustainable Victoria by seeking to increase the share of public transport, walking and cycling trips as a proportion of all transport trips in Victoria. The *Transport Integration Act 2010* draws on six transport system objectives to deliver on the above vision. These are: • social and economic inclusion • economic prosperity • environmental sustainability • integration of transport and land use • efficiency, coordination and reliability • safety, health and wellbeing.	The *Transport Integration Act 2010* sets out the following decision-making principles to be considered for the project: • integrated decision making • triple bottom line assessment • equity • transport system user perspective • precautionary principle • stakeholder engagement and community participation • transparency.

Legislation/policy	Description	Relevance to project
Road Management Act 2004	The *Road Management Act 2004* provides *'practical guidance to any person conducting, or proposing to conduct, any works on a road in Victoria.*' The *Road Management Act 2004* has been established to promote safe and efficient road networks and a coordinated approach for the management of public roads. The Road Management Act (General) Regulations 2005 and the Road Management Act (Works and Infrastructure) Regulations 2005 have been established under the *Road Management Act 2004* and are to be complied with for all public roads.	The *Road Management Act 2004* provides the statutory framework for RRV to manage the project and is applicable throughout the whole of life cycle of the project, including planning and development, constructions, operations and asset management. Code of practices are set out under the *Road Management Act 2004* to provide guidance for road authorities, works and infrastructure managers.
Planning and Environment Act 1987	The Planning Policy Framework is included in the planning scheme for all Victorian councils under the *Planning and Environment Act 1987*. It outlines aspects of State planning policy that councils, as local planning authorities, must consider in addressing statutory and strategic planning matters in their respective municipalities.	Clause 18 (Transport) of the Planning Policy Framework is relevant to the traffic and transport impact assessment, which states that '*Planning should ensure an integrated and sustainable transport system that provides access to social and economic opportunities, … coordinates reliable movements of people and goods, and is safe'*. The project seeks to provide a safe transport system through designing new transport routes that aim to optimise accessibility, safety, service and amenity.
Policy and plans		
Strategic Plan 2019-23: Simple, connected journeys (Department of Transport 2019)	In July 2019, VicRoads and Public Transport Victoria were integrated to form the Department of Transport. The department portfolio includes RRV. The *Strategic Plan 2019–23*, released by Department of Transport in 2019, outlines the vision and focus of Department of Transport, including transport priorities, initiatives and outcomes.	Key priorities in the *Strategic Plan 2019–23* relevant to the project are to: • operate a safe and inclusive system, with an objective to create a road network that is well maintained, efficient and safe to use • optimise the system for sustainable and reliable travel, with an objective to make freight more efficient • design and plan a people-focused system, with an initiative to continue to upgrade regional roads through RRV.
Victorian Road Safety Strategy 2021	The *Victorian Road Safety Strategy 2021-2030* is the State road safety strategy aimed at creating a safer road environment and reducing the opportunity for poor decision making. The strategy commits the Victorian Government to initially halve road deaths and progressively reduce serious injury by 2030 before ultimately eliminating death and serious injury from roads by 2050. The strategy will be delivered via a series of short-term action plans over the life of the strategy, which may include measures such as policy, innovation and technology, infrastructure improvements, public information campaigns, education programs, enforcement and other mechanisms available to government.	Key goals in the *Victorian Road Safety Strategy 2021–2030* that are relevant to the project are to: • make remote and rural roads safer for all road users • reduce fatalities and serious injuries where speed is a contributing factor • ensure unprotected and vulnerable road users are supported by the road system, not impacted by it.

Legislation/policy	Description	Relevance to project
Victorian Freight Plan: Delivering the Goods (Transport for Victoria 2018)	The *Victorian Freight Plan: Delivering the Goods* (Transport for Victoria 2018) is a State-wide plan for freight that builds on previous Victorian government freight strategies. The Plan sets out long-term directions for the freight network in Victoria to create an efficient, safe and sustainable freight and logistics system that enhances the economic prosperity and liveability of the State. A key objective of the *Victorian Freight Plan: Delivering the Goods* is to improve the efficiency of moving freight while minimising adverse impacts.	The *Victorian Freight Plan: Delivering the Goods* identifies: • reducing the impact of congestion on supply chain costs and communities as a key priority area • the importance of regional Victoria freight networks and supply chains.
Central Highlands Regional Transport Strategy (Central Highlands Councils 2014)	The *Central Highlands Regional Transport Strategy* (Central Highlands Councils 2014) provides a tool for implementing established transport frameworks, and for planning and policy development for future projects. The purpose of the Strategy is to identify priority transport projects of regional significance and align the transport directions of the Central Highlands with State, regional and local policy.	Considerations of the *Central Highlands Regional Transport Strategy* relevant to the project are: • ensuring connectivity of Beaufort to other centres • amenity considerations for the Beaufort town centre • provision of a safe, reliable and resilient transport network.
Central Highlands Regional Growth Plan (Victorian Government 2014)	The *Central Highlands Regional Growth Plan* (Victorian Government 2014) has been developed in a partnership between local government and State authorities. The Plan provides an approach to land use planning in the Central Highlands region, which covers the municipalities of Ararat, Ballarat, Golden Plains, Hepburn, Moorabool and Pyrenees. The Plan identifies opportunities to accommodate and encourage growth over the next 30 years, and key regional priorities for future infrastructure planning and investment to support growth.	The *Central Highlands Regional Growth Plan* identifies: • the Western Highway and rail corridors linking Melbourne and Adelaide as significant transport networks, which service freight and passenger requirements and are vital to the local economy • the issue of managing the amenity impacts of freight in high amenity areas to reduce potential conflicts in townships, such as Beaufort.
Plan Melbourne 2017–2050 (DELWP 2017)	*Plan Melbourne 2017–2050* (DELWP 2017) is a long-term plan that aims to accommodate for the city's forecasted population of 8 million by 2050. The Plan acts as a guide for planners, councils and developers to achieve the plans goals of Melbourne and Victoria in growing as liveable, sustainable and productive places by 2050. Regional Victoria is included within the Plan, focusing on several directions and policies to stimulate employment and growth, and improve transport connections through regional centres.	*Plan Melbourne 2017–2050* identifies the importance of transport connections between cities and regions. The project supports this objective as it will improve the transport corridor between Melbourne and Adelaide, and the connections to regional centres along the Western Highway.

8.4 Methodology

Existing data and documentation reviewed for the traffic and transport impact assessment included:

- road crash statistics for a five-year period (2016–2020) from the VicRoads Crash Stats database for all roads within the project study area
- council strategic documents, policies and guidelines related to transport and land use
- information provided in the *Ararat and Beaufort Bypass Planning Studies – Transport Surveys* (Trafficworks 2015).

Methods used to characterise the existing conditions of the road network consisted of:

- conducting automatic tube counts at eight different locations across a seven-day period (from Thursday 26 October to Wednesday 1 November 2017[1]) to establish the volume of traffic using the road network, including distinguishing between heavy vehicles (commercial vehicles) and light vehicles
- origin-destination surveys, which took place on Thursday 26 October 2017. To understand the general origin-destinations of traffic travelling through Beaufort, vehicles were recorded by survey stations located at key entrances and exits of Beaufort. The survey stations included Western Highway (west of Martins Lane, between Kings Road and Beaufort-Lexton Road, and West of Smiths Lane), Main Lead Road, Beaufort-Lexton Road and Skipton Road, as shown in Figure 8.1 below
- travel time surveys, which also took place on Thursday 26 October 2017 and consisted of a midday session (12:00 PM – 1:00 PM) and a PM session (2:30 PM – 5:30 PM). The survey was conducted along the Western Highway in both directions between Olinda Street and the United Petroleum service station (west of the Beaufort township). The surveys established average travel times for traffic passing through Beaufort via the Western Highway
- intersection counts at two intersections along Western Highway (Havelock Street/Livingstone Street and Lawrence Street) recorded the directions and volumes of traffic between 7:00 AM and 7:00 PM. This also occurred on Thursday 26 October 2017. Full results of surveys can be viewed in EES Appendix M: *Traffic and transport impact assessment*.

AUTOMATIC TUBE COUNTS

Record the amount and type of vehicles using a road through a tube/cable laid across the carriageway that measures the length between the tyres and axel of each vehicle that drives over it.

ORIGIN-DESTINATION SURVEYS

Surveys to determine trip patterns of vehicles, which can assist with transport planning.

TRAVEL TIME SURVEYS

Surveys of the time taken for a vehicle to travel a specified distance.

SIDRA MODELLING

Software package used to analyse intersection and network capacity and performance, and assist in intersection design.

The results from these surveys were used to develop two traffic models to develop a base case for the road network volumes, and to predict future impacts to traffic at Beaufort intersections with the bypass in operation, known as the 'project' scenario. A 'no project' scenario was also considered to assess future traffic impacts if the project was not constructed.

The traffic models included a simple spreadsheet network model of the major roads in Beaufort, and SIDRA models of the intersections along the Western Highway at Havelock Street/Livingstone Street, Lawrence Street and Racecourse Road for the AM and PM peak periods. The spreadsheet model was developed using a combination of the origin-destination, intersection and automatic tube count surveys, while the SIDRA modelling was completed for the AM and PM peak hours based on the developed peak hour volumes.

[1] The automatic tube count surveys undertaken between Thursday 26 October and Wednesday 1 November 2017 do not include the survey location of the Western Highway between King Street and Beaufort-Lexton Road. At this location the tubes were damaged and as such, were resurveyed the following week (Thursday 2 November to Wednesday 8 November 2017). Factoring was completed to account for potential traffic volume variations due to the Melbourne Cup holiday period.

An estimation of the construction traffic volumes for heavy vehicles was completed based on the assumptions that construction work would occur over a two year period (each year consisting of 300 working days). Truck movements were estimated to occur over an 11 hour period (7:00 AM to 6:00 PM) and the assumed haulage vehicles type was the common three-axle rigid truck and three-axle dog trailer (42.5t) as outlined by the National Heavy Vehicle Regulator.

Future operational traffic volumes, including heavy vehicle and light vehicle numbers were modelled using the spreadsheet network model for the 'project' and 'no-project' scenarios for years 2021 and 2031.

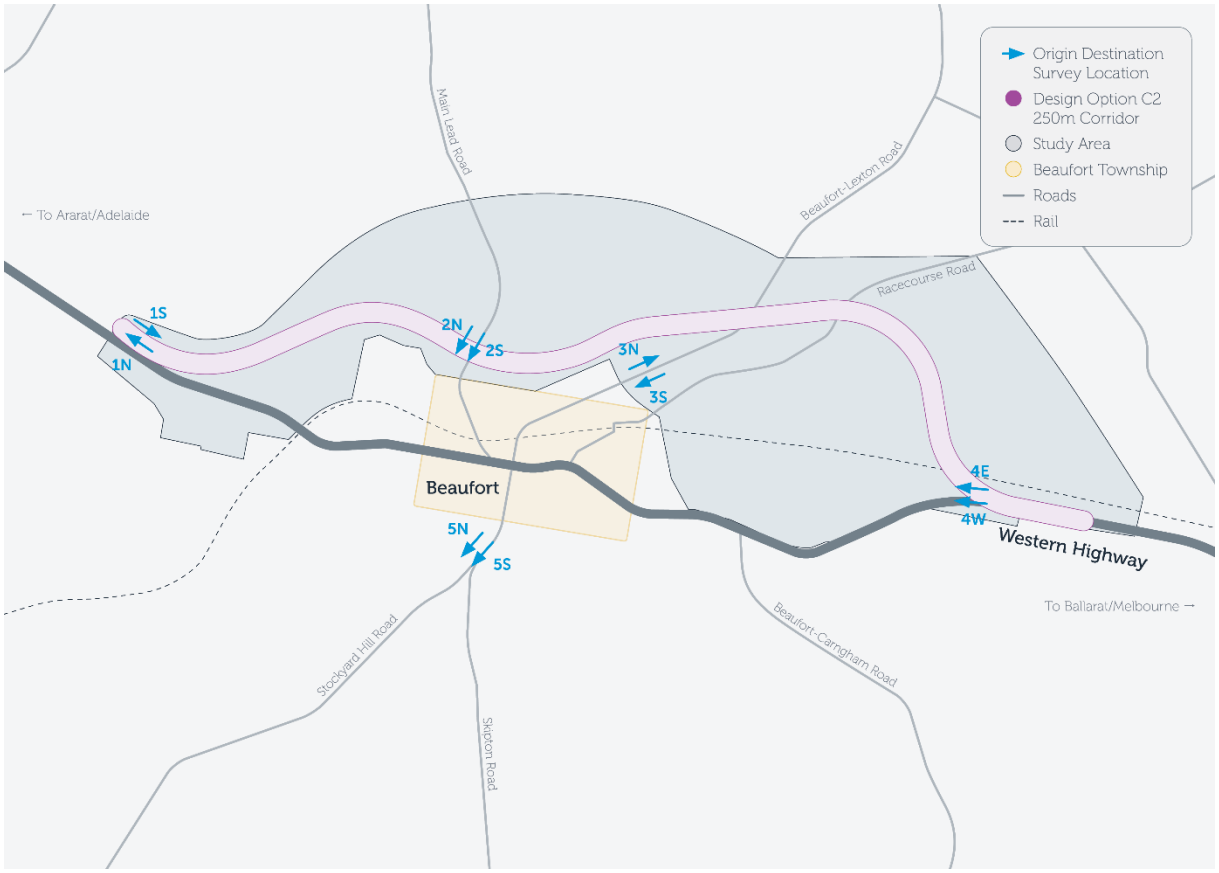


Figure 8.1 Origin-destination survey locations in relation to the study area

8.5 Traffic and transport investigation area

The study area for the project includes approximately 1,800 ha of land north of the Beaufort township, as shown in Figure 8.1. This study area contains the four bypass options assessed as part of the EES process to determine potential environmental impacts and constraints associated with the alignment options.

The preferred bypass alignment, C2, and investigation area for the traffic and transport impact assessment covers the key road network of and around Beaufort, which extends beyond the project study area and is outlined in Figure 8.2 below.

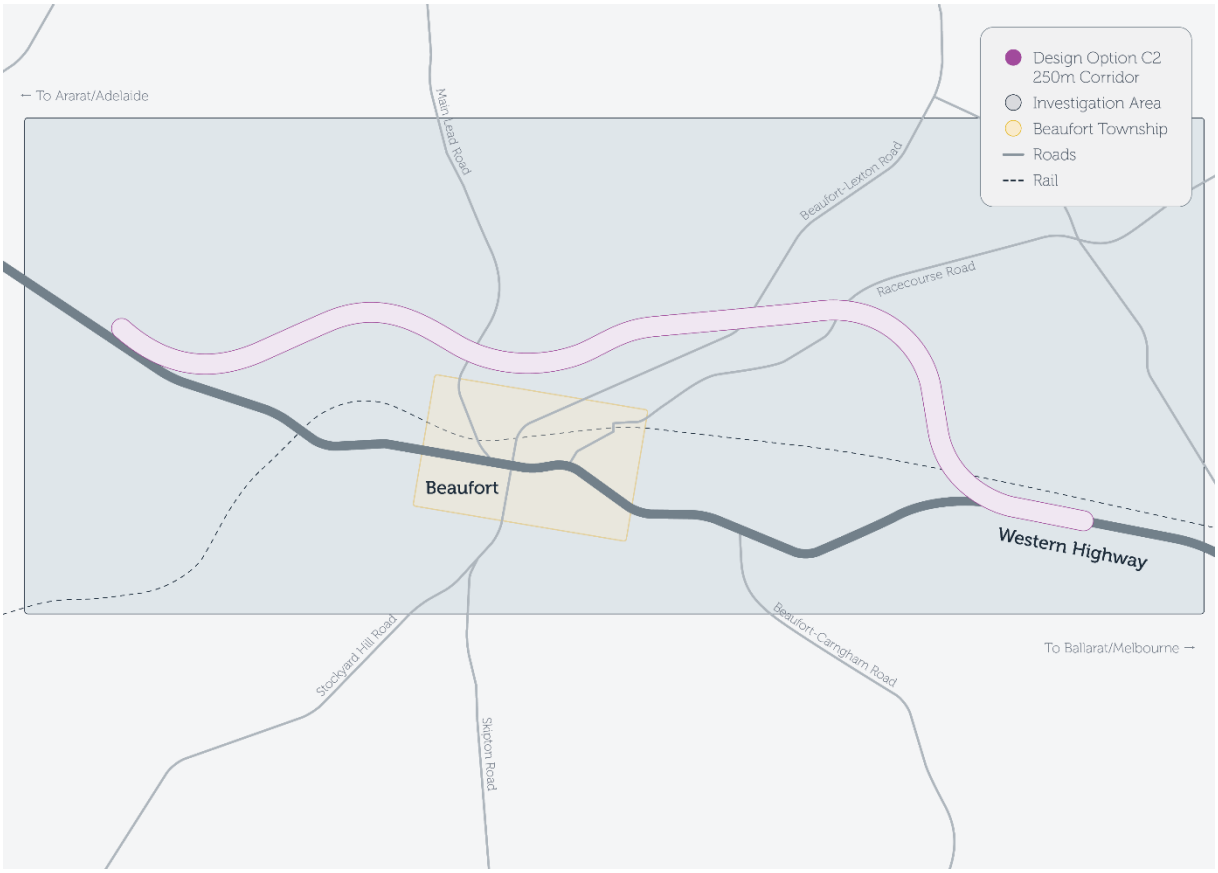


Figure 8.2 Investigation area of the traffic and transport impact assessment

8.6 Existing conditions

This section describes the existing conditions associated with the local traffic network, including existing traffic volumes, traffic movements and travel times, and outlines the existing public transport and pedestrian and cyclist facilities available within the investigation area.

8.6.1 Road and rail network

The key roads within the investigation area are a mixture of declared roads and council roads that provide access to rural properties around Beaufort. Declared roads within the investigation area are managed by RRV, while the local roads are managed by the Pyrenees Shire Council. Details on these roads are summarised in Table 8.4 below.

Table 8.4 Key roads within the investigation area

Road	Speed limit	Traffic cross-section	Road manager
Western Highway (Neill Street)	50–100 km per hour	Single lane in each direction. Divided section through town of Beaufort.	RRV
Smiths Lane	60–100 km per hour	Single lane, unsealed, shared between each direction.	Local council
Racecourse Road	50–100 km per hour	Single lane in each direction south of railway tracks, single lane shared between each direction north of the Melbourne-Ararat rail line.	Local council
Beaufort-Lexton Road	50–100 km per hour	Single lane each direction.	RRV
Main Lead Road	50–100 km per hour	Single lane each direction.	Local council
Back Raglan Road	50–80 km per hour	Single shared between each direction.	Local council

The Beaufort railway station is located just north of the town centre on Pratt Street. Existing level crossings between the railway and roads within the investigation area are:

- King Street
- Lawrence Street
- Racecourse Road.

The existing Western Highway crosses the Melbourne-Ararat rail line on the western side of Beaufort via a road over rail bridge.

8.6.2 Traffic volumes

The existing traffic volume results for the key roads in the investigation area, established by the automatic tube count surveys, are summarised in Table 8.5 below. The locations of the automatic tube count surveys are shown in Figure 8.3.

Table 8.5 Two-way traffic volume data and classification

Road	7 day avg (vehicles per day)	Weekday avg (vehicles per day)	Light vehicle	Heavy vehicle
Western Highway West	7,440	7,712	77%	23%
Western Highway central*	10,477	11,063	86%	14%
Western Highway East**	8,164	8,988	72%	28%
Back Raglan Road	49	51	75%	25%
Main Lead Road	788	792	86%	14%
Beaufort-Lexton Road	541	556	80%	20%
Racecourse Road	115	119	90%	10%
Skipton Road	1,663	1791	85%	15%

*Volumes have been factored (refer to EES Appendix M: *Traffic and transport impact assessment* for details)

**Only Thursday to Sunday data was summarised due to anomalies with data collected for Monday to Wednesday.

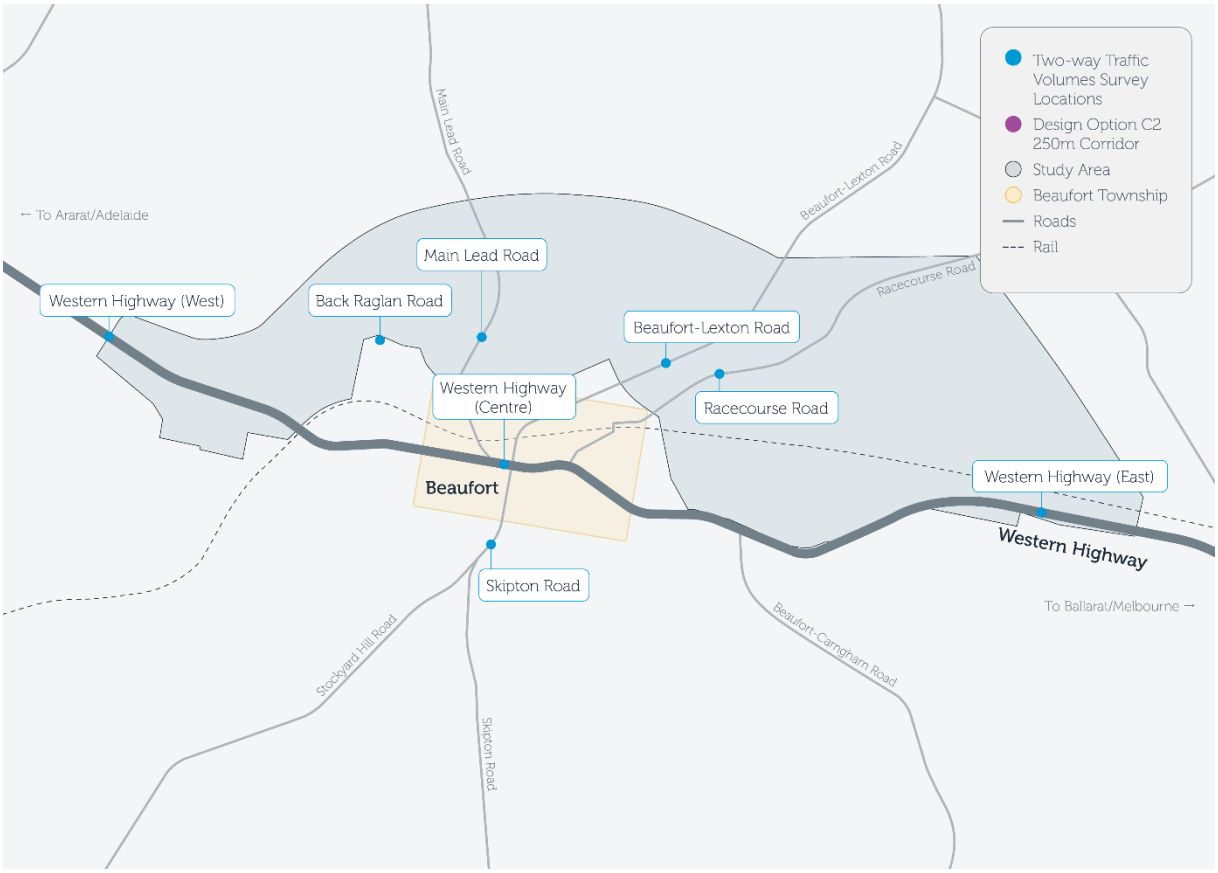


Figure 8.3 Two-way traffic volumes summary showing locations of automatic tube count survey (October 2017)

The collected survey data shows traffic volumes of approximately 11,060 vehicles on the Western Highway in central Beaufort per day (based on the weekday average). Within the investigation area, the Western Highway, Skipton Road, Main Lead Road and Beaufort-Lexton Road show the highest average traffic volumes. From these roads, only Main Lead Road is managed by Pyrenees Shire Council, with the other roads managed by RRV.

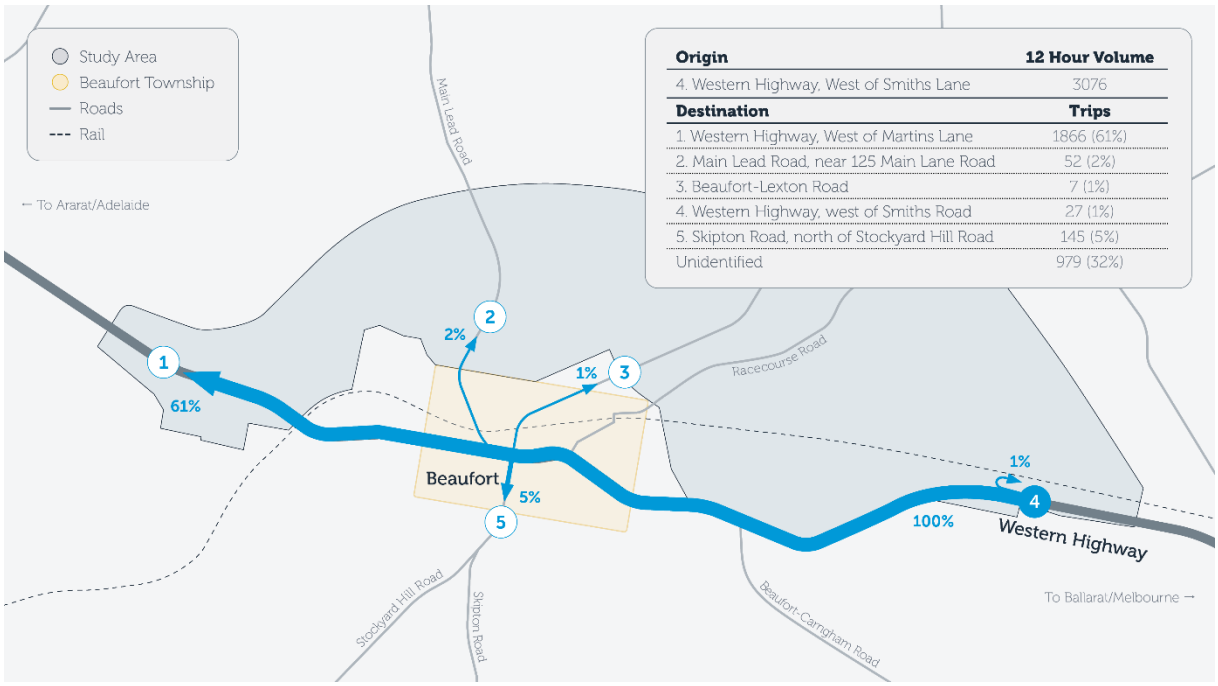
8.6.3 Heavy/commercial vehicles

The traffic volumes survey data shows that the Western Highway experiences a reasonably high volume of heavy vehicles for a main street through a township. At the western automatic tube count location, 23% of traffic recorded were heavy vehicles. At the eastern automatic tube count location, 28% of traffic consisted of heavy vehicles. Heavy vehicle usage is steadily increasing on the Western Highway, with an annual growth rate of 1.76% for heavy vehicles travelling from Horsham to Ballarat according to the Department of Transport and Regional Services (2007) *Melbourne – Adelaide Corridor Strategy*.

8.6.4 Through-traffic origin and destination

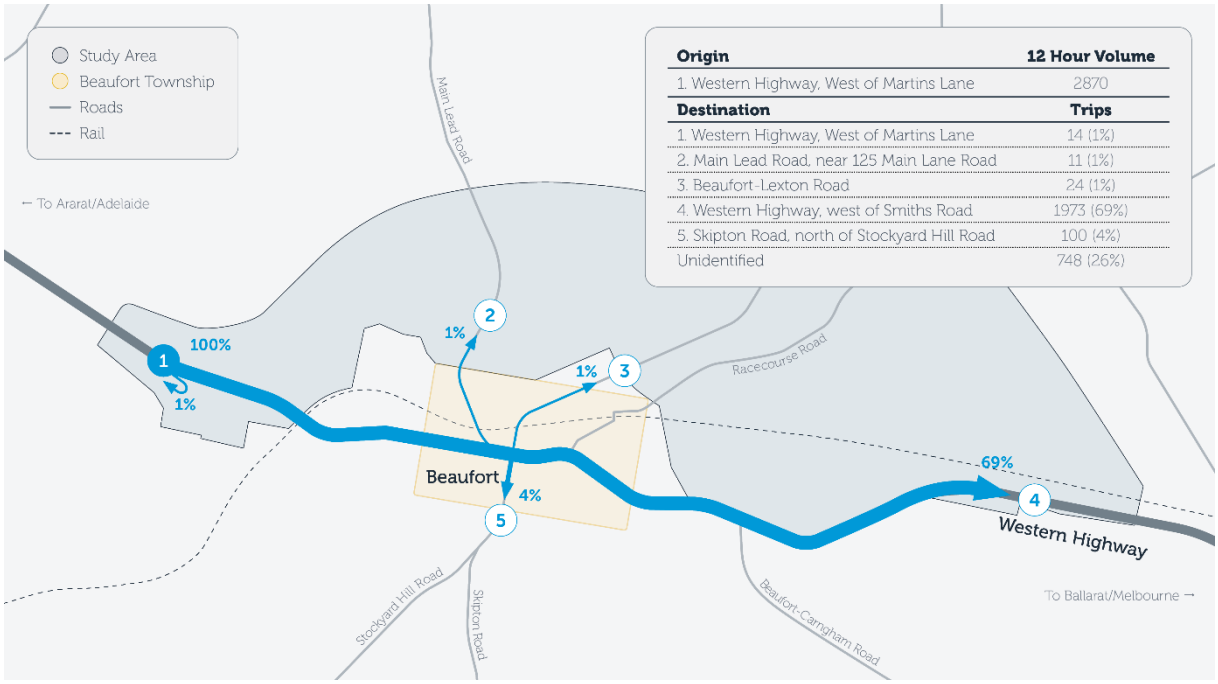
Surveys were conducted between 7:00 AM and 7:00 PM on Thursday 26 October 2017 to establish traffic movement entering Beaufort. These surveys showed that 69% of eastbound traffic from the Western Highway travels directly east through Beaufort, while the remaining traffic stops, or takes a local road north or south out of Beaufort. Westbound traffic entering Beaufort via the Western Highway continues to travel west 61% of the time (refer to Figure 8.4 and Figure 8.5 below).

Further details on the origin and destination survey, and results for the other roads surveyed, can be found in EES Appendix M: *Traffic and transport impact assessment*.



1. Percentages have been rounded to the nearest whole figure and may not add up to 100% due to rounding errors
2. Unidentified trips are vehicles that were only recorded at one origin-destination station (entering or exiting the investigation area). It is assumed that they have an origin/destination within the investigation area or have entered/exited the investigation area through a local road.

Figure 8.4 Origin-Destination 12-hour survey – Eastbound traffic on Western Highway, west of Martins Lane



1. Percentages have been rounded to the nearest whole figure and may not add up to 100% due to rounding errors
2. Unidentified trips are vehicles that were only recorded at one origin-destination station (entering or exiting the investigation area). It is assumed that they have an origin/destination within the investigation area or have entered/exited the investigation area through a local road.

Figure 8.5 Origin-Destination 12-hour Survey – Westbound on Western Highway

8.6.5 Travel times

Travel time surveys were conducted along the Western Highway between the United Petroleum service station (west of the Beaufort township) and Olinda Street in both directions. Surveys were completed for two sessions: a midday session (12:00 PM – 1:00 PM) and a PM session (2:30 PM – 5:30 PM). Five runs were completed in each direction for the midday session, while 15 runs and 18 runs were completed in the PM session for westbound and eastbound respectively. A summary of results is displayed in Table 8.6 below.

Table 8.6 Western Highway travel times

	Eastbound		Westbound	
	Time	Speed	Time	Speed
Midday run (12:00 PM – 1:00 PM)	4 mins 16 secs	50 km per hour	4 mins 30 secs	53 km per hour
PM run (2:20 PM – 5:30 PM)	4 mins 19 secs	52 km per hour	4 mins 5 secs	55 km per hour

The travel times along the Western Highway in the eastbound direction were largely consistent across the two survey periods, with only a three second difference in average time. For westbound direction, the midday run was slightly slower (25 seconds) compared to the PM period.

The full set of results are displayed in EES Appendix M: *Traffic and transport impact assessment*.

8.6.6 Crash analysis

An analysis of crash history data for a 9.9 km section of the Western Highway from Smiths Lane to Martins Lane between 2016–2020 (inclusive) has been undertaken. This assessment showed that over this period nine crashes serious injury or fatal crashes have been recorded within the investigation area, of which there were:

- one fatality crash at a midblock location
- seven serious injury accidents at midblock locations, and one at an intersection.

Additionally, during this period there were:

- three run off road crashes and six crashes occurred between vehicles
- no serious injury or fatal crashes involving pedestrians, motorcyclists or cyclists.

Table 8.7 summarises the crash event statistics within the investigation area. This table separates crashes by two road types: within the built-up area in Beaufort, and in non-built up areas.

Table 8.7 Beaufort investigation area Western Highway casualty crash rates

Area	Approx. annual average daily traffic	Length	Annual vehicle kilometres travelled (per 100 mil. vehicle kilometres travelled)	Crash rate (serious injury per year)	Crash rate (casualty per 100 mil. vehicle kilometres travelled)
Non-built up areas	7350	7.3	0.20	1	5.11
Built up areas	7700	2.6	0.07	0.4	5.71

Table 8.8 provides national and state average casualty rates for rural roads. Built up areas are areas that are considered similar to urban roads, with non-built up areas compared to the rural road scenario.

Crash rates within non-built up and built up areas of 4.08 and 2.74 crashes per 100 million Vehicle Kilometres Travelled respectively are low in comparison with both state and national averages, shown in Table 8.8.

Table 8.8 Nationally weighted mean road section casualty crash rates

Road stereotype	Crash rate (casualty crashes per 100 mil. vehicle kilometres travelled)	
	Australia	Victoria
Rural	14.76	16.31
Rural undivided/single	16.26	18.57
Urban	23.69	23.22
Urban undivided/single	29.44	32.12

Source: AustRoads (2010) Road Safety Engineering Risk Assessment Part 7: Crash Rates Database

8.6.7 Public transport

Within the investigation area there is one rail route and three coach routes servicing Beaufort and providing access to Melbourne, Ballarat, Horsham, Ararat and Ouyen.

V-Line also provides a train service via Beaufort Train Station associated with the Melbourne to Ararat service. This provides five services to and from Melbourne during weekdays, and three services to and from Melbourne during weekends.

V-Line also provides coach services from Beaufort Train Station, with the following routes:

- Ouyen – Melbourne via Hopetoun and Ballarat
- Nhill – Melbourne via Horsham.

Local school bus routes also operate through Beaufort, servicing local and regional residents. These bus routes are dictated by residential locations and households demand. A school bus route currently operates along Beaufort-Lexton Road.

8.6.8 Pedestrians and cyclists

Currently there is only short sections of pedestrian footpath provided within the central township of Beaufort. There is limited provision for pedestrians wanting to cross the Western Highway in Beaufort as only one signalised pedestrian crossing is available in town located at the intersection with Lawrence Street. No designated bike lanes exist on roads, however, generally there are cycling opportunities around the Beaufort area.

Pyrenees Shire Council have developed the *Beaufort Walkability Plan* (2016), which focuses on improving accessibility and infrastructure for pedestrians and cyclists in the Beaufort area. In support of this Plan, council was awarded funding in 2017 as part of the Federal Government's *Building Better Regions Fund Infrastructure Projects* stream and are delivering the construction of walking and cycling paths that link community, recreation, education, transport and business precincts.

8.7 Impact assessment

The following section discusses the potential impacts of the project construction and operation on traffic and transport in the investigation area. This assessment has been undertaken based on the project functional design.

8.7.1 Construction

The project is expected to have an overall construction timeframe of two years, once funding is obtained. The proposed alignment largely covers greenfield areas, meaning construction works will predominantly remain off existing roads other than where the bypass interchanges and overpasses are proposed. The primary construction impacts will include:

- increased traffic volume on Beaufort's local road network due to construction vehicles accessing and departing construction sites
- impacted access to and from the existing road network for some properties near the construction sites.

Traffic volume

Traffic volumes are likely to increase on the surrounding road network due to construction vehicles and the haulage routes that will be used to transport construction materials to and from the construction sites, as well as workers accessing and departing these sites. The potential project haulage routes would likely consist of:

- Western Highway
- Beaufort-Lexton Road
- Main Lead Road
- Skipton Road.

The greatest proportion of construction vehicle movements will be due to the movement of earthworks. The predicted construction traffic numbers in relation to earthwork movements are presented in Table 8.9 below. Without mitigation, the impact of construction traffic volumes will be medium.

Table 8.9 Predicted construction traffic numbers for earthwork movements

Earthworks material to be transported (m^3)	Construction vehicles per day	Construction vehicles per hour
1,700,000*	133	13

**Rounded to the nearest thousandth*

Local access

Temporary access changes to adjoining properties will occur at site entrances during the construction phase. Construction access points will likely result in the following:

- temporary impacts to private property access from private tracks and the public road network
- road/lane closures
- changes in road environment (including speed or alignment)
- implementation of diversions/detours.

Impacts to local property access will be temporary and localised in nature to areas where construction access and egress is required. Without mitigation, impacts to local access during construction will be medium.

Impacts to access for private properties is also discussed in EES Chapter 12: *Social effects*.

8.7.2 Operation

The impact assessment for the operation stage looked at impacts on the Beaufort township road network performance (travel times and traffic volumes), road safety and connectivity, and transport accessibility.

Once the bypass is operational it will have several positive impacts to the local transport network including:

- improved road network performance, including:
  - a reduction in traffic volume on the local road network, particularly on the Western Highway through Beaufort
  - a reduction in travel time on the local road network
  - improved traffic flow at intersections along the Western Highway and local roads in Beaufort
  - a reduction in freight travelling through the Beaufort town centre
- improved road design
- increased capacity for pedestrian and cyclist friendly design on local roads.

Network performance

Traffic volume

The bypass is expected to attract a large volume of traffic from the existing Western Highway and local roads, resulting in a significant reduction in traffic volume on the local road network. A large portion of the reduced traffic will also consist of heavy/commercial vehicles. Table 8.10 compares the modelled traffic volumes on the road network within the investigation area between a 2031 'without-project' case and a 2031 'with-project' case on a Thursday. This reduction in traffic volumes within the local road network is a positive impact of the project. The full results for traffic volume assessment can be found in EES Appendix M: *Traffic and transport impact assessment*.

Table 8.10 Thursday 24-hour traffic volumes – 2031 without project versus 2031 with project (LV: light vehicles, HV: heavy vehicles)

Site location	Segment location	Direction	Vehicles per day		Vehicle no. change with project					
					Change		LV		HV	
			Without project	With project	+ / -	%	LV	%	HV	%
Western Highway	West of Martins Lane Entrance (West of Beaufort)	East Bound	5,300	1,612	-3,688	-70%	-2,724	-70%	-965	-70%
		West Bound	4,947	1,655	-3,292	-67%	-2,230	-63%	-1,062	-76%
Main Lead Road	Near 125 Main Lead Road, next to Beaufort Trotting Training Track	North Bound	501	501	0	–	–	–	–	–
		South Bound	503	503	0	–	–	–	–	–
Beaufort-Lexton Road	Between Topp Lane and Action Lane	East Bound	376	319	-57	-15%	-41	-14%	-15	-17%
		West Bound	354	309	-45	-13%	-36	-13%	-8	-12%
Western Highway	West of Smiths Lane (East of Beaufort)	East Bound	5,638	1,978	-3660	-65%	-2,705	-65%	-957	-64%
		West Bound	5,381	2,104	-3277	-61%	-2,216	-61%	-1,061	-61%

Site location	Segment location	Direction	Vehicles per day		Vehicle no. change with project					
					Change		LV		HV	
			Without project	With project	+ / -	%	LV	%	HV	%
Skipton Road	Between Stockyard Hill Road and Park Road	North Bound	1,185	1,185	0	–	–	–	–	–
		South Bound	1,240	1,240	0	–	–	–	–	–
Back Raglan Road	North of Martins Lane and Back Raglan Road intersection	North Bound	38	38	0	–	–	–	–	–
		South Bound	38	38	0	–	–	–	–	–
Racecourse Road	Adjacent Yam Holes Creek	East Bound	83	83	0	–	–	–	–	–
		West Bound	67	67	0	–	–	–	–	–
Western Highway*	Between King St & Beaufort-Lexton Road (Albert St) i.e. the commercial centre of Beaufort	East Bound	7,917	4,229	-3,688	-47%	-2,723	-40%	-965	-84%
		West Bound	6,743	3,451	-3,292	-49%	-2,230	-42%	-1,062	-76%
Beaufort Bypass	West of Beaufort-Lexton Road Interchange	East Bound	–	3,688	+3,688	+100%	+2,723	+100%	+965	+100%
		West Bound	–	3,292	+3,292	+100%	+2,230	+100%	+1,062	+100%
Beaufort Bypass	East of Beaufort-Lexton Road Interchange	East Bound	–	3,661	+3,661	+100%	+2,704	+100%	+956	+100%
		West Bound	–	6,293	+6,293	+100%	+4,986	+100%	+1,306	+100%

**Volumes have been factored as detailed in EES Appendix M: Traffic and transport impact assessment*

The comparison of the model results for the 'without project' case and 'with project' case in Table 8.10 highlights the significant reduction in traffic on the existing Western Highway within Beaufort township expected with the bypass in operation. The estimated volume of under 7,000 vehicles per day by 2031 on the Western Highway between King Street and Beaufort-Lexton Road is a big decrease compared to the 14,000 vehicles per day forecasted for a 'without project' scenario. At a volume of 14,000 vehicles per day the centre of town is likely to experience congestion levels that lead to safety and accessibility issues.

The vehicles per day on Beaufort-Lexton Road is likely to be higher than what the spreadsheet model has forecasted, as it will function as a direct connection to the new interchange with the proposed bypass. The spreadsheet model under-reporting these volumes can be attributed to very low existing volumes in comparison with the mainline flows on the highway.

Travel time savings

Travel time outcomes is an important element in assessing the effectiveness of the project's impact. A comparison of the travel time to and from the eastern and western bypass interchanges (key origin/destination) was made against the calculated current travel times of the Western Highway between the proposed bypass interchange locations, which were calculated to be 06:00 minutes for light vehicles and 06:36 minutes for heavy vehicles. The average estimated travel time for each period between the proposed bypass interchange locations is summarised in Table 8.11 below. This reduction in travel time is a positive impact of the project.

Table 8.11 Travel times comparison

Direction	Session	Average surveyed travel time (mm:ss) (3.75 km section)	Calculated average travel time (mm:ss) (10 km section)			
			Light vehicles	Change with bypass	Heavy vehicles	Change with bypass
Noon (Westbound)	12:00–13:00	04:30	08:15	02:15 minutes	08:20	01:44 minutes
Noon (Eastbound)	12:00–13:00	04:16	08:03	02:03 minutes	08:06	02:30 minutes
PM (Westbound)	14:30–17:30	04:05	07:50	01:50 minutes	07:55	01:19 minutes
PM (Eastbound)	14:30–17:30	04:19	08:06	02:06 minutes	08:09	02:33 minutes

The average travel time for the key origin/destination, between the proposed east and west interchanges, is estimated to decrease by up to 02:15 minutes for light vehicles and 01:44 minutes for heavy vehicles travelling west when comparing the project to current travel times on the existing Western Highway through Beaufort.

Local access

The project will create permanent access changes to the local road network and to individual properties. These permanent access changes will effect a small number of properties and will have a low impact during the operational phase.

The majority of local road accesses will be retained through the design of road overpasses. The project will create permanent access changes from dwellings and the local road network at the listed locations below:

- Parcel 3\PS727373 and 9E\PP2605 (66 and 124 Martin Lane, Beaufort) are accessed from Martins Lane. Direct access to the western end of Martins Lane from the Western Highway will be redirected to the unnamed road adjacent to 4932 Western Highway (United Petroleum service station).
- Parcel 10~Q\PP2096 (Camp Hill State Forest) contains a fire track that will require realignment to ensure access for fire management vehicles.
- Parcel 1\TP531530 (4126 Western Highway, Trawalla) will have local road access removed that will require realignment to ensure access to the property is retained.

Road safety

The reduction in through traffic along the Western Highway within Beaufort, particularly long-haul heavy vehicles, will likely result in less crashes and vehicle related incidents, thereby improving safety within Beaufort. A reduction in traffic will also improve safety within the township through improving access and wait times at intersections.

Other road users will also benefit, particularly cyclists and pedestrians, where reduced exposure to traffic risks will improve safety and amenity. Road safety impacts during the operation of the project will be positive through improved safety environments.

Public transport, walking and cycling

The project does not provide specific public transport improvements, however, it will contribute to the reduction of through traffic within Beaufort which will improve walkability and cycling safety within the Beaufort township. Currently V/line coach routes do not cross any rail level crossings, so any changes to the existing routes to take advantage of the Beaufort-Lexton Road interchange will be at the discretion of the operator and will need to consider potential delays at the rail crossing. This is considered a low impact given the low number of services.

The significant reduction in traffic volumes through Beaufort will provide additional capacity to allow the Pyrenees Shire Council to implement the *Beaufort Walkability Plan*, which is focused on improving accessibility and infrastructure for pedestrians and cyclists in the Beaufort area.

With the predicted reduction in traffic through Beaufort there is potential to remodel the signals at the Lawrence Street intersection to provide a more urban, pedestrian friendly layout by removing the left turn slip lane. This would improve conditions for pedestrians and cyclists in the centre of town. The reduction of heavy vehicle traffic through the town will also enable a reduction in road design requirements and could facilitate future implementation of medians, narrower lanes, cycle lanes which would provide an enhanced urban environment and better multi-modal outcomes.

8.8 Mitigation

This section outlines the mitigations proposed to manage potential impacts to traffic and transport, which can be summarised into two categories: network performance impacts and local access impacts.

The construction and operation of the project will be undertaken in accordance with relevant RRV standards and specifications including, but not limited to:

- VicRoads (2011) *Roadside Management Strategy*
- Road Safety (Traffic Management) Regulations 2009
- VicRoads *Contract Specifications Section 166 – Traffic Management*.

Access and traffic management strategies will be prepared in consultation with affected landholders. Strategies will include detailed access arrangements, traffic management plans and traffic guidance to manage temporary and permanent changes to network access, internal property access, and potential construction traffic disruptions during the detailed design.

The specific mitigations proposed to manage potential impacts to traffic and transport are summarised in Table 8.12 below. The table describes mitigation measures for both construction and operation phases of the project.

Table 8.12 Mitigation measures for traffic and transport impacts

Impacts	Mitigation measures	Mitigation number
Construction		
Traffic volumes	During the detailed design phase, a detailed construction Traffic Management Strategy will be developed, to the satisfaction of the Department of Transport and Pyrenees Shire Council. Measures for the strategy will include: • ensuring there is a thorough community consultation process and public advertisement of works • co-ordination of heavy vehicle movements with other projects in the region • preparation of Traffic Management Plans.	T01
Local access	During the detailed design and pre-construction phases, a construction and operational access strategy will be developed to the satisfaction of the Department of Transport, Pyrenees Shire Council and DELWP. Measures for the access strategy will include: • ensuring there is a thorough community and landholder/manager consultation process and public advertisement of works • ensure that alternative access and redirections are provided where existing access is removed, which follows relevant standards and guidelines, including but not limited to: – within project Specific Controls Overlay, in accordance with project approval conditions – AS1742.3 – Manual of uniform traffic control devices – VicRoads Traffic Engineering Manual Vol 2 Part 2.03 – Traffic control devices for works on roads. The access management strategy will include strategies for maintaining access to private land, local road network, public amenity and Crown land.	T02

Impacts	Mitigation measures	Mitigation number
Operation		
Local access	Measures to address permanent changes to local access will include: • mitigations outlined in T02.	–

8.9 Residual impacts

Following incorporation of mitigations outlined in Section 8.8, the following residual impacts outlined in Table 8.13 will apply for the project.

Table 8.13 Traffic and transport residual impacts

Impacts	Residual impacts	Residual rating
Construction		
Traffic volumes	The residual impact to road users during construction will remain as medium following implementation of mitigations, related to: • changed road environment during construction (construction traffic/site access/variable speeds/unfamiliar conditions/additional roadside hazards) leads to potential for increased incidence of accidents • changed road environment during construction (construction traffic/site access/variable speeds/unfamiliar conditions/additional roadside hazards) leads to potential for increased traffic on local roads decreasing amenity to road users and residents/businesses.	Medium
Local access	With the implementation of a project access strategy, road network and internal property access impacts resulting from construction traffic will be co-ordinated to ensure construction access impacts are minimised. Where there are temporary impacts to adjacent landholders, consultation will occur and alternative access arrangements will be provided. With the implementation of prescribed mitigations, the temporary impacts to localised landholders will be medium due to potential increased travel times and decreased amenity.	Medium
Operation		
Network performance	A net positive impact on network performance will result from the project, when compared with the 'no project' scenario.	Positive
Local access	Where permanent changes to road network and internal property access are required because of the project, alternative access arrangements have been incorporated into the design. The residual impact with regard to access to properties is low. Consultation with affected landholders will ensure changes to access are understood and that provided alternatives are adequate for landowner and land manager requirements through the access strategy.	Low

8.10 Conclusion

This chapter has summarised the findings of the traffic and transport impact assessment, which was undertaken for the project to address the scoping requirements for the development of the EES.

Traffic and transport impact assessment surveys and modelling have allowed a detailed understanding of the existing conditions of the road network within the investigation area. Beaufort has on average 8,988 westbound vehicles entering the town via the Western Highway every weekday, which continue to travel west 61% of the time. A large portion of the westbound traffic are heavy vehicles (28%). In a 'no project' scenario, RRV data suggests that this volume of heavy vehicles is set to increase steadily, creating more pressure on the local road network, leading to a delay in travel times and increased safety issues.

Construction impacts are expected to be minimal with construction works largely occurring in greenfield areas and will have limited impact on the existing road network. Traffic impacts due to increased construction traffic and changed road environment will be managed through a traffic management strategy designed to minimise disruptions and ensure road safety.

Alternative access arrangements will be provided during construction where temporary impacts to adjacent landholders occurs. Where permanent local road access changes are required because of the project, alternative access arrangements have been incorporated into the design. Consultation with affected landholders will ensure changes to access are understood and provided alternatives are adequate for landowner and land manager requirements through the access strategy.

The bypass would result in several positive outcomes for traffic and transport using the road network within the investigation area, when compared with the 'no project' scenario. There will be significant reduction of travel time for eastbound and westbound traffic using the Western Highway that will be able to use the bypass. The town of Beaufort will also see a decrease in the volume of traffic, particularly heavy/commercial vehicles, travelling through the centre via the Western Highway. This is likely to lead to an increase of amenity and safety for road users of the local network.