

# WELSFORD STREET STAGES 5 & 6

## Draft Final Report

PREPARED FOR GREATER SHEPPARTON CITY COUNCIL | August 2023

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We design with community in mind

# Revision schedule

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			Prepared by	Checked by	Reviewed by	Approved by
Dr-1	03.07.23	Preliminary Draft	Todd Mexted	Alex Blackett		
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# Quality statement

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# Executive Summary

## Context & Project Purpose

Greater Shepparton City Council (Council) wants to consolidate the Shepparton CBD and make it the principal retail centre in the region by creating an active, vibrant and safe place, as set out in the Shepparton CBD Strategy (2008). As such, there is a desire to downgrade Wyndham Street's movement function and associated through traffic movements (including freight and non-local trips) within the retail core, to help reallocate road space for place creation and achieve improved user amenity and safety. Council has nominated Welsford Street as the CBD bypass with the goal of relocating local north-south movements on Wyndham Street.

This report provides concept designs and costings for Stages 5 & 6 of the upgrade of Welsford Street, following the previously undertaken Stages 1 to 4 of the Welsford Street Alternative Route (WSAR). Stages 5 & 6 are shown in the context of the overall WSAR in the figure below.



## Transport Network Modelling

The Shepparton mesoscopic model and Victorian strategic model were the transport network modelling tools used to understand how traffic patterns and network operations will change in the future, or need to change, with an upgraded WSAR. This modelling was also used to inform the concept design development process to enable the corridor to support the future demands and desired operations. Four future 2032 scenarios were tested, in addition to a 'Do Nothing' scenario, with a summary of the scenarios provided in the table below.

Scenarios	2032 Demands (1% pa external growth)	Upgrade full length of Welsford St	Signal timing improvements	Reduced to 1 lane on Wyndham St and adjusted signal timings	Reduce Stages 5 & 6 to 1 lane in each direction
Future Model - Do Nothing (2032)	Yes	-	-	-	-
Future Model - Scenario 1 (2032)	Yes	Yes	-	-	-
Future Model - Scenario 2 (2032)	Yes	Yes	Yes	-	-
Future Model - Scenario 3 (2032)	Yes	Yes	Yes	Yes	-
Future Model - Scenario 4 (2032)	Yes	Yes	Yes	Yes	Yes

The modelling results of the various scenarios indicate that there will be an increasing level of operational issues across the network under the 'Do Nothing' scenario in 2032. If only the works associated with Stages 5 & 6 are implemented as outlined

in Scenario 1, then there will be meaningful network operational improvements in 2032. However, there will be limited reductions in traffic volumes on Wyndham Street.

Scenarios 2 and 3 reflect measures along Wyndham Street that would be accompanied by major place making improvements. The results show large volumes of traffic are redirected to Welsford Street, which operationally seems to be able to manage these demands.

Scenario 4 indicates that only having one lane in each direction for Stages 5 and 6 achieves very similar operational outcomes to having two-lanes in each direction, even when large volumes of traffic are redirected to Welsford Street, so is recommended to be adopted as part of the concept designs.

### Concept Designs

The approach to developing the concept designs involved adopting the general layout based on the traffic modelling results, then testing the operation of the proposed layout using operational understandings of intersections and swept path assessments.

The intersections within Stages 5 & 6 are proposed to generally remain as per existing conditions, albeit with additional treatments to suit the corridor upgrades. Key intersection treatments include:

- Sobraon Street / Wyndham Street Intersection: the addition of a second right-hand turn lane from Sobraon Street on to Wyndham Street.
- Welsford Street / Tom Collins Drive / Sobraon Street Intersection: this intersection will remain give-way controlled, only with modifications to kerbing and removal of the central island on Welsford Street.
- Welsford Street / Vaughn Street Intersection: this intersection will remain give-way controlled, with the introduction of a raised central median, left-in / left-out movements to and from Vaughn Street and addition crossing safety features.
- Welsford Street / High Street Intersection: this intersection will remain signalised, with the main change being the introduction of a left turn option on the existing north-bound through lane.

Car parking in some areas will be impacted by the concept design, however it is understood that Council is investigating options to off-set these losses through additional off-street car parking facilities in accordance with the Shepparton CBD Car Parking Strategy.

Of the eighty trees identified in the study area, four may require removal based on the current concept design, however it is expected that continued efforts and investigation will occur around how these four trees could be retained without detrimentally impacting the project objectives as the project moves into the next design stages.

### Concept Design Costings

A cost estimate was prepared on the basis of the concept designs of Stages 5 & 6, with the total estimated construction costs summarised in the table below.

Item	Description	Total Construction Costs Inc Client Costs (excl. GST)
1.	Testing & WAE	\$36,535.00
2.	Direct construction works	\$1,872,789.00
3.	Pedestrian crossing lights	\$125,000.00
4.	Traffic management	\$437,850.00
5.	Contractor management, overhead and margin	\$713,508.00
	<b>Overall project cost</b>	<b>\$3,185,682.00</b>
	<b>Contingency (25%)</b>	<b>\$796,421.00</b>
	<b>Overall project cost including contingency (excl. GST)</b>	<b>\$3,982,103</b>



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# 1 Introduction

## 1.1 Background

Greater Shepparton City Council (Council) wants to consolidate the Shepparton CBD and make it the principal retail centre in the region by creating an active, vibrant and safe place, as set out in the Shepparton CBD Strategy (2008). As such, there is a desire to downgrade Wyndham Street's movement function and associated through traffic movements (including freight and non-local trips) within the retail core, to help reallocate road space for place creation and achieve improved user amenity and safety.

Given that Shepparton sits at the intersection of two significant road corridors, namely the Goulburn Valley Highway (Wyndham Street within the city centre) and Midland Highway (High Street within the city centre), it supports large volumes of both regional and local through traffic within the CBD. Alternative routes for the various associated vehicle movements are being pursued for the following:

- The existing Shepparton Alternative Route (SAR) to the east of the city, which supports regional trips to/from the north, south, and east.
- Formalise the Inner East Link Road (IELR) along a number of local roads along the eastern side of the city centre, which supports local trips to/from the northeast and southeast, as well as into and out of the city centre.
- The proposed Shepparton Bypass (Bypass) to the west of the city, which will support regional trips to/from the north, south, and west (also includes an east-west connection between the Bypass and SAR north of the city).

With the above routes, the one missing alternative route is one that supports local trips to/from the north, south and/or west. In this regard, Council has nominated Welsford Street as the CBD bypass with the goal of relocating local north-south movements on Wyndham Street, especially vehicles accessing Midland Highway/Peter Ross-Edwards Causeway.

These various alternative routes are outlined in Figure 1-1, as presented in Plan 7 of the Shepparton & Mooroopna 2050 Regional City Growth Plan (2021).

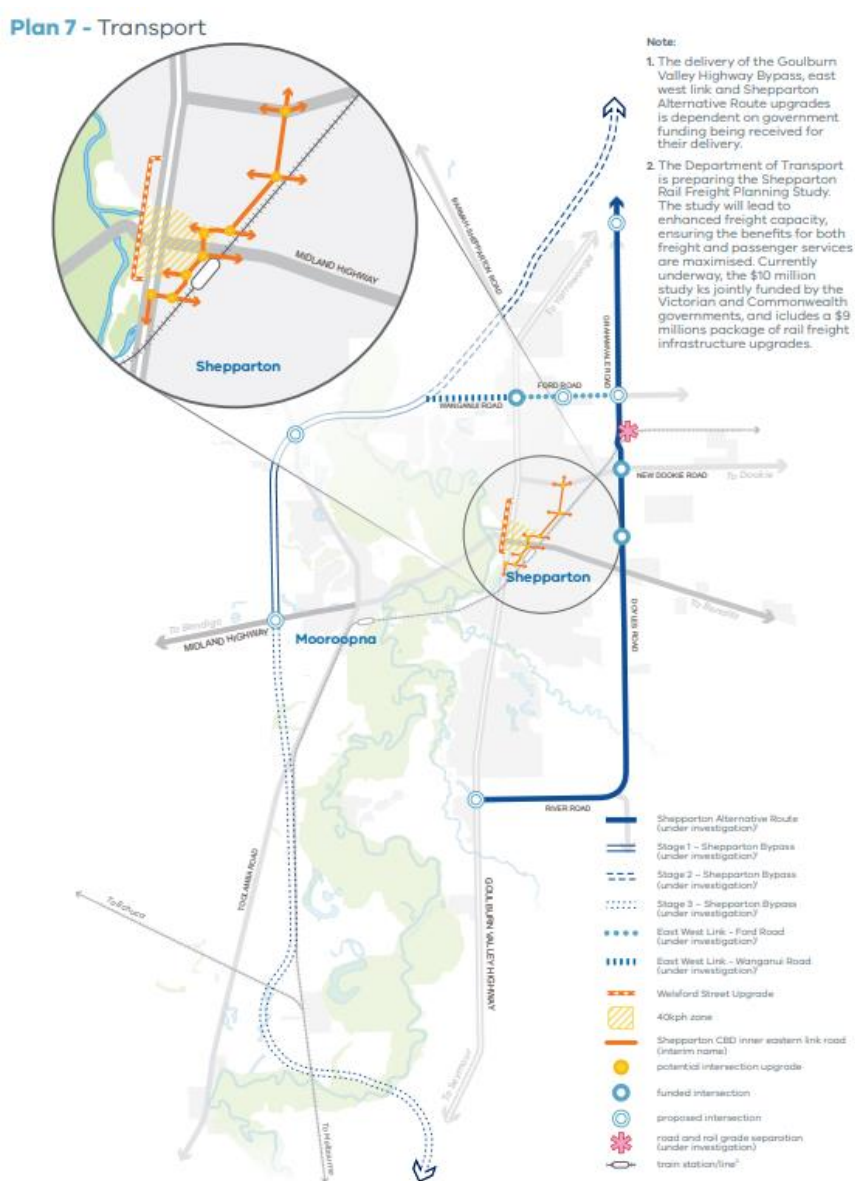
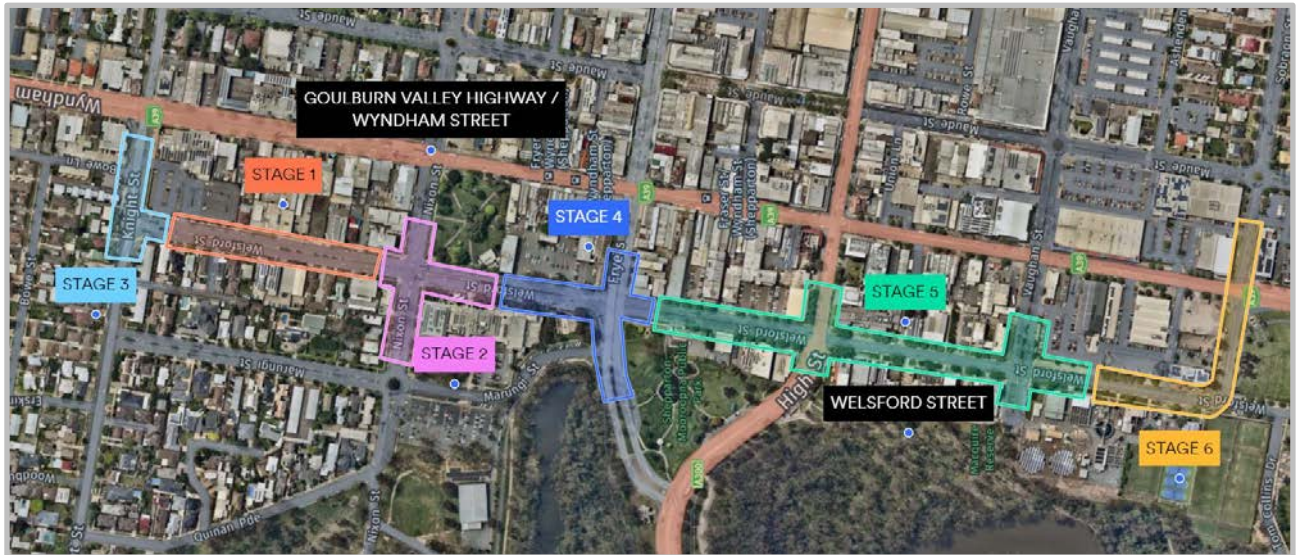


Figure 1-1: Broader transport network changes planned for Shepparton



## 1.2 Project Context & Purpose

The extent and connection of the Welsford Street Alternative Route (WSAR) with the local road network is shown in Figure 1-2. It also provides an outline of the various stages over which it is being delivered, as discussed further below.



**Figure 1-2: Welsford Street Alternative Route - Stages of Development**

The northern half (Stages 1 to 3) of the WSAR has already undergone significant works to upgrade it to a four lane dual carriageway along Welsford Street, including the upgrade of a signalised intersection with Nixon Street.

[Stage 4 of the upgrade](#) includes the continuation of the four lane dual carriageway to Fryers Street, with only one lane in each direction provided to the south. Construction of Stage 4 was recently completed in the first half of 2023.

Stantec has been engaged to develop concept designs and costings for Stages 5 & 6 of the upgrade of Welsford Street. It is noted that with the upgrading of Welsford Street within an existing built out urban environment that it will result in a significant change to the existing conditions. In order to achieve this change in a feasible manner, consideration has been given to what impacts the proposal will have, the constructability of the associated works and consideration of any tradeoffs to meaningfully reduce impact and cost.

Once delivered, Wyndham Street between at least Knight Street and Sobraon Street will be able to be downgraded once Stages 5 & 6 are completed.

## 1.3 Report Purpose

This report sets out all investigations and findings that have been undertaken to develop concept designs and costings for Stages 5 & 6 of the WSAR. In this regard, it provides the following:

- Project background and context.
- Relevant policies, strategies and other previous work informing the WSAR.
- The existing conditions within and connecting the WSAR road corridor.
- Key issues and opportunities that were identified for the project.
- Transport network modelling findings.
- Concept designs and costings for the construction of Stages 5 & 6.

## 1.4 Scope and Methodology

The scope and methodology undertaken to develop concept designs and costings for Stages 5 & 6 of the WSAR is outlined graphically in Figure 1-3.



Figure 1-3: Project Scope and Methodology

## 2 Strategic Planning Context

Various background policy and information has been reviewed as part of the project. The key matters setting out the project context have been summarised and provided in this section of the report.

### 2.1.1 Shepparton Mooroopna 2050 Regional City Growth Plan (VPA, 2021)

The *Shepparton and Mooroopna 2050: Regional City Growth Plan* sets out the future vision for Shepparton and Mooroopna and makes recommendations on how to achieve it. It aims to guide and manage sustainable future growth and development over the next 30 years, while defining key projects/infrastructure to support growth and addressing key challenges for the region. The recently released final 'growth plan' outlines the future growth for Shepparton and its CBD, as well as planned or proposed major transport network changes. This specifically includes identification of the Welsford Street Upgrade, in addition to Shepparton Bypass options being investigated.

### 2.1.2 Transport Network Development

An increase in traffic volumes attributed to Shepparton's ongoing growth is putting pressure on the arterial road network. Two significant arterial roads, Goulburn Valley Highway and Midland Highway, intersect at the centre of Shepparton's CBD. While these arterial roads have helped make Shepparton a highly accessible location and brought people into the city, they are beginning to compromise the safety, amenity and the viability of the city centre.

A range of network development activities are underway in the area beyond the Welsford Street upgrade, including:

- **Shepparton Bypass:** a full bypass of Shepparton is ultimately envisioned, as reflected with the Public Acquisition Overlay (PAO) that was put in place in 2006 through Amendment C33, and connects to the Goulburn Valley Highway to the south.
- **Stage 1 of the Shepparton Bypass:** will provide a crucial second river crossing over the Goulburn River that will link northern Shepparton to Mooroopna, and serve as an alternative to the Peter Ross-Edwards Causeway. The project will be supported by other transport network changes that will significantly alter the role and function of Goulburn Valley Highway (Wyndham Street) through the Shepparton CBD. This is a state and federal funded major transport infrastructure project, however is still in planning and has not been fully funded. When constructed, it is expected that the future volumes of through traffic will ultimately reduce, supporting the revitalisation of the CBD.
- **Shepparton Alternative Route (SAR):** until such time that the full Shepparton Bypass is implemented, the main north-south bypass route is the Shepparton Alternative Route. This route is progressively being improved, with various key intersections recently and proposed to be upgraded, such as the Midland Highway, Old Dookie Road, New Dookie Road and Ford Road. Further investigations on when, what and how other sections of the route are upgraded is currently being investigated.
- **Wanganui Road and Ford Road:** to support Stage 1 of the Shepparton Bypass and provide an alternative east-west route through the city centre of Shepparton via the Midland Highway, an upgrade of Wanganui Road and Ford Road to arterial level roads is proposed.
- **Midland Highway:** various safety improvements have recently been, and are planned to be, implemented along the Midland Highway to the west of Shepparton.
- **Shepparton CBD Inner East Link Road (interim name):** Council has begun planning for the Shepparton CBD Inner East Link Road (interim name), which will provide a safe and efficient alternative route to Wyndham Street for vehicles travelling between the south and north-east of the Shepparton CBD. The Shepparton CBD Inner East Link Road (interim name) follows the railway line between Hayes Street and Balaclava Road via Johnson Street, Hoskin Street, Railway Parade and Hawdon Street, and seeks to upgrade five intersections at:
  - Goulburn Valley Highway/Hayes Street
  - Hayes Street/Johnson Street
  - Hoskin Street/North Street/High Street/Railway Parade
  - Fryers Street/Railway Parade/Thompson Street
  - Knight Street/Railway Parade/Hawdon Street/Andrew Fairley Avenue

## 2.1.3 Movement & Place

The Movement and Place Framework (Framework) recognises that streets not only keep people and goods moving, but they are also places for people to live, work, and enjoy.

In this new language, road corridors and streets are defined by the context of the interfacing land use and assigned various 'movement' and 'place' classifications. This way of thinking implies that while we are planning for and developing our transport network, we need to consider the needs for movement and placemaking simultaneously (i.e., providing suitable levels of access to places while making them attractive for people to spend time in).

The Framework also helps provide a multi-modal approach to network development by distinguishing where specific modes are to be prioritised over others. It is not possible to prioritise all modes within each road corridor given spatial limitation and/or conflicts between what user environments are needed to suitably support them and adjacent land use related activities, such as active transport and motorised vehicles along retail strips. Rather, each mode is classified around their network role and function, and based on the context of the interfacing land use. Then a Target Minimum Level of Service (LoS) is set with associated operation outcomes aimed to be achieved. This helps inform how to balance or make trade-offs around what transport corridor arrangements should be provided.

A Movement and Place Assessment report was undertaken by Council for Welsford Street, Shepparton, in 2018. This was undertaken as a pilot study to explore the application of the Framework in a local context, and to refine the Framework using the expertise of local government.

The resulting modal classifications and Target Minimum LoS's for Welsford Street and the other key roads in the CBD are shown in Figure 2-1. It currently indicates high movement and place classifications along Goulburn Valley Highway and Midland Highway within the CBD, and lower movement and place classifications along the other roads, like Welsford Street.




















Road Segment	Classifications										Target Minimum LOS											
	 Place	 Movement	 General Traffic	 Tram	 Bus	 Freight	 Cycling	 Walking	 Interchange	 Tourist Route	 General Traffic - Peak	 General Traffic - Off Peak	 Tram	 Bus	 Freight	 Cycling	 Walking	 Interchange	 Activity	User Experience	Road Safety - 2051	Environment (General)
Welsford Street N	P3	M3	GT4	N/A	N/A	F2	N/A	N/A	N/A	N/A	D	D			C		C		B	C	A	C
Midland Highway	P2	M2	GT3	N/A	N/A	F2	N/A	W3	N/A	N/A	D	D			D		C		B	B	A	C
Goulburn Valley Highway	P2	M2	GT2	N/A	N/A	F3	C2	W3	N/A	N/A	D	D			D	C	C		B	B	A	C
Nixon Street	P2	M5	GT5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	E	E			E		A		B	D	A	C
Knight Street	P3	M2	GT4	N/A	N/A	F2	C1	N/A	N/A	N/A	D	D			C	B	D		B	B	A	C
Fryers Street E	P2	M3	GT4	N/A	N/A	N/A	C1	W2	N/A	N/A	D	D			E	B	B		B	C	A	C
Fryers Street W	P4	M2	GT4	N/A	N/A	F2	C1	W2	N/A	N/A	D	D			C	A	B		C	B	A	C
Sobaron Street	P2	M2	GT4	N/A	N/A	F2	N/A	N/A	N/A	N/A	D	D			D		C		B	B	A	C
Welsford Street S	P3	M3	GT4	N/A	N/A	F3	C3	W2	N/A	N/A	D	D			C	C	B		B	C	A	C
Welsford Steet Central	P3	M4	GT4	N/A	N/A	N/A	C2	W2	N/A	N/A	D	D			E	B	B		B	C	A	C

Figure 2-1: Shepparton CBD Network Movement & Place Classifications and Target Minimum LoS's<sup>1</sup>

It is difficult to achieve high movement and place based outcomes along the same road corridor, like the sections of Goulburn Valley Highway and Midland Highway within the Shepparton CBD, at least when the high movement classifications

<sup>1</sup> Source: Figure 3 of the Movement and Place Assessment Report v2



relate to General Traffic and/or Freight (high active and public transport outcomes in high place environments are more achievable).

What the upgrade of Welsford Street and the other alternative routes enables is the potential to downgrade the General Traffic and Freight function along these high place sections of Goulburn Valley Highway and Midland Highway, if they can provide suitable operational outcomes.

In this regard, an assessment of upgrading Welsford Street's General Traffic and Freight function was undertaken as part of the Movement and Place Assessment report. The results are shown in Figure 2-2 and suggests that the proposed upgrade would likely have positive operational outcomes for General Traffic and Freight, and conversely enable the adjacent section of Goulburn Valley Highway within the CBD to downgrade the General Traffic function, which in turn will enable higher place and active transport outcomes to be achieved.

Road Segment	Target Minimum LOS												Existing												Option 1												
	General Traffic - Peak	General Traffic - Off Peak	Tram	Bus	Freight	Cycling	Walking	Interchange	Activity	User Experience	Road Safety - 2051	Environment (General)	General Traffic - Peak	General Traffic - Off Peak	Tram	Bus	Freight	Cycling	Walking	Interchange	Activity	User Experience	Road Safety - 2051	Environment (General)	General Traffic - Peak	General Traffic - Off Peak	Tram	Bus	Freight	Cycling	Walking	Interchange	Activity	User Experience	Road Safety - 2051	Environment (General)	
Welsford Street N	D	D			C		C		B	C	A	C																									
Midland Highway	D	D			D		C		B	B	A	C																									
Goulburn Valley Highway	D	D			D	C	C		B	B	A	C																									
Nixon Street	E	E			E		A		B	D	A	C																									
Knight Street	D	D			C	B	D		B	B	A	C																									
Fryers Street E	D	D			E	B	B		B	C	A	C																									
Fryers Street W	D	D			C	A	B		C	B	A	C																									
Sobaron Street	D	D			D		C		B	B	A	C																									
Welsford Street S	D	D			C	C	B		B	C	A	C	D				D	D	D		C	C	B	C	B	B			B	D	C		B	B	B	B	
Welsford Steet Central	D	D			E	B	B		B	C	A	C																									

Figure 2-2: Results of Option Assessment<sup>2</sup>

On the basis that the above General Traffic and Freight outcomes are achieved as part of the WSAR, then it would be recommended that the network classifications for the adjacent section of Goulburn Valley Highway within the CBD to be revised accordingly.

## 2.2 Public Consultation

Council undertook public consultation for Stages 5 & 6 of the WSAR in 2022, with the process and key findings outlined as follows:

### 2.2.1 Activities Undertaken

Council undertook pre-draft consultation between 25 July 2022 to 26 August 2022. Methods of engagement included:

- letter to all landowners and occupiers of land within the study area.
- media release, which attracted media attention from the Shepparton News.
- consultation webpage on Council's Shaping Greater Shepparton website with an online submission form and an interactive mapping tool.
- 1-to-1 appointments with Council officers.
- promotions on social media.

### 2.2.2 Findings

42 submissions were received by Council via the interactive map tool, online submission forms and 1-to-1 appointments with Council officers. The key themes of the feedback were:

<sup>2</sup> Source: Figure 5 of the Movement and Place Assessment Report v2



- Car parking.
- Bicycle infrastructure.
- Trees.
- Intersections with Vaughn Street and High Street.
- Pedestrian crossings.
- Parking restrictions and signage.
- Speed limits.

The feedback provided has been considered when developing the concept designs for the project.

## 2.3 Issues and Opportunities

Various issues and opportunities have been identified through the background activities that have occurred as part of this project. These are set out in Table 2-1, along with the affected user groups and the locations.

Table 2-1: Issues and Opportunities

Issues		Location(s)	Opportunities		User(s)
ISS-01	Continued traffic growth is expected on Wyndham Street and High Street, as these roads currently provide the main north-south and east-west routes through the CBD.	<ul style="list-style-type: none"> <li>Wyndham Street</li> </ul>	Opp-01	Development of the Shepparton Bypass is proposed over a 10 to 15 year timeframe to redirect freight and through traffic around Shepparton. In the meantime, there is an opportunity to develop <b>local alternative routes</b> for both streets to address immediate needs, downgrade them and help realise the Shepparton CBD Strategy.	General Traffic, Freight, Buses, Pedestrians, Cyclists
ISS-02	Wyndham Street is still used as the route through the CBD, despite Welsford Street being identified as the CBD north-south bypass route.	<ul style="list-style-type: none"> <li>Welsford Street</li> <li>Wyndham Street</li> <li>Sobraon Street</li> </ul>	Opp-02	<b>Encourage use</b> of local alternative route of the CBD via Welsford street, through: <ul style="list-style-type: none"> <li>Improved signage leading to, and at the intersections of Welsford Street and Wyndham Street, and Knight Street and Wyndham Street to identify the route as the 'CBD bypass'.</li> <li>Upgrade the Wyndham Street-Sobraon Street corridor.</li> <li>Provide associated intersection treatments, movement priorities / signal phasing towards the Wyndham Street-Sobraon Street corridor.</li> </ul>	General Traffic, Freight, Buses
ISS-03	<p>Studies have found that Welsford Street is currently being used by heavy vehicles travelling through the CBD from the Peter Ross-Edwards Causeway.</p> <p>Traffic modelling of options with and without the proposed bypass show that traffic on Welsford Street <b>would steadily grow</b>, in line with projected population and employment growth, and that the current design will not be fit for purpose.</p>	<ul style="list-style-type: none"> <li>Welsford Street</li> </ul>	Opp-03	<b>Upgrade Welsford Street</b> in the immediate short-term to accommodate traffic growth and freight movement until Shepparton Freeway Bypass (Stage 1) is operational.	General Traffic, Freight, Buses
			Opp-04	Opportunity to improve conditions for <b>truck movements</b> . Welsford Street is recognised as one of the routes to be included as a priority regional project for heavy vehicle route upgrade.	Freight
ISS-04	Forecasts indicate a significant increase in heavy vehicle <b>traffic travelling through</b> Shepparton.	<ul style="list-style-type: none"> <li>Shepparton</li> </ul>			
ISS-05	The existing location of freight traffic generators, combined with the layout of the road network that includes limited crossing opportunities of the Goulburn River, results in a high demand for <b>east-west movement through the CBD</b> of Shepparton. The existing road network struggles to cope with	<ul style="list-style-type: none"> <li>Shepparton</li> </ul>	Opp-05	Downgrade Wyndham Street between High Street and Knight Street to improve its sense of place and commercial activity.	General Traffic, Amenity, Economic

Issues		Location(s)	Opportunities		User(s)
	this demand, resulting in <b>congestion and reduced amenity in the CBD</b> with significant truck volumes passing through.				
ISS-06	Freight related land uses are currently located in the east / northeast of the CBD, as this area historically offered better access to the north and south and other businesses already located in the east. This area is also anticipated to experience demand for industrial growth over the next 20 years. This area is also served by the Shepparton Alternative Route; however its current design is <b>no longer suitable for the scale and type of commercial vehicle traffic</b> it attracts.	<ul style="list-style-type: none"> <li>Shepparton</li> </ul>	Opp-06	The Shepparton & Mooroopna 2050 Regional City Growth Plan identifies decentralised future industrial growth areas at Lemnos, Shepparton North, Mooroopna North and GV Link site (south of Mooroopna). This presents a future opportunity to help reduce freight movements through the Shepparton CBD.	Freight
ISS-07	The vast majority of freight is moved on-road as there are <b>few viable rail options for industry</b> .	<ul style="list-style-type: none"> <li>Shepparton</li> </ul>			Freight
ISS-08	There is <b>uncertainty around the delivery timing</b> of the bypass and the uptake of the GV Link.	<ul style="list-style-type: none"> <li>Shepparton</li> </ul>			Freight
ISS-09	Welsford Street's road reserve width is limited and is not considered able to accommodate all existing and proposed facilities, ie. two through lanes in each direction, a central lane for protected turning movements, bicycle lanes, kerbside car parking, footpaths, utility services and trees.  As such, some of these facilities will not be able to be accommodated, which will be determined through supporting the primary role and most beneficial functions to the whole of the community.	<ul style="list-style-type: none"> <li>Welsford Street</li> </ul>	Opp-07	<p>The Movement and Place Framework is expected to be utilised to help determine the primary role and most beneficial functions of the road corridor. This in turn will help make relevant decisions and trade-offs around how we allocate the available road width.</p> <p>Potential options and trade-offs could include:</p> <ul style="list-style-type: none"> <li>Only provide one through lane in each direction and a centre-of-road turning lane at mid-block locations to help retain existing kerbside parking and trees.</li> <li>Remove kerbside trees and locate new ones in the central median to support the second through lanes, and underground the power lines.</li> </ul>	General Traffic, Freight, Buses, Pedestrians, Cyclists
ISS-10	On-street parking for police vehicles and the accessible parking bay in front of the police station must be provided in the future layout. If two south-bound lanes are to be provided, then tree removal and indented parking will be required.	<ul style="list-style-type: none"> <li>Welsford Street</li> </ul>			General Traffic, Police Vehicles

Issues		Location(s)	Opportunities		User(s)
ISS-11	Access to abutting commercial businesses must be considered and catered for, in particular key crossovers such as to the ALDI off-street car park	<ul style="list-style-type: none"> <li>Welsford Street</li> </ul>			General Traffic
		<ul style="list-style-type: none"> <li>Welsford Street</li> </ul>	Opp-08	On-street parking adjacent to ALDI could be indented.	General Traffic
ISS-12	There is a congestion point at the Welsford Street / Sobraon Street bend and two lanes would not be achievable in each direction.	<ul style="list-style-type: none"> <li>Welsford Street</li> <li>Sobraon Street</li> </ul>	Opp-09	Potential to provide two south-bound lanes and one north-bound lane, given only one lane is provided on the eastern approach.	General Traffic, Freight, Buses
ISS-13	Currently during the PM peak, traffic sometimes queues back to the Welsford Street / Sobraon Street bend due to only one right turn lane onto Wyndham Street from Sobraon Street. If the traffic queues back to just east of the bend, this is a traffic hazard as south-bound drivers approaching the bend do not have much notice of stationary traffic around the bend.	<ul style="list-style-type: none"> <li>Welsford Street</li> <li>Sobraon Street</li> </ul>	Opp-10	Provide two right turn lanes in Sobraon Street for traffic turning south into Wyndham Street to reduce queuing.	General Traffic, Freight, Buses
ISS-14	<p>The right turn movement out of Tom Collins Drive into Sobraon Street is well used but some may consider unsafe especially at peak times. Consider whether this movement is allowed in the future. Bus movements and other traffic to Aquamoves will need to be reviewed as part of this determination.</p> <p>It is also noted that buses have difficulty turning into Tom Collins Drive due to the tight intersection layout.</p>	<ul style="list-style-type: none"> <li>Welsford Street / Sobraon Street / Tom Collins Drive intersection</li> </ul>	Opp-11	Improve layout of Welsford Street / Sobraon Street / Tom Collins Drive intersection regarding bus turning movements	General Traffic, Freight, Buses
ISS-15	Pedestrian access across Welsford Street and Sobraon Street in Stages 5 & 6 is poor with only one zebra crossing adjacent to Vaughn Street and lack of crossing points elsewhere.	<ul style="list-style-type: none"> <li>Welsford Street / Sobraon Street / Tom Collins Drive intersection</li> </ul>	Opp-12	Improve / rationalise / restrict pedestrian movements at the Welsford Street / Sobraon Street / Tom Collins Drive intersection, as some pedestrians undesirably cross the road between the east side of Welsford Street and the lake precinct to the west.	General Traffic, Freight, Buses, Pedestrians, Cyclists

## 3 Baseline Conditions

### 3.1 Study Area

The study area for the project is shown in Figure 3-1. The extent of the study area is Welsford Street (south of its intersection with Fryers) and Sobraon Street (west of its intersection with Maude Street). The study area also includes the following intersections:

- High Street/Welsford Street intersection (Signalised)
- Welsford Street/Vaughan Street intersection (Unsignalised)
- Welsford Street/Sobraon Street intersection (Unsignalised)
- Wyndham Street/Sobraon Street (Signalised)

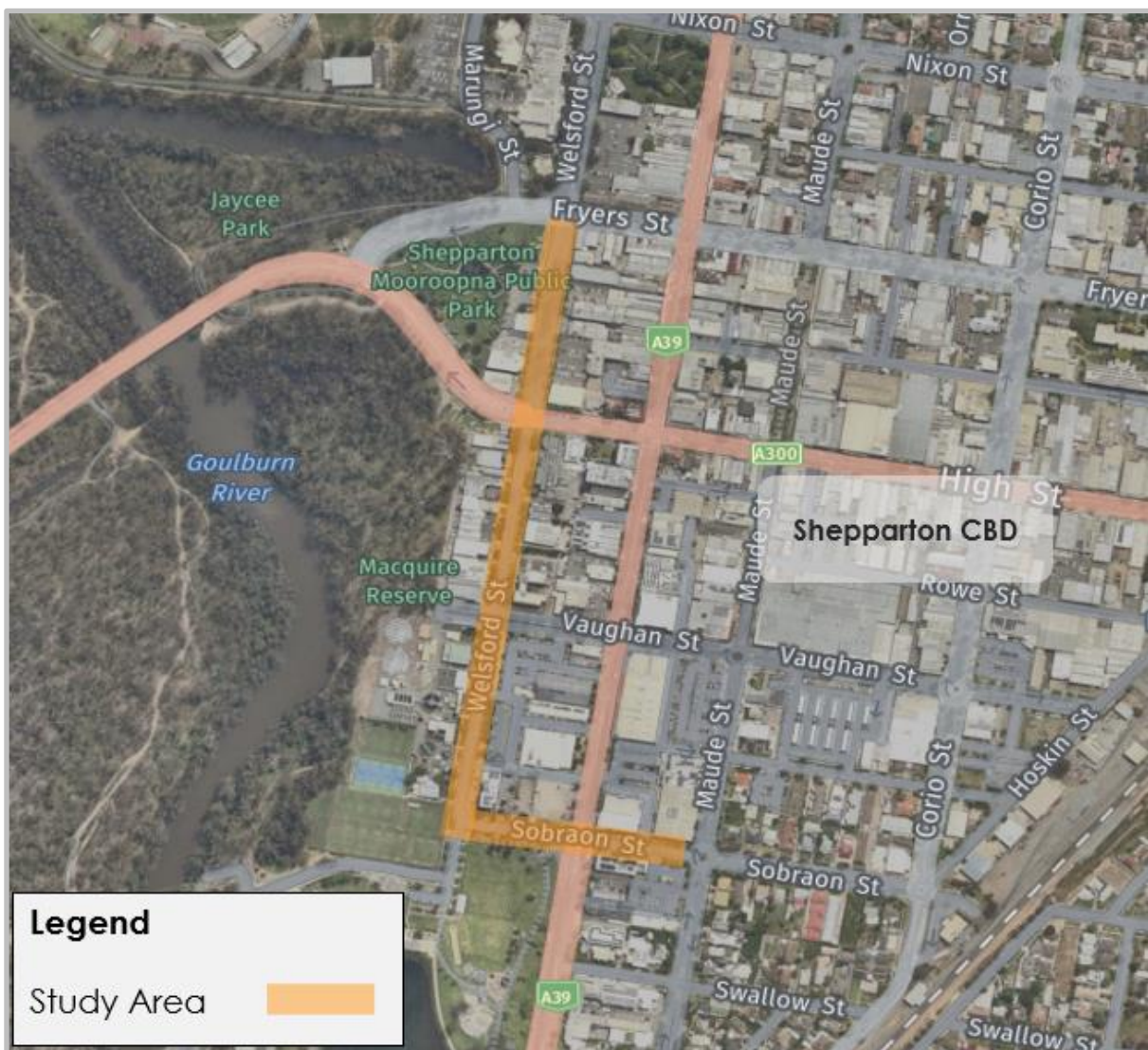


Figure 3-1: Study Area (Wider context)<sup>3</sup>

<sup>3</sup> Source: Nearmap (<https://www.nearmap.com/au/en>)



## 3.2 Road Network



### 3.2.1 Welsford Street

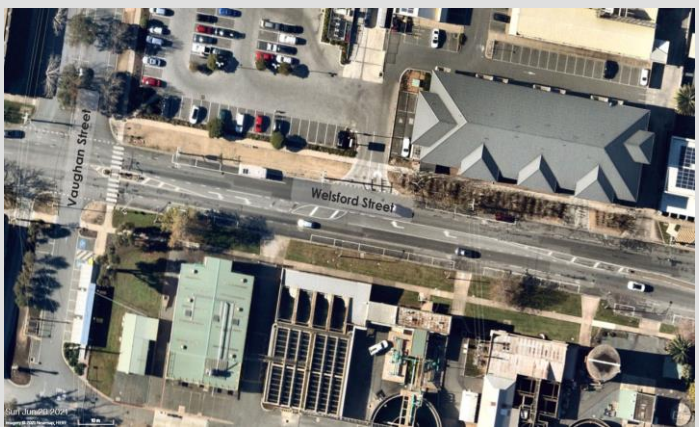
Welsford Street is a two-way street that is approximately 1.3 km long and extends between Knight Street to the north and Tom Collins Drive to the South. Welsford Street has dedicated on-street bicycle lanes starting from south of its intersection with Fryers Street and extends to Sobraon Street. It currently functions as a local council road.

Along the Stages 5 & 6 section of Welsford Street, the Movement and Place classifications are currently Place 3 (P3), Movement 3 (M3), General Traffic 4 (GT4), Freight 3 (F3), Cycling 3 (C3) and Walking 2 (W2). This indicates that the corridor currently has a moderate movement and place function, with only walking having a high classification. Through the proposed upgrade, there is considered potential to increase the General Traffic and Freight function instead of along the adjacent section of Goulburn Valley Highway where there is high General Traffic function currently provided.

Within the study area, the configuration of Welsford Street is relatively similar across different segments. The details of the configuration are summarised in Table 3-1.

**Table 3-1: Welsford Street Segments**

Section	Features	Aerial Imagery
1 Between Fryers Street and High Street	<ul style="list-style-type: none"> <li>One through traffic lanes in each direction</li> <li>About 3.7 m wide per traffic lane</li> <li>1.5 m wide median</li> <li>Parallel parking bays on both sides of the street. About 32 car parking spaces along this segment.</li> <li>Dedicated on-street bicycle lane in each direction.</li> </ul>	
2 Between High Street and Vaughan Street	<ul style="list-style-type: none"> <li>One through traffic lane in each direction</li> <li>About 3.3 m to 3.5 m wide per traffic lane</li> <li>Parallel parking bays on both sides of the street. About 36 car parking spaces along this segment</li> <li>Dedicated on-street bicycle lane in each direction.</li> </ul>	

Section	Features	Aerial Imagery
3 Between Vaughan Street and Sobraon Street	<ul style="list-style-type: none"> <li>One through traffic lane in each direction</li> <li>About 2.9 m wide per traffic lane</li> <li>Parallel parking bay on both sides. About 30 car parking spaces along this segment.</li> <li>Dedicated on-street bicycle lane in each direction.</li> </ul>	

### 3.2.2 Sobraon Street

Sobraon Street is a local road managed by Council, that extends between Welsford Street to the west and Corio Street to the east, in an east-west alignment. Within the study area, Sobraon Street has a through traffic lane in each direction, with each lane width varying between 3.3 metres to 4.5 metres.

The Movement and Place classifications are Place 2 (P2), Movement 2 (M2), General Traffic 4 (GT4) and Freight 2 (F2). As such, it has high place and freight function. The high place function relates to the John Pick and Victoria Lake Parks to the south, which have good separation to the road corridor, so are not overly impacted by its movement operations. Through the proposed upgrade of Sobraon Street and Welsford Street, there is considered potential to increase the General Traffic function instead of along the section of Goulburn Valley Highway within the CBD where the high General Traffic function is currently provided.

Sobraon Street also has dedicated on-street bicycle lane and on-street parking in each direction. Within the study area, based on aerial imagery (Nearmap), there is a total of 33 on-street parking spaces.

### 3.2.3 Intersecting Roads

#### 3.2.3.1 High Street (Midland Highway)

High Street is an arterial state road that provides the main east-west route through Shepparton and caters for large volumes of traffic including freight vehicles and non-local traffic. Generally, near the study area, High Street has two through traffic lanes in each direction and services approximately 32,000 vehicles per day. High Street is a gazetted A-Double and B-Double heavy vehicle route.

The Movement and Place classifications are Place 2 (P2), Movement 2 (M2), General Traffic 3 (GT3) and Freight 2 (F2).

#### 3.2.3.2 Wyndham Street (Goulburn Valley Highway)

Wyndham street is an arterial state road that connects the Goulburn Valley Highway to the south through central Shepparton and continues north to the Murray Valley Highway. It provides a major freight link and forms part of the A-Double and B-Double road network, noting however that these heavy vehicles are restricted from access between High Street and the south side of the Broken River bridge crossing.

The Movement and Place classifications are Place 2 (P2), Movement 2 (M2), General Traffic 2 (GT2), Freight 3 (F3), Cycling 2 (C2) and Walking 3 (W3).

#### 3.2.3.3 Vaughan Street


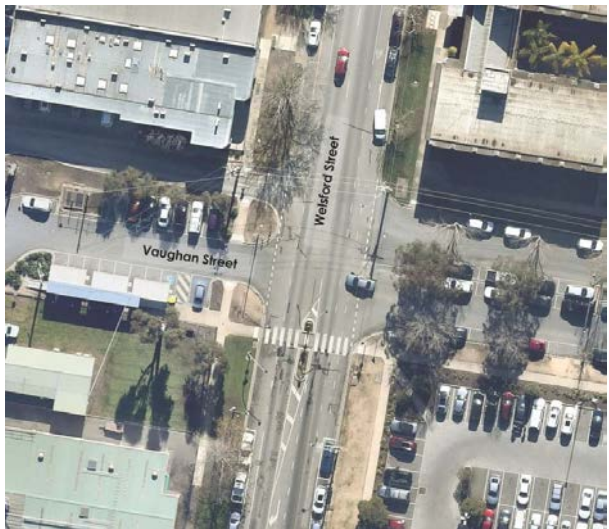

Vaughan Street is a local street that is approximately 700 m long and runs from Welsford Road to the west and ends at Hoskin Street to the east. Vaughan Street has one lane of traffic in each direction and parallel parking bays on both sides of the street as well as on both side of the median.




### 3.2.4 Intersections

The intersections within the study area are shown in Table 3-2.

**Table 3-2: Intersections within Study Area**

Intersection	Layout
<ul style="list-style-type: none"> <li>• High Street/Welsford Street intersection (Signalised)</li> <li>• State Road: High Street (Midland Highway)</li> <li>• Local Road: Welsford Street</li> </ul>	
<ul style="list-style-type: none"> <li>• Welsford Street/Vaughan Street intersection (Unsignalised – Give Way)</li> <li>• Local Road: Welsford Street, Vaughan Street.</li> <li>• Formal pedestrian crossing (east-west direction) is available at the southern approach of the intersection.</li> </ul>	
<ul style="list-style-type: none"> <li>• Welsford Street/Sobraon Street intersection (Unsignalised – Give Way)</li> <li>• Local Road: Welsford Street, Sobraon Street.</li> </ul>	

Intersection	Layout
<ul style="list-style-type: none"> <li>• Wyndham Street/Sobraon Street (Signalised)</li> <li>• State Road: Wyndham Street (Goulburn Valley Highway)</li> <li>• Local Road: Welsford Street</li> <li>• Formal pedestrian crossings are available across all approaches.</li> </ul>	

### 3.3 Freight

VicRoads, in consultation with local authorities, sets out the routes and heavy vehicle dimension limits across the road network. This is due to the impact and influence that heavy vehicles have on roads, namely in terms of pavement and road geometry, but also due to local community amenity, and the orderly operation of the network.

Heavy vehicle access permits for vehicles over 4.5 gross tonnes are now being assessed and managed through a new National Heavy Vehicle Regulator (<https://www.nhvr.gov.au/>), which is based in Queensland.

Based on the heavy vehicle network maps available on VicRoads' website, the following A-Double (PBS level 2B cubic) and B-Double heavy vehicle routes exist within proximity of the study area:

- A-Double routes are approved along Goulburn Valley Highway, Midland Highway, Doyles Road and Balaclava Road (refer to Figure 3-2). It is noted however that the following sections of road are restricted:
  - Balaclava Road, between Goulburn Valley Highway and Wheeler Street.
  - Goulburn Valley Highway, between Midland Highway and the south side of the Broken River crossing.
- B-Double routes are generally similar to the A-Double routes, including the restricted sections, however additional roads are approved east of Goulburn Valley Highway, as shown in Figure 3-3. An additional restricted section of not within proximity of the study area is Fryers Street, between Welsford Street and North Street.

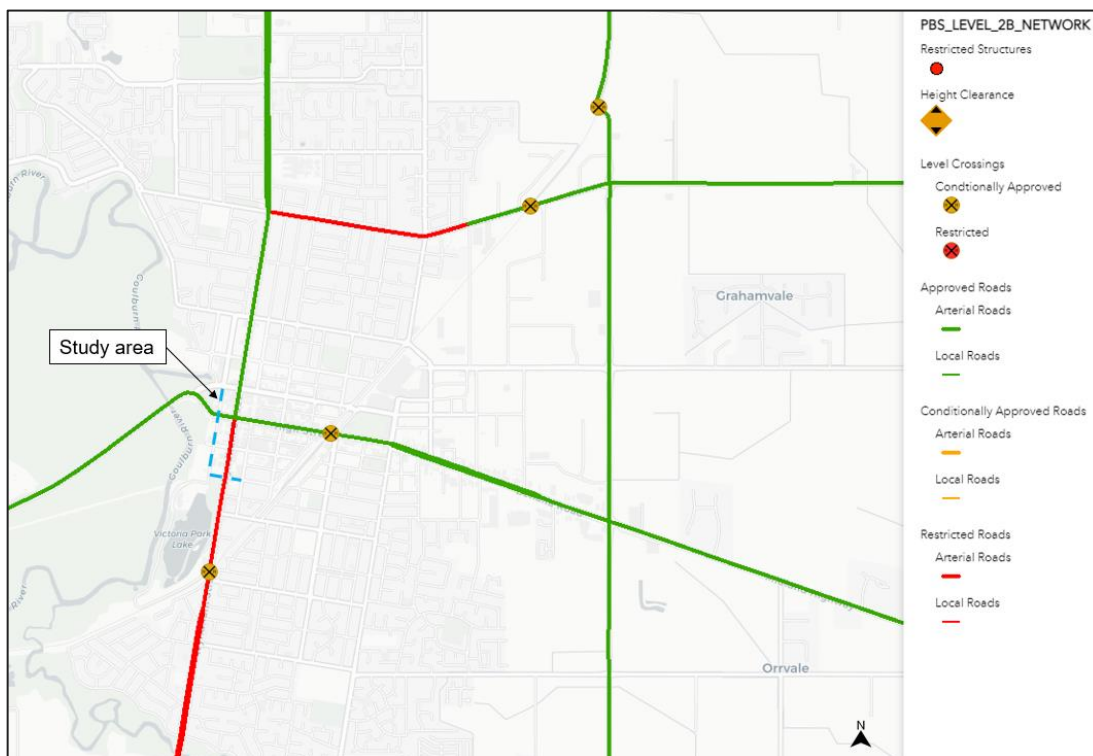


Figure 3-2: A-Double Heavy Vehicle Network<sup>4</sup>

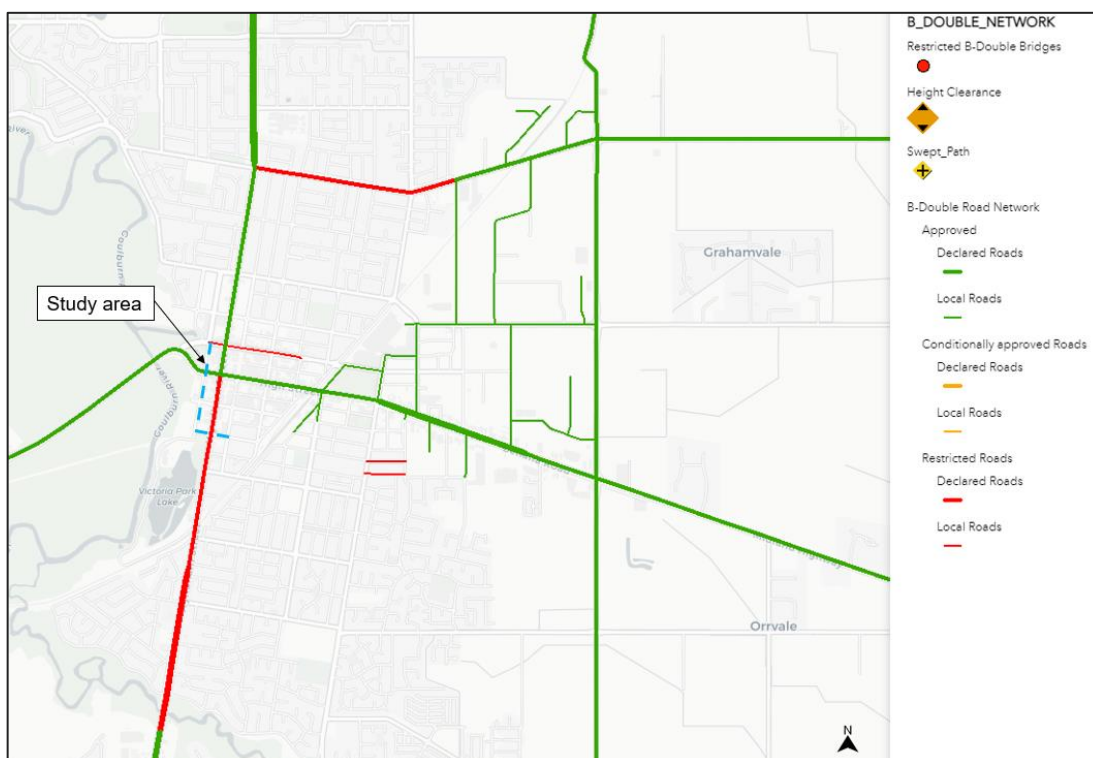


Figure 3-3: B-Double Heavy Vehicle Network<sup>5</sup>

<sup>4</sup> Source: VicRoads PBS Level 2B (Cubic) Map ([PBS and HPFV Combinations : VicRoads](#))

<sup>5</sup> Source: VicRoads B-Double Network Map ([Victoria's Gazetted B-Double Network \(arcgis.com\)](#))



## 3.4 Public Transport

Figure 3-4 shows the bus network map for Shepparton City and that only *Bus route 9* travels along the study area, through the southern half of Welsford Street. Details of the bus route is outlined within Table 3-3.

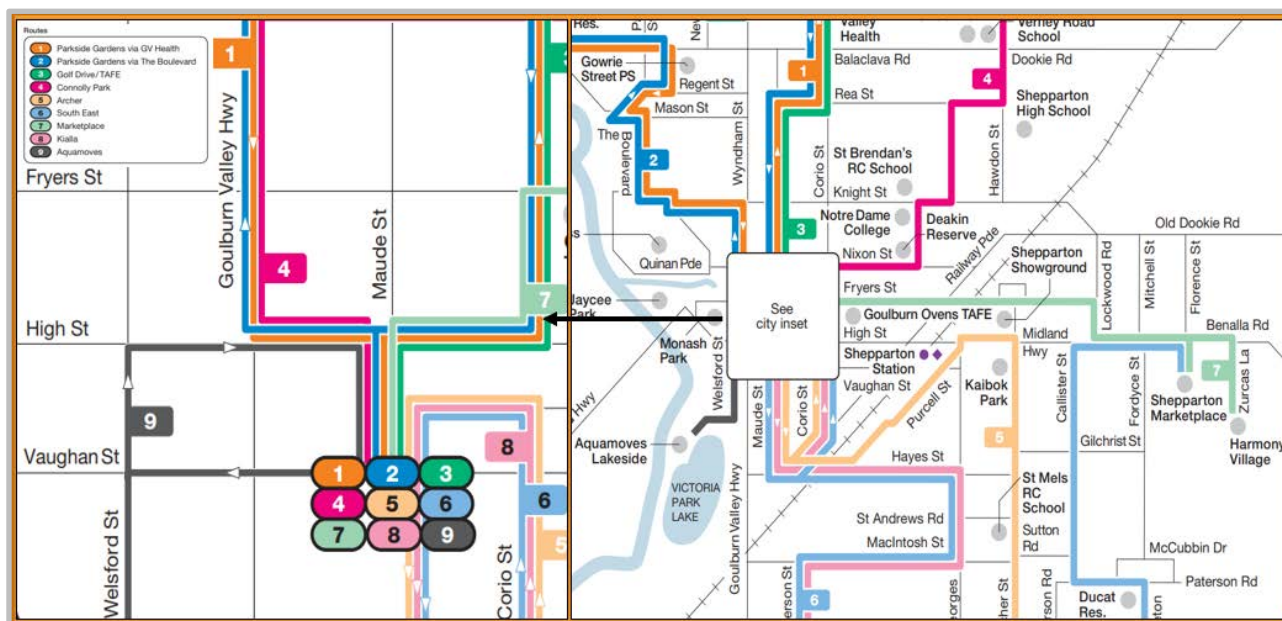


Figure 3-4: Bus Network Map<sup>6</sup>

Table 3-3: Bus route details

Service	Stops	Route Description	Significant Destinations on Route	Frequency On/Off Peak
<b>Bus Route 9 (Shepparton – Aquamoves)</b>	166 Welsford St	Welsford Street from High Street to Tom Collins Drive	Aquamoves, Shepparton bus interchange, Victoria Park Lake	1 hour*

\*Observations indicate that this route will skip the Welsford Street stop if no passengers are observed waiting for buses and proceed straight to Aquamoves or the Maude Street interchange via Vaughan Street.

<sup>6</sup> Source: Shepparton Bus Network (<https://www.ptv.vic.gov.au/assets/default-site/more/maps/Local-area-maps/Regional/fa2dcc9629/Shepparton-Bus-Network.pdf>)

## 3.5 Active Transport

### 3.5.1 Pedestrian Infrastructure

Footpaths are available throughout the study area, from Welsford Street to Sobraon Street. As indicated within Table 3-2, formal pedestrian crossings are available at the following locations:

- Southern approach of Welsford Street and Vaughan Street intersection.
- All approaches at High Street and Welsford Street intersection.
- All Approaches at Wyndham Street and Welsford Street intersection.
- All Approaches at Wyndham Street and Sobraon Street intersection.

### 3.5.2 Cycling Infrastructure

As outlined in Section 3.2, within the study area, there are dedicated on-street cycle lanes in both directions along Welsford Street and Sobraon Street.

The Greater Shepparton Cycling Strategy (2013-17) provides maps and details of the existing and proposed cycling facilities for Shepparton, as shown in Figure 3-5. It is noted that at the time of the cycling strategy, Welsford Street had existing on-road bicycle lanes and Wyndham Street (Goulburn Valley Highway) was proposed to accommodate segregated bicycle lanes. The cycling strategy had no further aspirations to upgrade cycling infrastructure on Welsford Street, but did aspire to have segregated cycling lanes on Wyndham Street as part of its traffic movement downgrading.



Figure 3-5: Existing and Proposed Cycling Facilities<sup>7</sup>

<sup>7</sup> Source: Greater Shepparton Cycling Strategy 2013-2017

## 3.6 Crash History

Figure 3-6 shows the total number of crashes by year and severity across the Shepparton LGA between 2016 and 2020. A summary of the crash analysis is as follows:

- The highest number of crashes (236) occurred in 2016. In 2016, the total number of crashes that resulted in fatalities and serious injury was also at its highest, at 107 crashes.
- While the number of serious injury related crashes declined from 2016 to 2019, the number of crashes that resulted in fatalities varied slightly, with the number increasing to 10 crashes in 2019.
- It is noted that in 2020, there was almost a 66% drop in total crashes. This is potentially due to the reduced traffic movement as a result of COVID-19 restrictions.

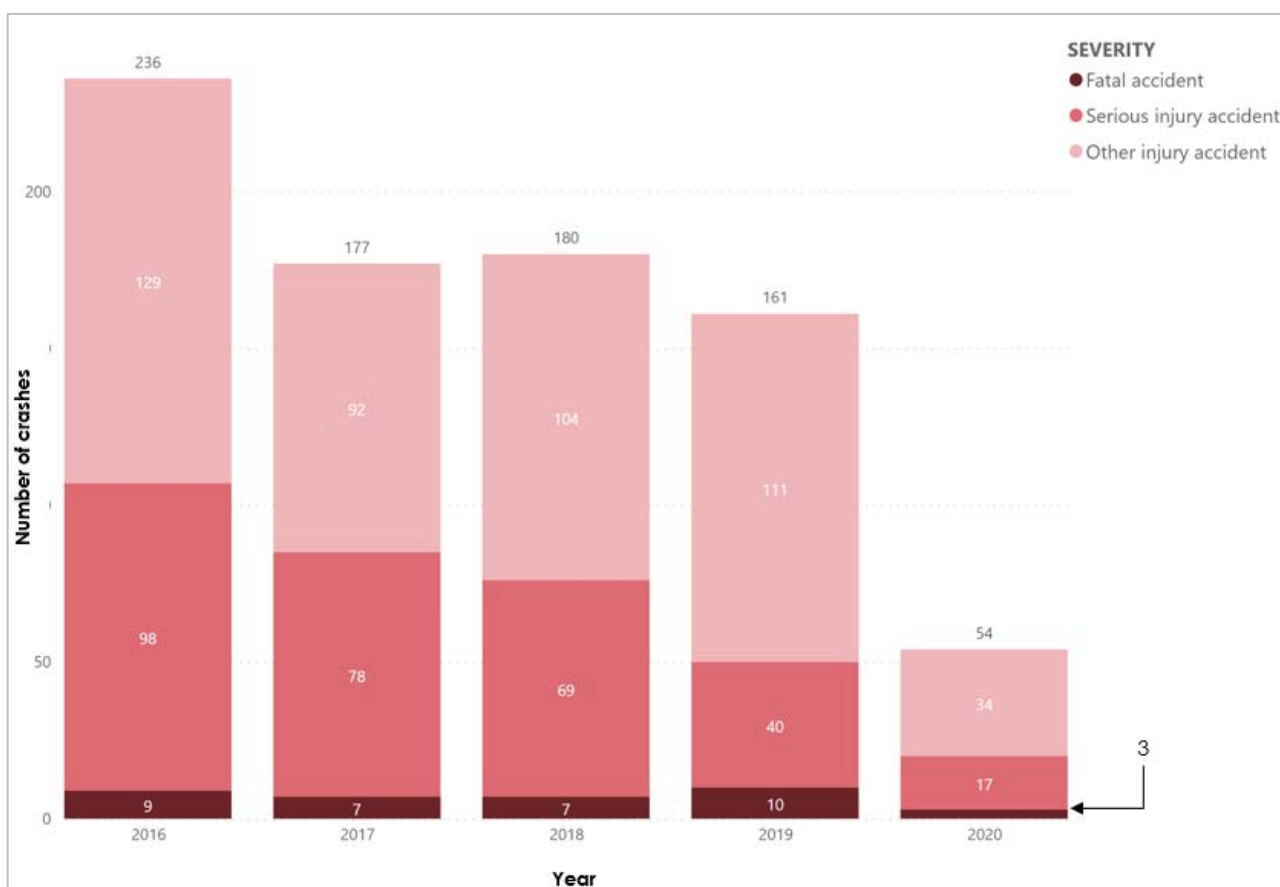
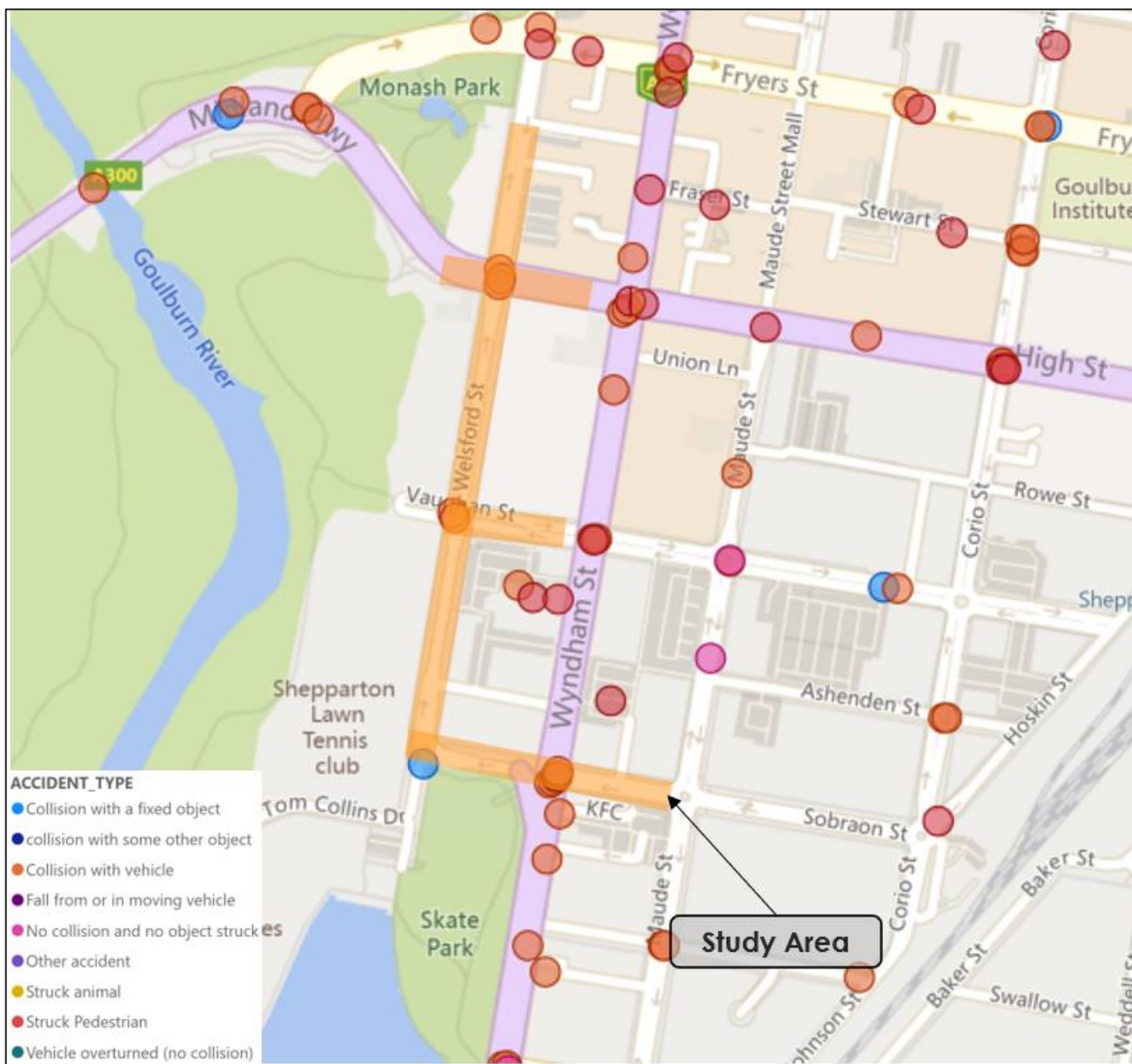


Figure 3-6: Shepparton Crash Severity by year (2016-2020)



**Figure 3-7: Crashes around the study area in the last 5 years**

Figure 3-7 shows the crashes and types of crashes that occurred along Welsford Street and the surrounding road network during the same period.

The summary of the crashes within the study area is as follows:

- Wyndham and Sobraon Street intersection has the highest number of crashes (6), one of which was a serious injury accident.
- Three (3) crashes occurred at the Welsford and High Street intersection, two of which involved a pedestrian being struck.
- Two (2) crashes occurred at Welsford and Vaughan Street intersection
- Majority of the crashes occurred at/near an intersection. The only midblock crash that occurred along Welsford Street, south of Welsford and Sobraon Street intersection and involved collision with a fixed object.

## 3.7 Utilities

The utilities within the study area are outlined in Table 3-4, which are reflected on the concept plans in Appendix B

**Table 3-4: Summary of DBYD**

Asset	Description	Location(s)
Water and Sewer	Water mains, Sewer pipes and Sewer pressure mains	Welsford Street, Midland Highway, Vaughan Street, Sobraon Street
Telecoms (Optus)	Underground cable	Midland Highway, High Street
Telecoms (NBN)	Cable, trench	Welsford Street, Midland Highway and the northern side of Sobraon Street
Telecoms (Nextgen)	Cable	Midland Highway and High Street
Telecoms (AARNet)	AARNet Fibre Optics	Southern side of High Street
Gas	High pressure pipes	Throughout study area
Electricity	High and low voltage cables, high voltage, low voltage and Sub transmission poles	Throughout study area



## 4 Transport Network Modelling

The Shepparton mesoscopic model and Victorian strategic model were the transport network modelling tools used to understand how traffic patterns and network operations will change in the future, or need to change, with an upgraded WSAR. This modelling was also used to inform the concept design development process to enable the corridor to support the future demands and desired operations. This section of the report will outline the traffic modelling process and key outputs.

### 4.1 Base Model

The transport network modelling initially involved extracting the relevant extents and details from the 2021 Victorian Integrated Transport Model (VITM) and the 2019 Shepparton mesoscopic model. The Shepparton mesoscopic model in particular was built to enable consideration of two key components: network level traffic patterns and intersection modelling across Shepparton.

The model is calibrated and validated to existing conditions and then future land use and network changes are included in the model to estimate traffic patterns into the future. It undertakes an iterative process where changes at one location, such as intersection type, movement priorities and/or approach capacities, such as with the WSAR, are then able to consider the impacts at a network wide level.

The Shepparton mesoscopic model extent includes the urban areas that are generally considered part of the Shepparton area. Figure 4-1 provides a geographic overview of the model extents including the road links in the Shepparton mesoscopic model. VITM is a State-wide model that was used to inform the general transport demand growth expected over the next 10 years, which was added to the Shepparton mesoscopic model demands.

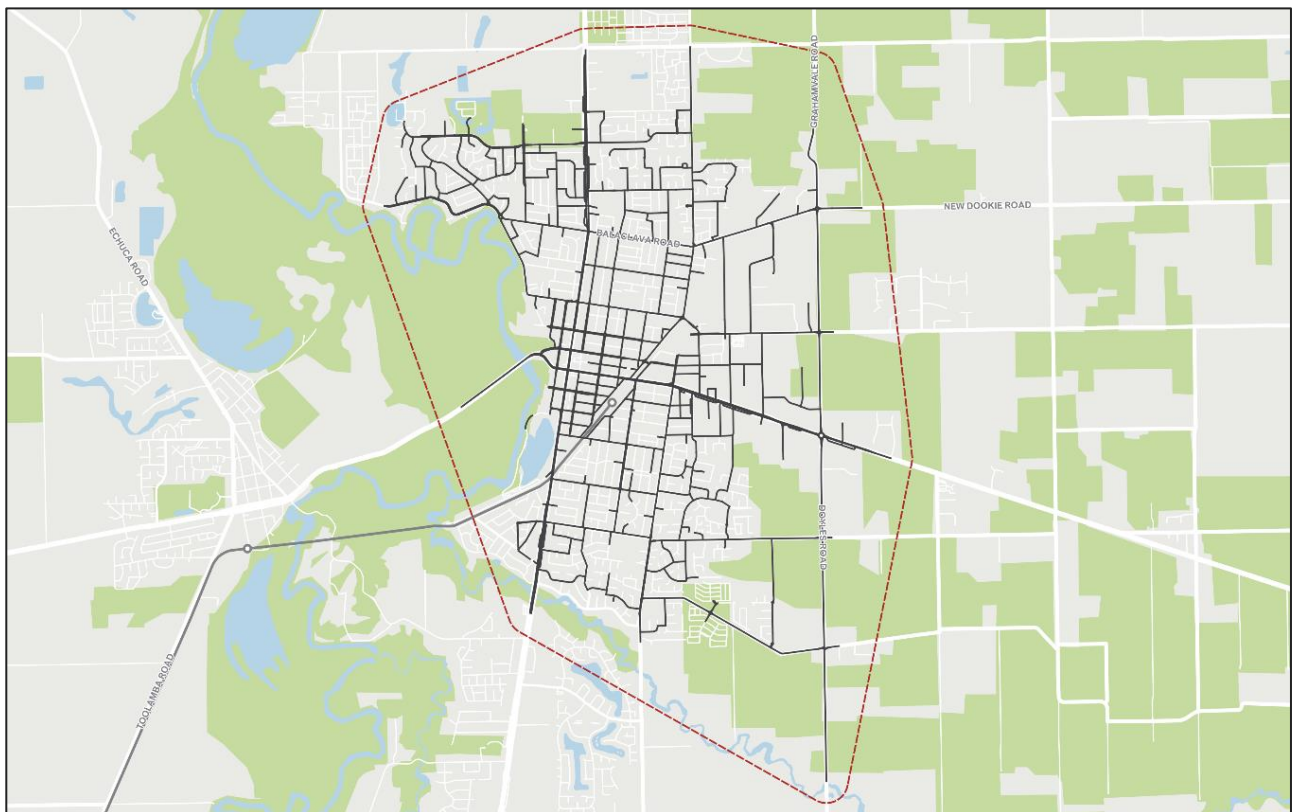


Figure 4-1: Shepparton Mesoscopic Model Extent

## 4.2 Calibration & Validation

The calibration and validation process first aimed to reflect the 2022 road network arrangements, namely the number of lanes in each direction and posted speed limits for Welsford Street and the surrounding roads, as shown in Figure 4-2 and Figure 4-3, respectively.



Figure 4-2: Number of Lanes



Figure 4-3: Posted Speed Limit

The next step was to extract 2022 SCATS traffic volume data from available signalised intersections along and proximate to both Welsford Street and Wyndham Street. The modelled and observed demands were then aligned, within typical industry tolerances.

The 2022 traffic volumes were then reflected on the network for the AM and PM peak periods, as shown in Figure 4-4 and Figure 4-5, respectively.



Figure 4-4: 2022 Traffic Volumes (AM peak)

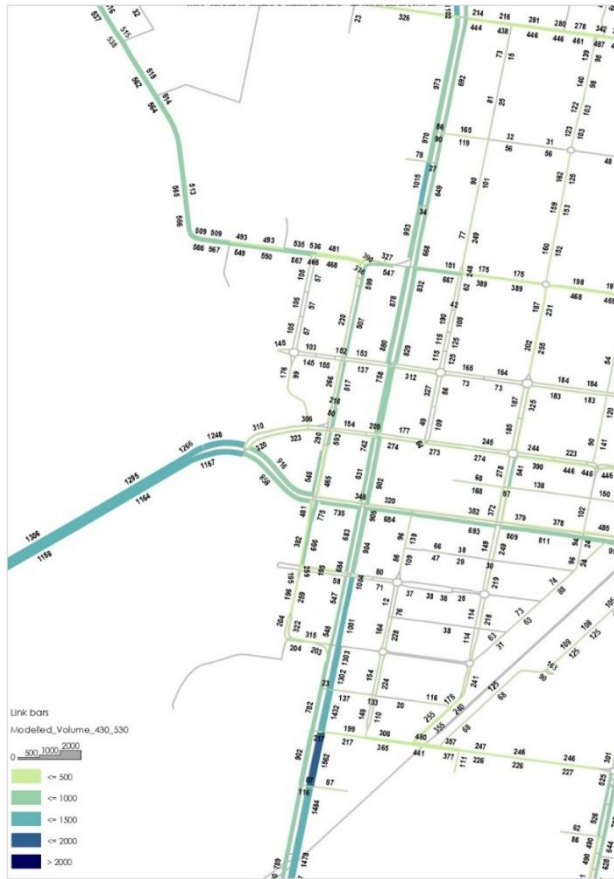


Figure 4-5: 2022 Traffic Volumes (PM peak)

## 4.3 Future Models

The 2022 traffic volumes reflected in the previous section then had 10 years of growth applied to them, with the 2032 AM and PM peak periods shown in Figure 4-6 and Figure 4-7, respectively.



Figure 4-6: 2032 Traffic Volumes (AM peak)



Figure 4-7: 2032 Traffic Volumes (PM peak)

## 4.4 Modelled Scenarios

In order to understand what future demands could reasonably be expected to use the WSAR in 2032, various scenarios were modelled, as set out in Table 4-1 and discussed in further detail thereafter.

Table 4-1: Modelling Scenarios

Scenarios	2032 Demands (1% pa external growth)	Upgrade full length of Welsford St	Signal timing improvements	Reduced to 1 lane on Wyndham St and adjusted signal timings	Reduce Stages 5 & 6 to 1 lane in each direction
Future Model - Do Nothing (2032)	Yes	-	-	-	-
Future Model - Scenario 1 (2032)	Yes	Yes	-	-	-
Future Model - Scenario 2 (2032)	Yes	Yes	Yes	-	-
Future Model - Scenario 3 (2032)	Yes	Yes	Yes	Yes	-
Future Model - Scenario 4 (2032)	Yes	Yes	Yes	Yes	Yes

These scenarios started with a worse case scenario of doing nothing to the road network, then looked at ways to improve the attractiveness of Welsford Street as a through route, making Wyndham Street less attractive as a through route, and testing the level of benefit in the number of lanes in each direction along Stages 5 & 6 of the WSAR.

Each of the associated network arrangements modelled are described as follows:

- **Do-Nothing:** considered to be a worse case scenario with the existing road network remaining unchanged but the 2032 demands being accommodated.
- **Upgrade full length of Welsford Street:** Aiming to make Welsford Street a more attractive through vehicle route by providing two lanes of traffic in each direction along Stages 5 & 6 with no other network changes and accommodating the 2032 demands.
- **Signal Timing Improvements:** Again aiming to make Welsford Street a more attractive through vehicle route by modifying the signal operations at the Sobraon Street and Knight Street intersections with Wyndham Street to better support the associated 2032 turning movement volumes. This also included the introduction of a second right turn lane on the north approach of the Wyndham Street / Knight Street intersection, which is discussed further in Section 5.4.3.
- **Reduced to 1 lane on Wyndham Street and adjusted signal timings:** Aiming to reduce the attractiveness of Wyndham Street for through vehicle movements by reducing the number of through lanes from two to one in each direction between Vaughan Street and Nixon Street, as well as reducing the cycle times along Wyndham Street except with High Street.
- **Reduce Stages 5 & 6 to 1 lane in each direction:** See if there is significant reduction in operational performance with only one lane in each direction along Stages 5 & 6 of the WSAR.

## 4.5 Modelling Results

The provided modelling outputs are just a sample of what is able to be extracted from the modelling packages, used to understand the resulting performance of each scenario and inform the development of the concept designs. However, what is considered critical in considering the modelling results is the following:

- Consider how well the modelling results support the project purpose, namely provide an alternative through vehicle route for those currently using Wyndham Street to provide opportunity to increase its place making and safety.
- Comparing each scenario with the 'do nothing' and/or other scenarios to provide their relative performance, as the modelling has not considered all potential changes to the Shepparton road network that will occur over the next 10 years. Rather, it is focused on the preferred option amongst a set that has been developed through an iterative investigative process.
- The modelling results do not take into consideration the feasibility of implementing the physical infrastructure associated with them. As such, we are using the modelling to understand what minimum level of works is required to provide an alternative through vehicle route to those currently using Wyndham Street.
- Have consideration of and what potential need for changes to the broader road network. It is noted that the modelling package tends to re-direct traffic away from locations that significant congestion occurs, which is what typically occurs in practice. However, we want any of the re-directed traffic to be using routes that traffic is being supported.

With the above understanding, the following modelling outputs for each scenario, except the 'Do Nothing' scenario, has been provided:

- Traffic volumes
- Traffic volume differences (against the 'Do Nothing' scenario)
- Level of Service
- Queue lengths



## 4.5.1 Traffic Volumes

### 4.5.1.1 Scenario 1: Upgrade full length of Welsford Street

The 2032 AM and PM peak hour traffic volumes for Scenario 1 is shown in Figure 4-8 and Figure 4-9, respectively.

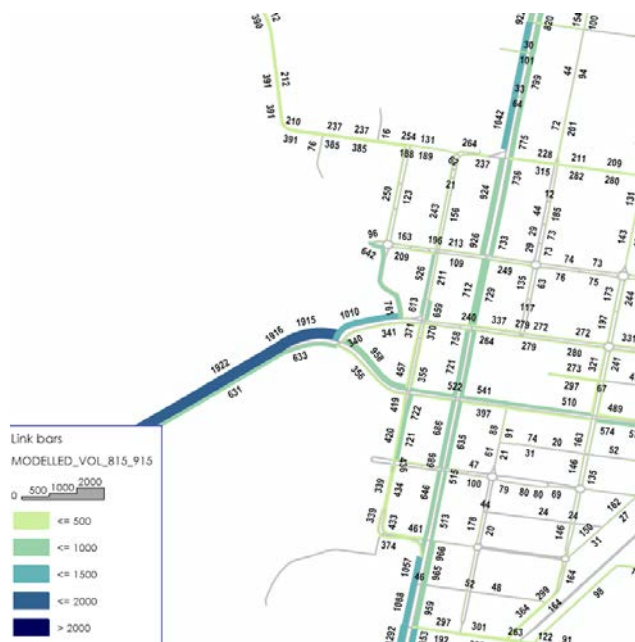


Figure 4-8: Scenario 1 - Traffic Volumes (AM peak)

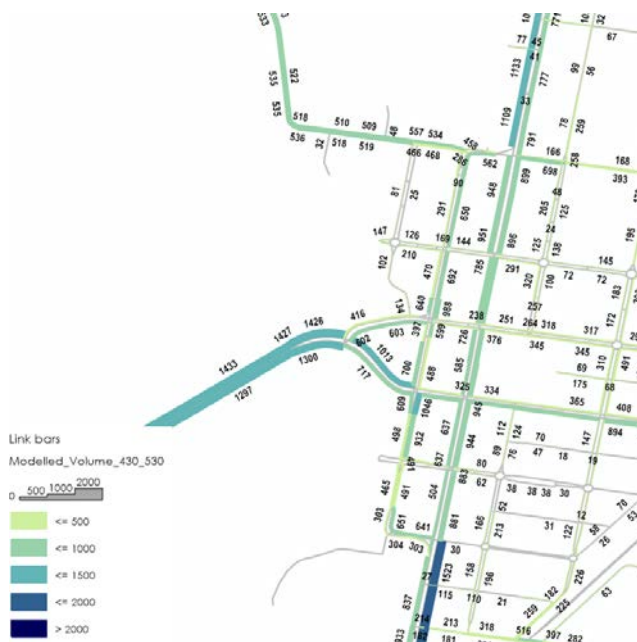


Figure 4-9: Scenario 1 - Traffic Volumes (PM peak)

### 4.5.1.2 Scenario 2: Signal Timing Improvements

The 2032 AM and PM peak hour traffic volumes for Scenario 2 is shown in Figure 4-10 and Figure 4-11, respectively.

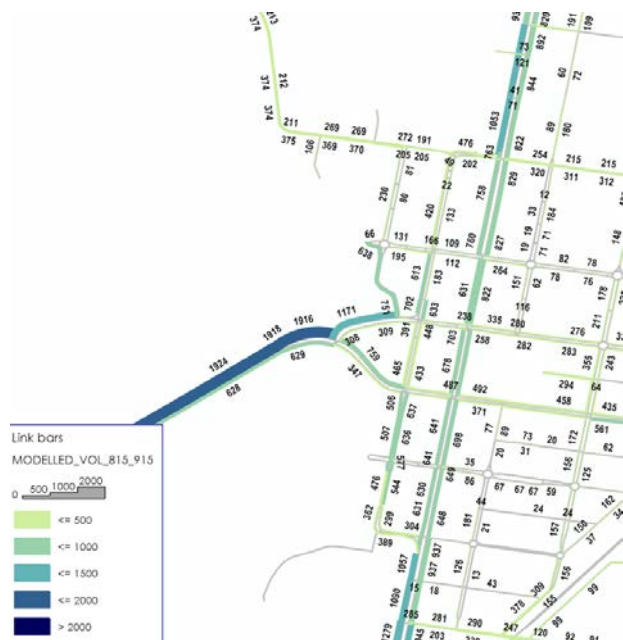


Figure 4-10: Scenario 2 - Traffic Volumes (AM peak)

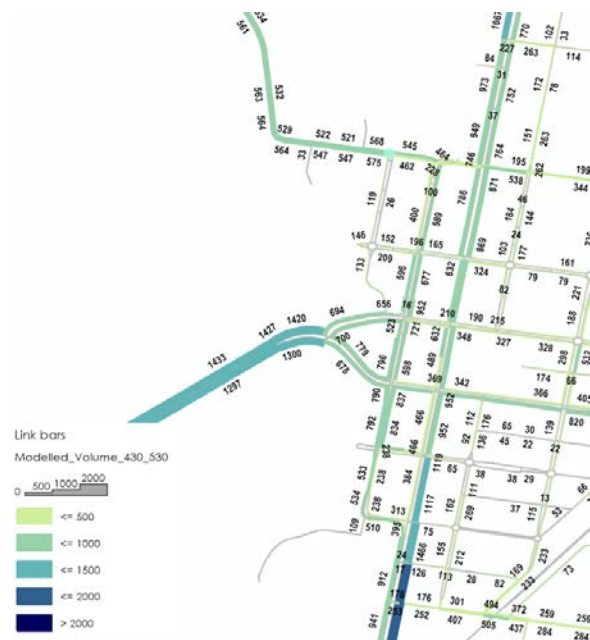


Figure 4-11: Scenario 2 - Traffic Volumes (PM peak)

#### 4.5.1.3 Scenario 3: Reduced to 1 lane on Wyndham St and adjusted signal timings

The 2032 AM and PM peak hour traffic volumes for Scenario 3 is shown in Figure 4-12 and Figure 4-13, respectively.

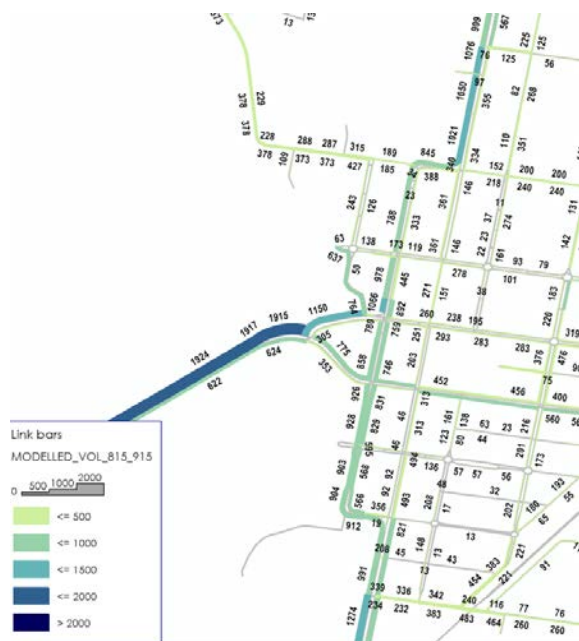


Figure 4-12: Scenario 3 - Traffic Volumes (AM peak)

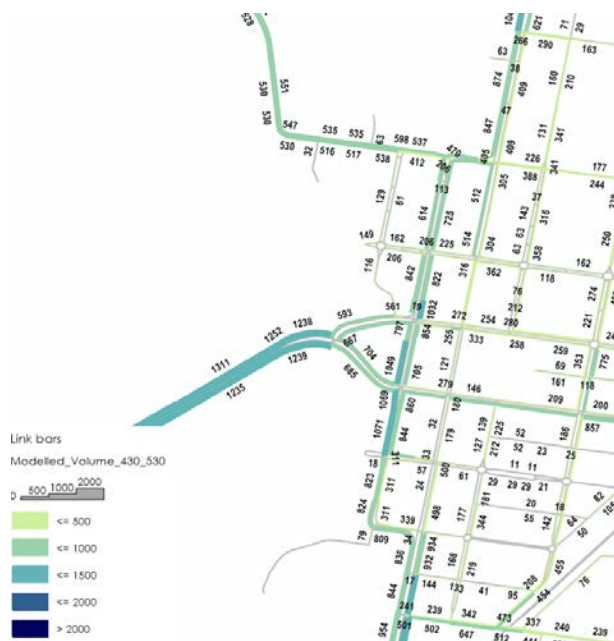


Figure 4-13: Scenario 3 - Traffic Volumes (PM peak)

#### 4.5.1.4 Scenario 4: Reduce Stages 5 & 6 to 1 lane in each direction

The 2032 AM and PM peak hour traffic volumes for Scenario 4 is shown in Figure 4-12 and Figure 4-13, respectively.

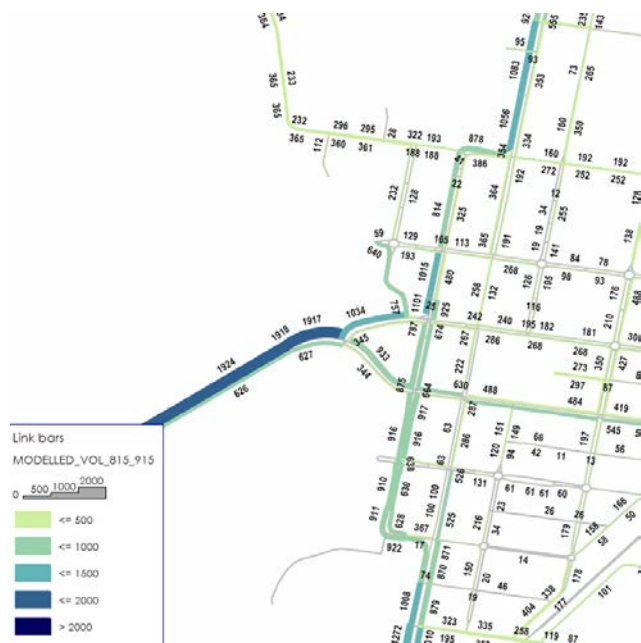


Figure 4-14: Scenario 4 - Traffic Volumes (AM peak)

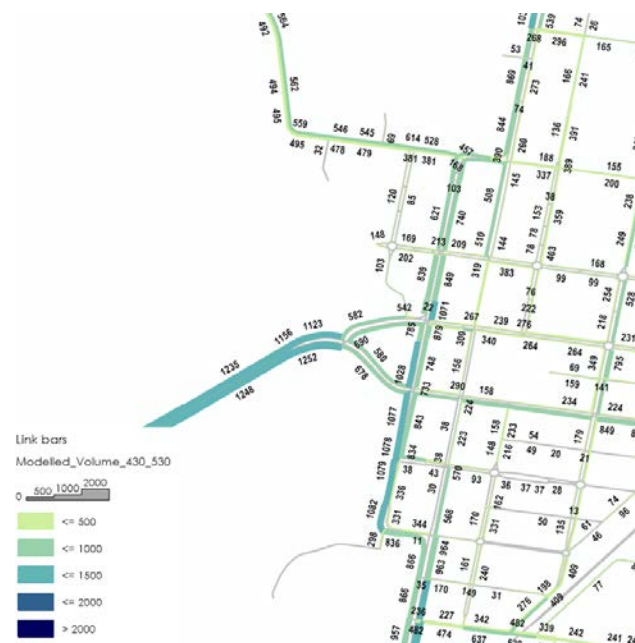


Figure 4-15: Scenario 4 - Traffic Volumes (PM peak)

## 4.5.2 Traffic Volume Differences

### 4.5.2.1 Scenario 1: Upgrade full length of Welsford Street

The 2032 AM and PM peak hour traffic volume differences between Scenario 1 and Do Nothing is shown in Figure 4-22 and Figure 4-23, respectively.

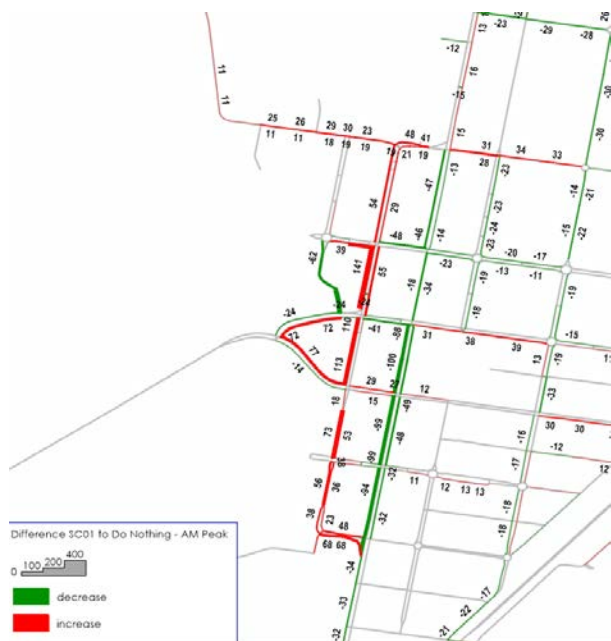


Figure 4-16: Scenario 1 - Volume Differences (AM peak)



Figure 4-17: Scenario 1 - Volume Differences (PM peak)

### 4.5.2.2 Scenario 2: Signal Timing Improvements

The 2032 AM and PM peak hour traffic volume differences between Scenario 1 and Do Nothing is shown in Figure 4-22 and Figure 4-23, respectively.

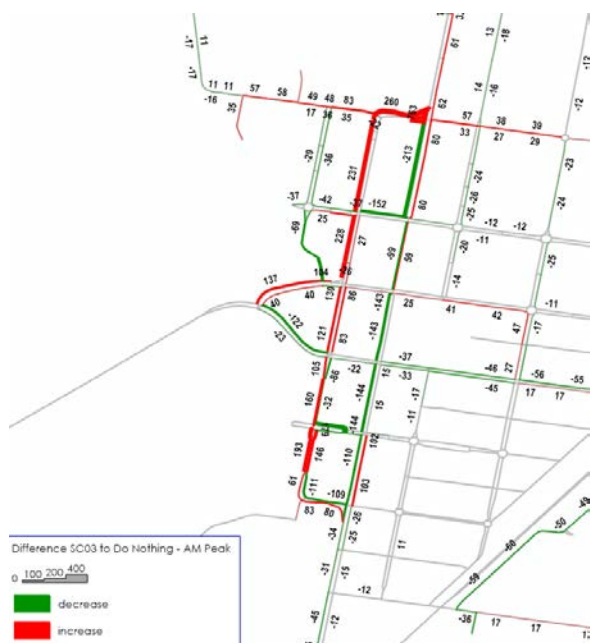


Figure 4-18: Scenario 2 - Volume Differences (AM peak)



Figure 4-19: Scenario 2 - Volume Differences (PM peak)



#### 4.5.2.3 Scenario 3: Reduced to 1 lane on Wyndham St and adjusted signal timings

The 2032 AM and PM peak hour traffic volume differences between Scenario 1 and Do Nothing is shown in Figure 4-20 and Figure 4-21, respectively.

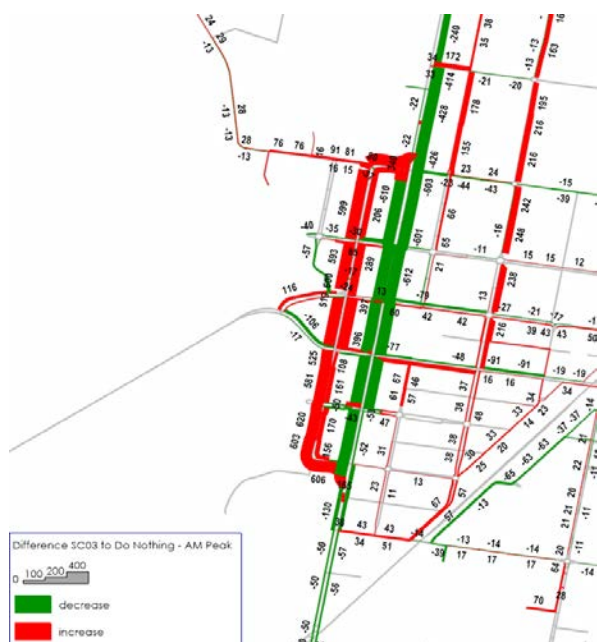


Figure 4-20: Scenario 3 - Volume Differences (AM peak)

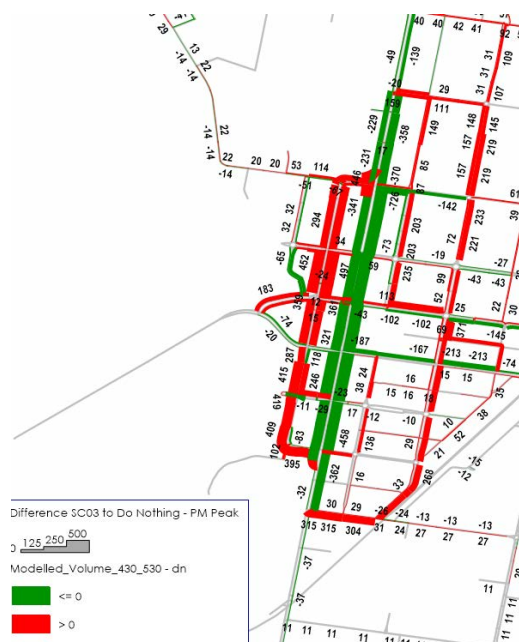


Figure 4-21: Scenario 3 - Volume Differences (PM peak)

#### 4.5.2.4 Scenario 4: Reduce Stages 5 & 6 to 1 lane in each direction

The 2032 AM and PM peak hour traffic volume differences between Scenario 1 and Do Nothing is shown in Figure 4-22 and Figure 4-23, respectively.

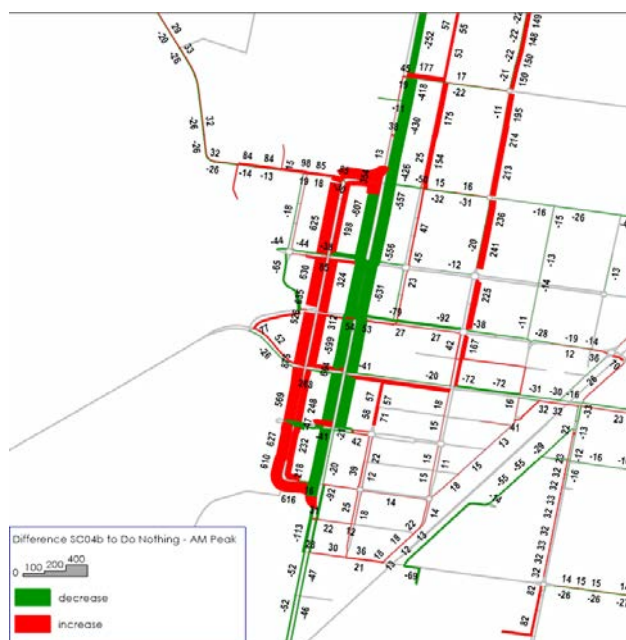


Figure 4-22: Scenario 4 - Volume Differences (AM peak)



Figure 4-23: Scenario 4 - Volume Differences (PM peak)

### 4.5.3 Level of Service

#### 4.5.3.1 Scenario 1: Upgrade full length of Welsford Street

The 2032 AM and PM peak hour Level of Service road link plots is shown in Figure 4-24 and Figure 4-25, respectively.

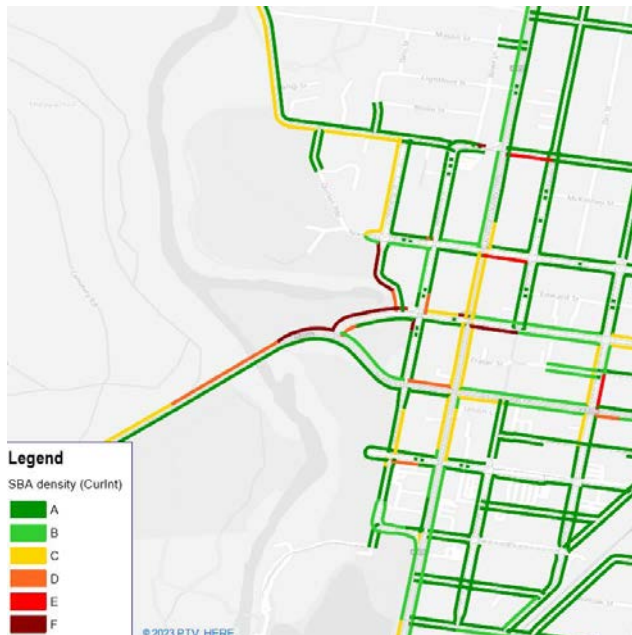


Figure 4-24: Scenario 1 – Level of Service (AM peak)

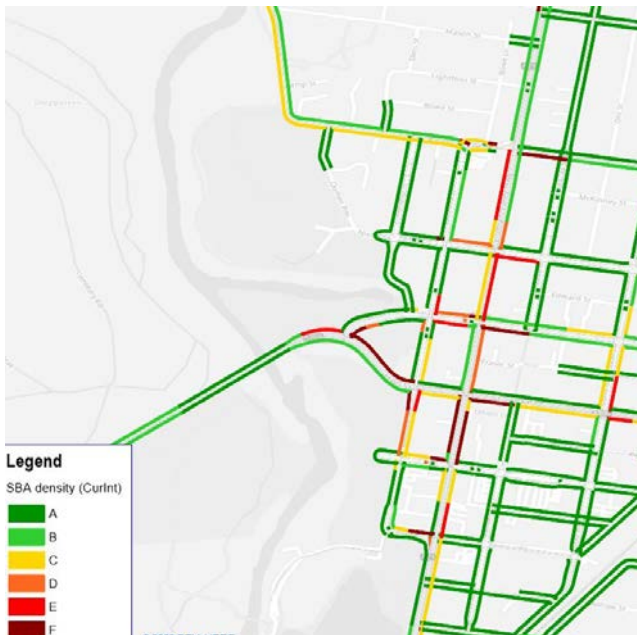


Figure 4-25: Scenario 1 - Level of Service (PM peak)

#### 4.5.3.2 Scenario 2: Signal Timing Improvements

The 2032 AM and PM peak hour Level of Service road link plots is shown in Figure 4-26 and Figure 4-27, respectively.

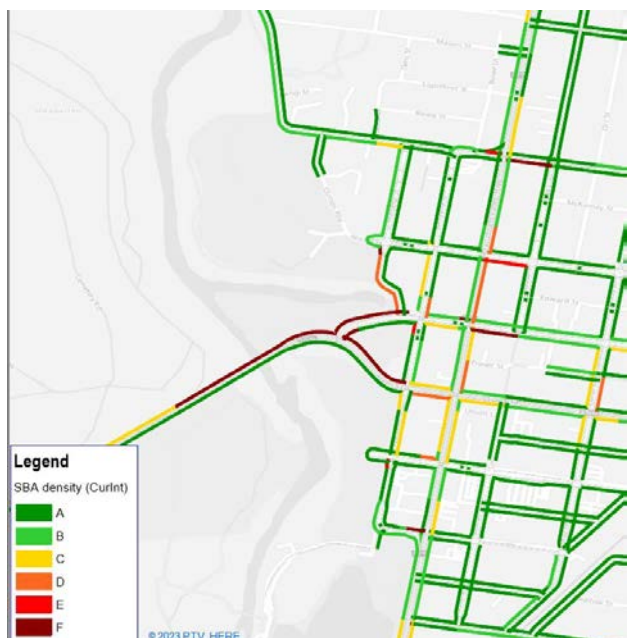


Figure 4-26: Scenario 2 - Level of Service (AM peak)

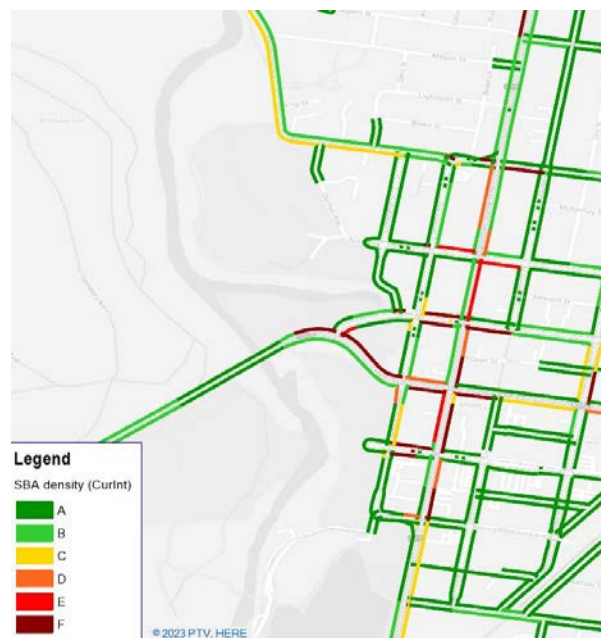


Figure 4-27: Scenario 2 - Level of Service (PM peak)



#### 4.5.3.3 Scenario 3: Reduced to 1 lane on Wyndham St and adjusted signal timings

The 2032 AM and PM peak hour Level of Service road link plots is shown in Figure 4-28 and Figure 4-29, respectively.

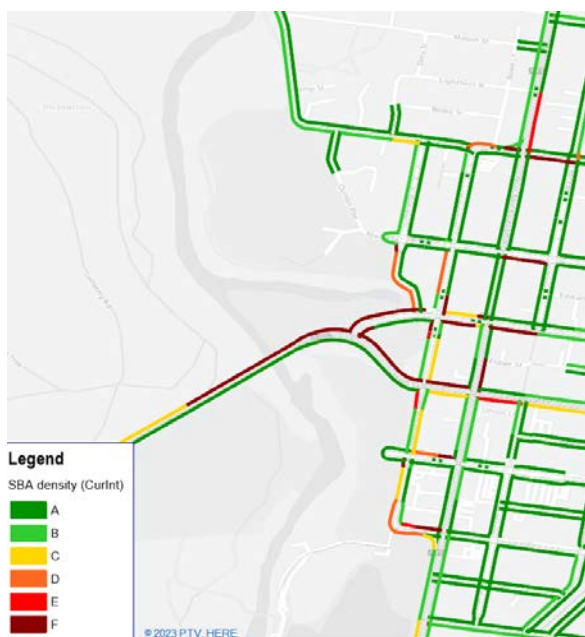


Figure 4-28: Scenario 3 - Level of Service (AM peak)

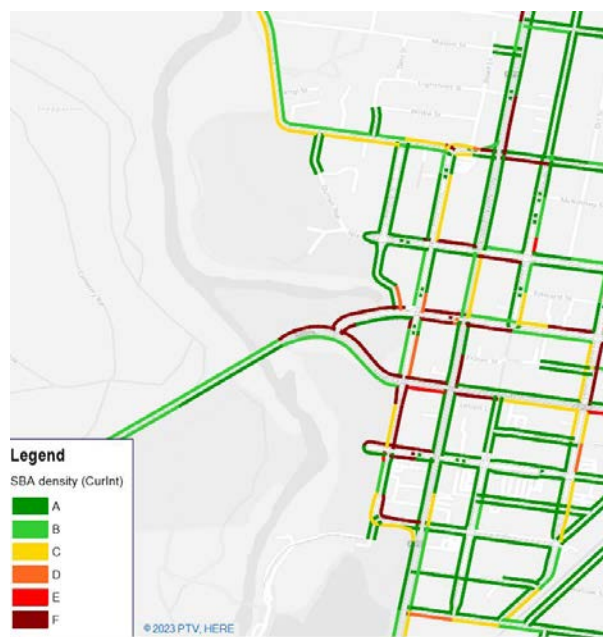


Figure 4-29: Scenario 3 - Level of Service (PM peak)

#### 4.5.3.4 Scenario 4: Reduce Stages 5 & 6 to 1 lane in each direction

The 2032 AM and PM peak hour Level of Service road link plots is shown in Figure 4-30 and Figure 4-31, respectively.

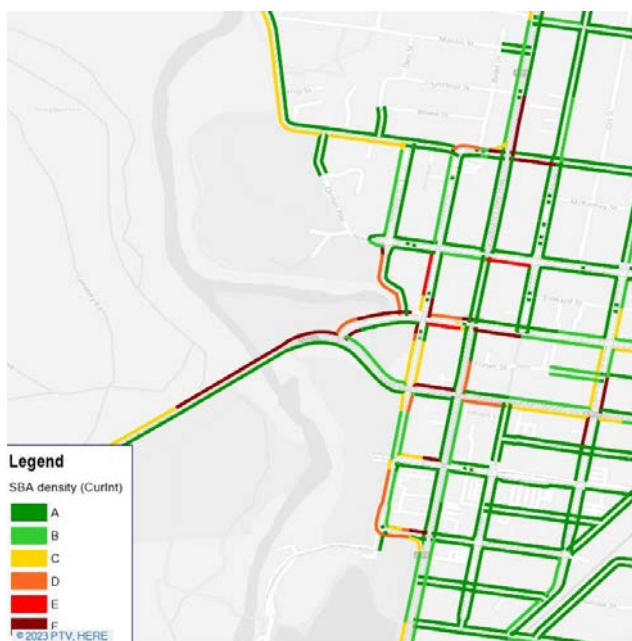


Figure 4-30: Scenario 4 - Level of Service (AM peak)

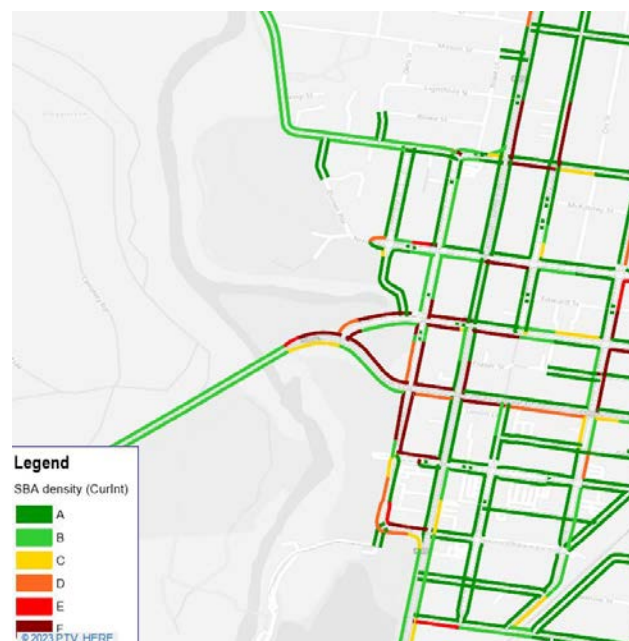


Figure 4-31: Scenario 4 - Level of Service (PM peak)

## 4.5.4 Queue Lengths

### 4.5.4.1 Scenario 1: Upgrade full length of Welsford Street

The 2032 AM and PM peak hour maximum queue lengths on each road link is shown in Figure 4-24 and Figure 4-25, respectively.

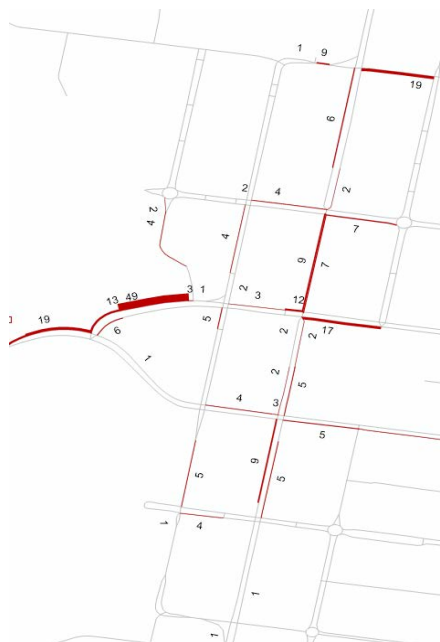


Figure 4-32: Scenario 1 – Queue Lengths (AM peak)



Figure 4-33: Scenario 1 - Queue Lengths (PM peak)

### 4.5.4.2 Scenario 2: Signal Timing Improvements

The 2032 AM and PM peak hour maximum queue lengths on each road link is shown in Figure 4-26 and Figure 4-27, respectively.

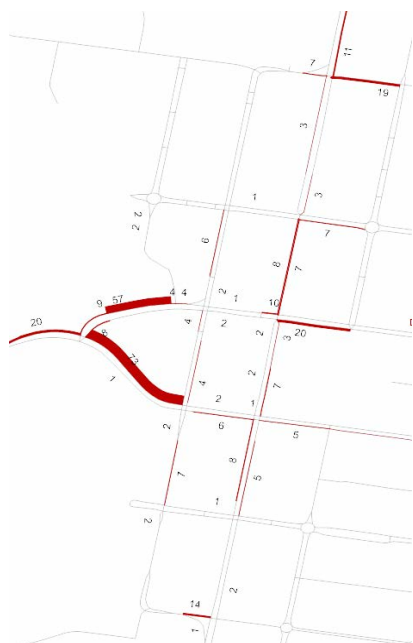


Figure 4-34: Scenario 2 - Queue Lengths (AM peak)

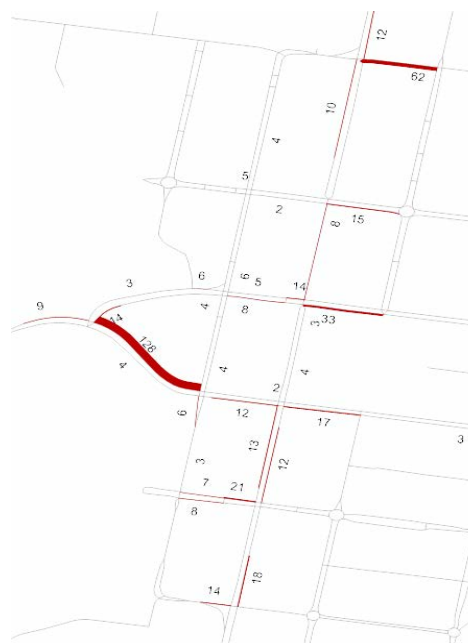


Figure 4-35: Scenario 2 - Queue Lengths (PM peak)

#### 4.5.4.3 Scenario 3: Reduced to 1 lane on Wyndham St and adjusted signal timings

The 2032 AM and PM peak hour maximum queue lengths on each road link is shown in Figure 4-36 and Figure 4-37, respectively.

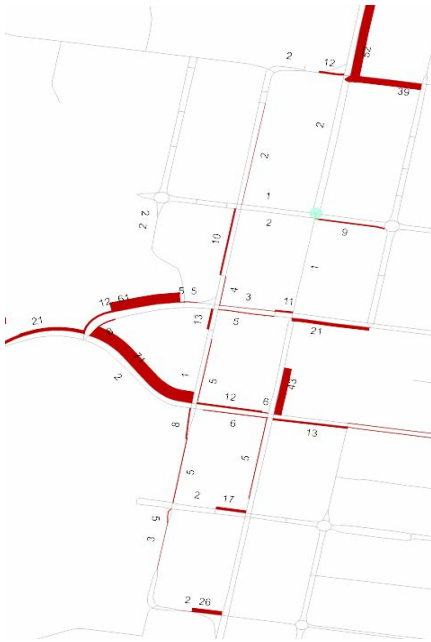


Figure 4-36: Scenario 3 - Queue Lengths (AM peak)



Figure 4-37: Scenario 3 - Queue Lengths (PM peak)

#### 4.5.4.4 Scenario 4: Reduce Stages 5 & 6 to 1 lane in each direction

The 2032 AM and PM peak hour maximum queue lengths on each road link is shown in Figure 4-38 and Figure 4-39, respectively.

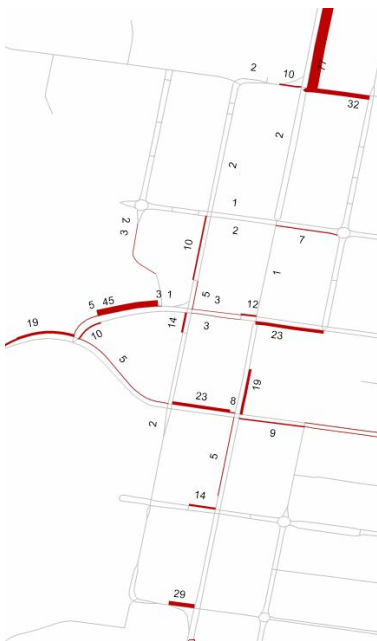


Figure 4-38: Scenario 4 - Queue Lengths (AM peak)

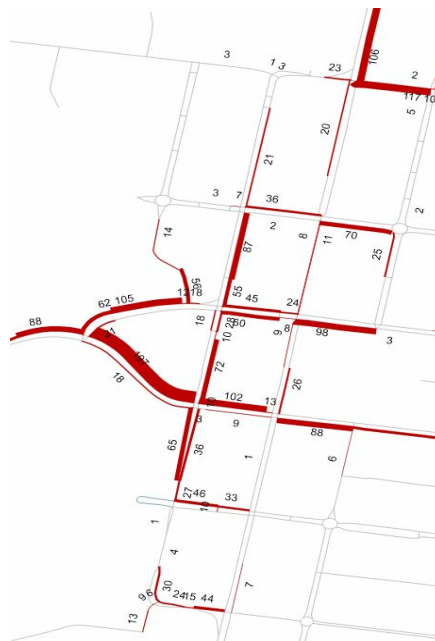


Figure 4-39: Scenario 4 - Queue Lengths (PM peak)

## 4.6 Results Discussion

The modelling results of the various scenarios indicate that there will be an increasing level of operational issues across the network under the 'Do Nothing' scenario in 2032. If only the works associated with Stages 5 & 6 are implemented as outlined in Scenario 1, then there will be meaningful network operational improvements in 2032. However, there will be limited reductions

in traffic volumes on Wyndham Street as most reductions occur along the roads to the west and northwest of Welsford Street, thus not providing much increased opportunity for place making improvements along Wyndham Street.

Scenarios 2 and 3 reflect measures along Wyndham Street that would be accompanied by major place making improvements. The results show large volumes of traffic are redirected to Welsford Street, which operationally seems to be able to manage these demands. There are some additional demands redistributed to other north-south roads to the east of Wyndham Street, which could be mitigated through the proposed Inner East Link Road.

Scenario 4 indicates that only having one lane in each direction for Stages 5 and 6 achieves very similar operational outcomes to having two-lanes in each direction, even when large volumes of traffic are redirected to Welsford Street, so is recommended to be adopted as part of the concept designs.

## 5 Concept Designs

### 5.1 Overview

The approach to developing the concept designs involved adopting the general layout based on the traffic modelling results, then testing the operation of the proposed layout using operational understandings of intersections and swept path assessments. Through this modelling, understanding of the network impacts and associated refinements to achieve the project objectives the ultimate design arrangements were identified. This resulted in various design iterations to ensure the network will operate at the desired level of performance. The following sub-sections illustrate this iterative process and decision making undertaken in the development of the concept designs.

### 5.2 Role & Function

The role and function of Welsford Street is informed by a number of factors, one of those being strategy and policy direction. At a strategic level there is a desire to downgrade Wyndham Street's through movement function and associated traffic volumes within the retail core, with Council nominating Welsford Street as the western CBD bypass. Welsford Street has been progressively upgraded, with the current project informing the final sections referred to as Stages 5 and 6.

Movement and Place is another policy framework guiding the aspirational vision of Welsford street, with an assessment report undertaken by Council in 2018. A performance review was undertaken of the WSAR, which suggested that the proposed arrangements would likely have positive General Traffic and Freight functions and enable the downgrading of Wyndham Street.

Transport network modelling has also been used to forecast future demands for the corridor and testing treatments and interventions to accommodate the future demands in the desired fashion – redirecting through volumes from Wyndham Street to Welsford Street.

The factors discussed above provide guidance for the design elements of the concept plans, which are set out below.

### 5.3 Key Design Elements

#### 5.3.1 Cross-Sectional Elements

Table 5-1 sets out the key cross-sectional elements, including the relevant design guidance used to inform them, as per the concept designs included in Appendix A.

**Table 5-1: Cross-Sectional Elements**

Design Element	Design Guidance	Notes / Commentary
<b>Traffic / turning lanes</b>	Table V4.2 of VicRoads Supplement to Austroads Guide to Road Design Part 3.	The concept design achieves a minimum lane through-lane width of 3.2 metres, with some turning lanes at a minimum width of 3 metres.
<b>Medians</b>	Table 4.15 of the Austroads Guide to Road Design Part 3, and Austroads Guide to Road Design Part 6 (various).	Raised medians are typically proposed to be a minimum of 2.5 metres wide.
<b>Public and active transport facilities</b>	VicRoads SD2071 and Figure 4 of VicRoads Design Guidance for strategically important cycling corridors.	Kerbside bus bays have been provided where bus stops are proposed to be relocated.  A 2.5 metre wide shared path is provided along the west side of Welsford Street.
<b>Utilities</b>	Dial before you dig.	Utilities within the corridor are reflected on the concept plans.

#### 5.3.2 Design Vehicles

The design vehicles used to inform the concept designs vary along the corridor, based on the largest vehicles anticipated to need to undertake turning movements. The design vehicles used to inform the design in the various sections include:

- Sobraon Street / Wyndham Street: 19 metre articulated vehicle
- Welsford Street / Tom Collins Drive / Sobraon Street: 19 metre articulated vehicle & 14.5 metre long rigid bus accessing Tom Collins Drive.



- Welsford Street / Vaughn Street: 19 metre semi-trailer
- Welsford Street / High Street: 19 metre semi-trailer

The swept paths of these design vehicles are included in Appendix A

### 5.3.3 Operating Speed

The existing speed limit of Welsford Street is 60km/h, which is maintained and adopted within the design.

### 5.3.4 Property Access

Table 2.1 from the Austroads Guide to Traffic Management Part 5: Road Management outlines different types of roads and the practices that best suit them depending on the purpose and function of the road. Given the function of the upgraded Welsford Street and its location within an urban environment with frequent existing property access points, the access management approach is guided by Category 3A/3B in Table 2.1 from Austroads Guide to Traffic Management Part 5: Road Management.

The access management details of this category are reproduced in Table 5-2 and the guiding principles adopted within the concept design.

**Table 5-2: Access Management – Extract from Table 2.1 of Austroads Guide to Traffic Management Part 5: Road Management**

Category	Generic Description	Typical Road Type and Function	Specific Access Control Tools	Good Practice in Implementation
<b>3A</b>	Roads with frequent but regulated direct access and median control / protection of right turns	Roads with frequent but regulated direct access and median control / protection of right turns	<ul style="list-style-type: none"> <li>• Median preventing right turns except at selected locations</li> <li>• Some median opening geometry allowing right turns in one direction only</li> <li>• Some median openings for U-turns only</li> <li>• Right turn bans may apply at specified times</li> </ul>	<ul style="list-style-type: none"> <li>• As property driveways directly access the major road, use of median to ensure that, generally, only left turns are used to enter or exit driveways abutting properties</li> <li>• At lower major road speeds, angled median openings can be used to allow exiting right turns while preventing entering right turns. This may be appropriate, for example, where sight distance is restricted in one direction</li> <li>• At lower speeds, long deceleration lengths are not needed in right turn or U-turn slots indented in the median</li> <li>• Locate U-turn slots and apply time-specific right turn bans when the major road traffic volumes are heavy</li> </ul>
<b>3B</b>	Roads with frequent but regulated access but no median and generally without right turn restrictions	Mixed function secondary urban arterial roads without medians, servicing both community and traffic roles. Primary and secondary rural arterial roads servicing inter-regional traffic movement and providing direct access to abutting properties	<ul style="list-style-type: none"> <li>• Signage and/or central line marking at specific, dangerous locations to disallow right turns or U-turns at all times or at specific times.</li> <li>• Control of driveway locations to meet safety objectives (sight distances, separation from intersections, etc.)</li> <li>• Minimisation of number of driveways by combining driveways of adjacent properties</li> </ul>	<ul style="list-style-type: none"> <li>• While Category 3B roads generally have no medians, it may be appropriate to use line marking or even short lengths of raised median, with or without signage, to legally and perhaps physically prevent right turns over a limited length of road. This may be appropriate, for example, where sight distance is restricted.</li> <li>• Minimisation of driveway numbers and control of their locations reduces conflicts between the traffic and access functions</li> </ul>

### 5.3.5 Intersections

The intersections within Stages 5 & 6 are proposed to generally remain as per existing conditions, albeit with additional treatments to suit the corridor upgrades, such as a raised median through the Vaugh Street intersection. The proposed intersections and their treatments are described below.

#### 5.3.5.1 Sobraon Street / Wyndham Street Intersection

The main change to this signalised intersection is the addition of a second right-hand turn lane from Sobraon Street on to Wyndham Street, as shown in Figure 5-1.



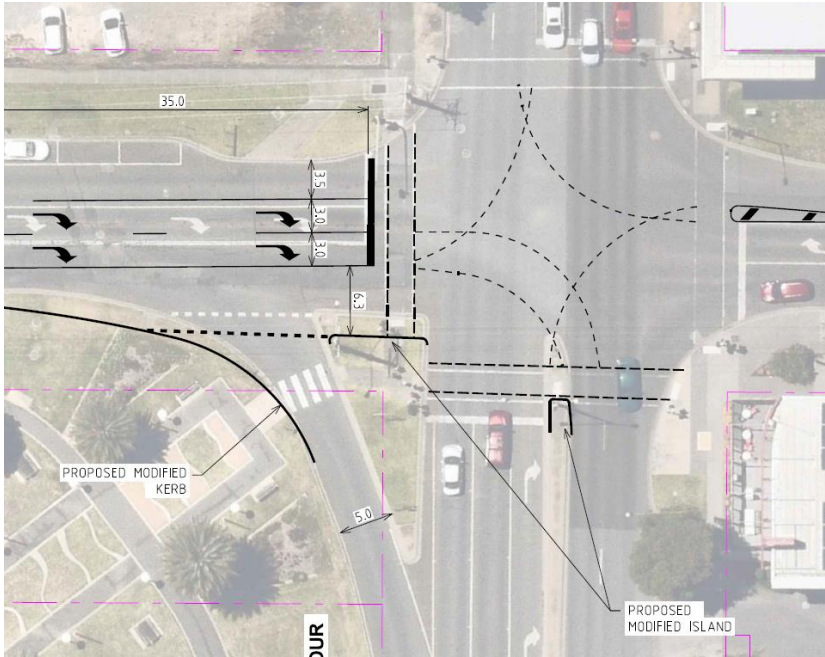


Figure 5-1: Sobraon Street / Syndham Street Intersection

#### 5.3.5.2 Welsford Street / Tom Collins Drive / Sobraon Street Intersection

This intersection will remain give-way controlled, only with modifications to kerbing and removal of the central island on Welsford Street, as shown in Figure 5-2.

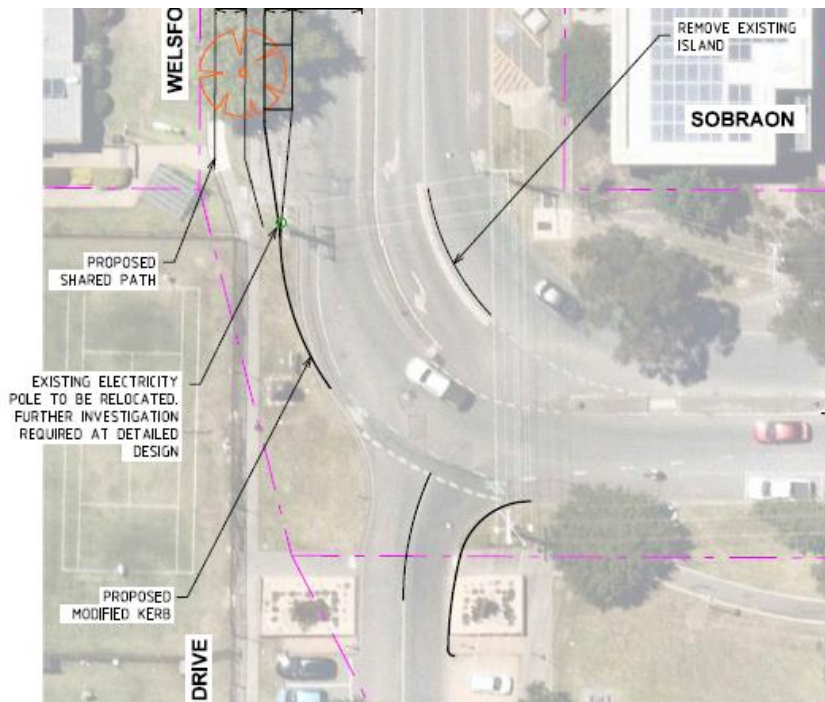


Figure 5-2: Welsford Street / Tom Collins Drive / Sobraon Street Intersection



## 5.4 Main Implications

### 5.4.1 Car Parking

As part of the upgrades to Stages 5 & 6 of Welsford Street, in particular around intersections, car parking is impacted by the design in specific locations. Table 5-3 summarises the existing parking provision and provides a comparison of the number of parking spaces post-implementation of Stages 5 & 6. Overall, there will be a loss of 24 car parking spaces and 1 loading zone as a result of the upgrade. It is understood that Council is investigating options to off-set these losses through additional off-street car parking facilities in accordance with the Shepparton CBD Car Parking Strategy that was completed in 2020.

**Table 5-3: Car Parking Summary**

Section	Existing	Post	Difference
<b>Sobraon Street, between Wyndham Street &amp; Welsford Street</b>	14 spaces	14 spaces	0 spaces
<b>Welsford Street, between Sobraon Street &amp; Vaughn Street</b>	37 spaces	33 spaces	-4 spaces
<b>Welsford Street, between Vaughn Street &amp; High Street</b>	33 spaces + 1 loading zone + 3 bus spaces	13 spaces + 3 bus spaces	-20 spaces -1 loading zone
<b>Welsford Street, north of High Street</b>	12 spaces	12 spaces	0 spaces
<b>Totals</b>	96 spaces + 1 loading zone + 3 bus spaces	72 spaces + 3 bus spaces	-24 spaces -1 loading zone

### 5.4.2 Trees

Welsford Street is a tree-lined corridor and while efforts have been made to minimise the impact on them there are various that are proximate proposed works. As such, an Arboricultural Impact Assessment was undertaken by Homewood Consulting Pty Ltd in June 2023 of all 80 trees within Stages 5 & 6 of the WSAR.

Of these 80 trees and based on the concept design, there are a total of 20 that have major encroachments, of which four could be expected to be removed, as indicated as follows:

- Trees 53 and 54 (both *Corymbia citriodoras* and of high and medium value) located in the central median on the north approach of the High Street / Welsford Street intersection will be impacted by the proposed modification to the existing centre median and are not expected to tolerate the works. The alternative is to not make the modifications to the central median and retain the existing island, but this does reduce the right turn lane length and not provide a standard deceleration lane length for a 60km/h speed environment.
- Trees 76 and 77 (*Platanus orientalis* and of medium-high value) located on the western side of Welsford Street at its intersection with Tom Collins Drive will require removal due to the proposed shared path. However, there is considered potential to make design changes and/or use specific construction methods to mitigate the impact of the proposed shared path on these trees to enable them to be retained. However, this isn't able to be confirmed at this stage of design.

It is expected that continued efforts and investigation will occur around how these four trees could be retained without detrimentally impacting the project objectives as the project moves into the next design stages.

### 5.4.3 Other Road Works

Through the modelling it was identified that there would be benefit in modifying the Wyndham Street / Knight Street intersection to provide double right-turn lanes on the north approach to help encourage the use of Welsford Street as the preferred through vehicle route. As such, a concept design of the potential arrangements has been developed and included in Appendix B.

## 6 Concept Design Costings

### 6.1 Overview

A concept design cost estimate has been completed by Slattery for the Welsford Street Stages 5 & 6 upgrades, based on the plans in Appendix A. The cost estimate includes a contingency of 25% for resolution of design items and specifications prior to tender, as well as contracts during the construction phase. The contingency is a deterministic assessment of the potential money needed for the project budget representing a value equivalent to a P90. P90 represents the project cost with sufficient risk provisions to provide a 90% level of confidence in the outcome, i.e. that there is a 90% likelihood that the project cost will not be exceeded.

### 6.2 Key Inputs and Rates

The majority of the proposed construction works relate to direct construction work, contractor management and traffic management. In this regard, the following key cost inputs have been adopted:

- Site establishment & dis-establishment - \$421,232.
- Contractors off-site overhead & margin - \$292,277.
- Traffic management - \$437,850.
- Pavement construction
  - milling to specified depth of cut – \$265,320 @ \$20/m<sup>2</sup> (13,266 m<sup>2</sup> in total).
  - Heavy duty dense asphalt in wearing course - \$447,535 @ \$32/m<sup>2</sup> (13,775 m<sup>2</sup> in total).
- Shared footpath concrete paving - \$237,625 @ \$170/m<sup>2</sup> (1,394 m<sup>2</sup> in total).

The costing made allowance for the relocation of 2 electricity poles, however no allowance was made for relocation of other utility services and noting Council's intent to underground the power lines along Welsford Street. It is recommended that formal quotes be obtained from the relevant service authorities based on the preliminary design arrangements in order to obtain a more informed understanding of extents of works and the associated costs. The most appropriate time to do this would be when further design work is completed.

Those service authorities most likely needing to be engaged relate to Powercor, Telecomms, Water, Gas and Sewer.

### 6.3 Cost Estimates

The proposed cost estimates for the proposed construction works to upgrade Welsford Street Stages 5 & 6 are presented in Table 6-1.

**Table 6-1: Cost Estimate**

Item	Description	Total Construction Costs Inc Client Costs (excl. GST)
1.	Testing & WAE	\$36,535.00
2.	Direct construction works	\$1,872,789.00
3.	Pedestrian crossing lights	\$125,000.00
4.	Traffic management	\$437,850.00
5.	Contractor management, overhead and margin	\$713,508.00
	<b>Overall project cost</b>	<b>\$3,185,682.00</b>
	<b>Contingency (25%)</b>	<b>\$796,421.00</b>
	<b>Overall project cost including contingency (excl. GST)</b>	<b>\$3,982,103</b>

A full copy of the concept design cost estimate can be found in Appendix C





# Appendix

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We design with community in mind

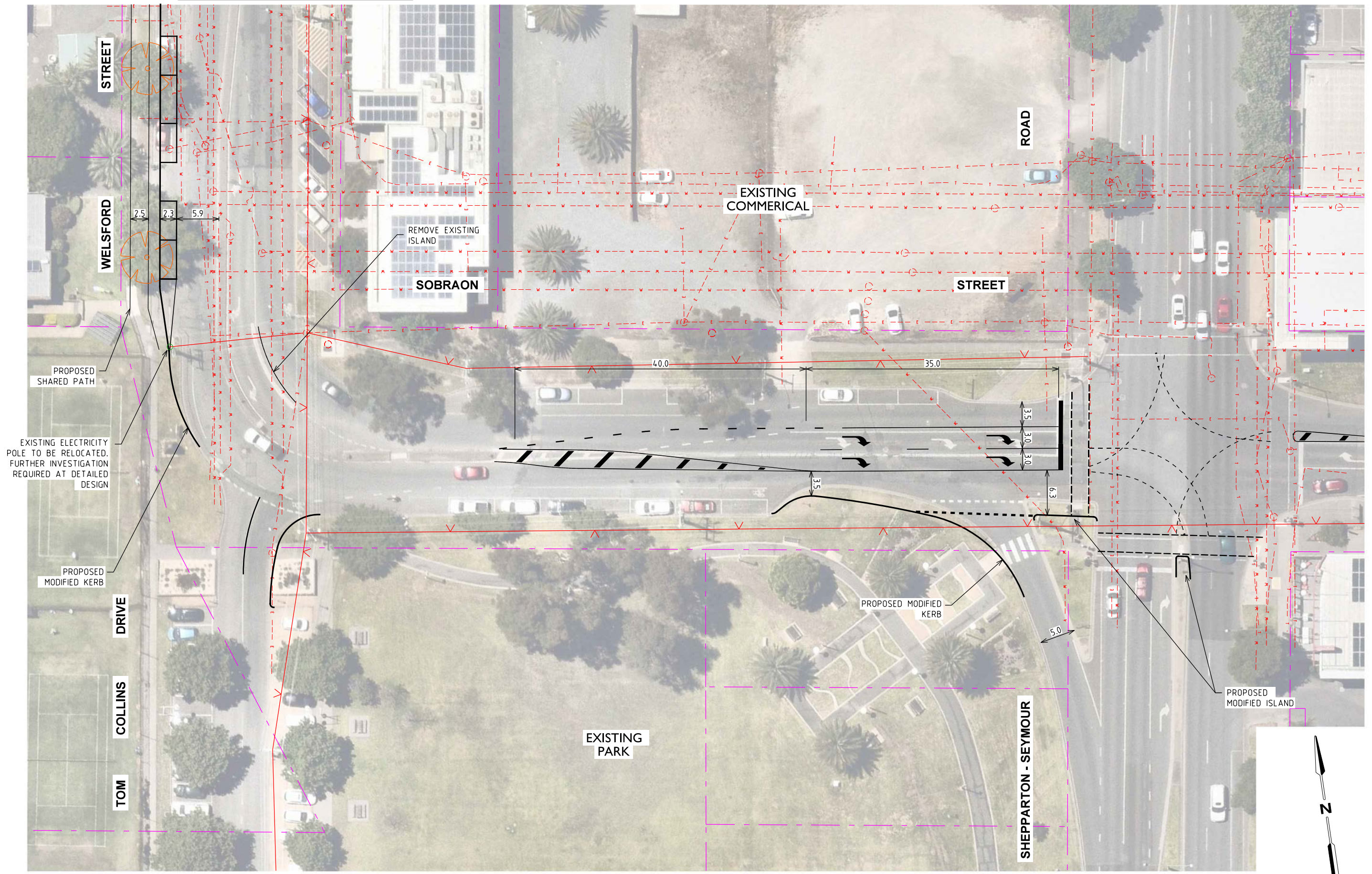


# Appendix A    Welsford Street, Stage 5 & 6 Concept Designs



## **A1 – Concept Designs with Services**

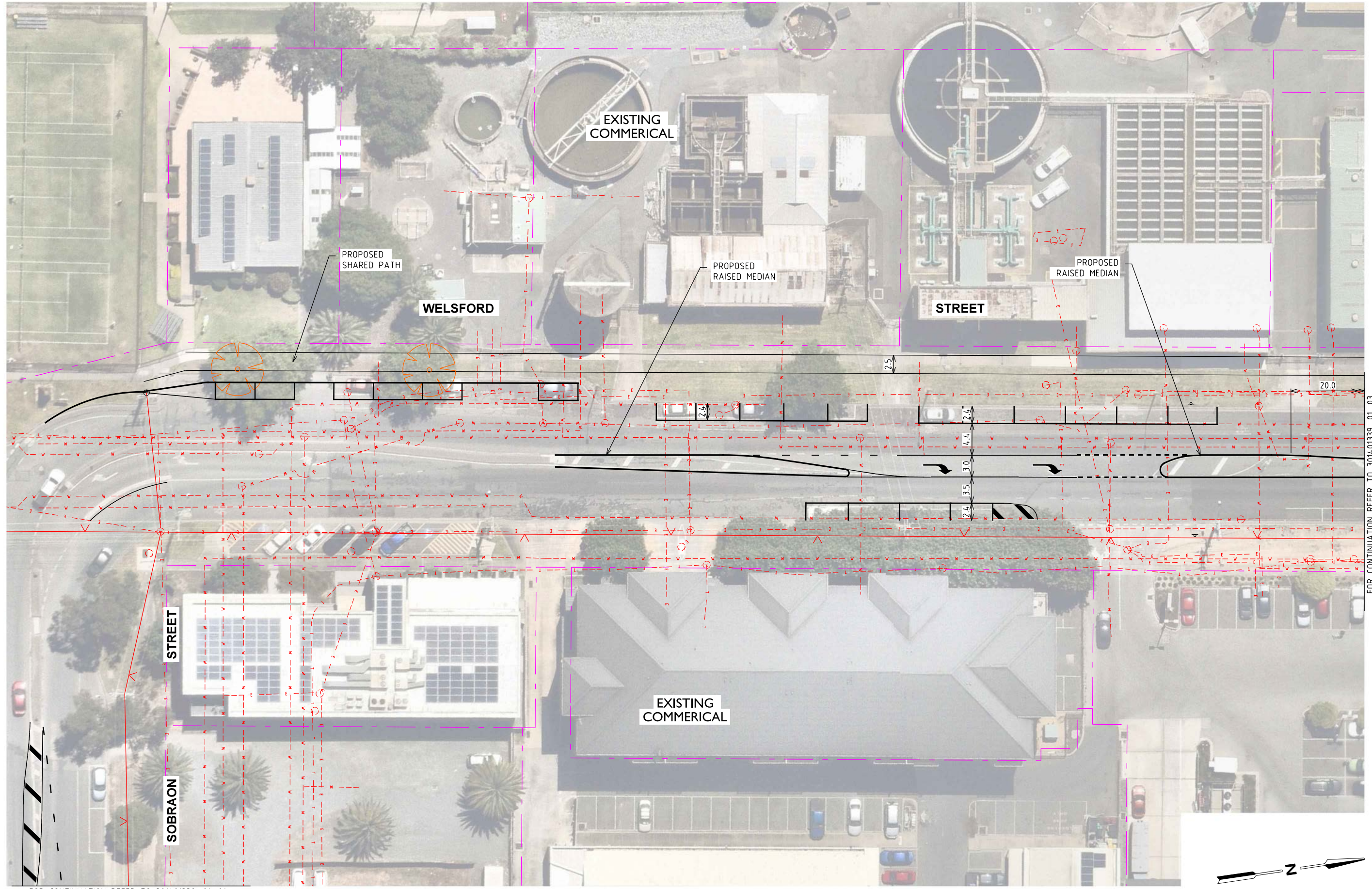






ON 15/06/2023 AT 5:44:27 PM

PLOTTED BY : h Stevenson



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FOR CONTINUATION REFER TO 301401339\_01\_03



**PRELIMINARY PLAN**  
FOR DISCUSSION PURPOSES  
ONLY SUBJECT TO CHANGE  
WITHOUT NOTIFICATION

**WARNING**  
BEWARE OF UNDERGROUND SERVICES  
THE LOCATIONS OF UNDERGROUND SERVICES ARE  
APPROXIMATE ONLY AND THEIR EXACT POSITION  
SHOULD BE PROVEN ON SITE. NO GUARANTEE IS  
GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

DESIGNED  
H. STEVENSON

APPROVED BY  
A. BLACKETT

DESIGN CHECK  
A. DELLISOLA

DATE ISSUED  
15 JUNE 2023

SCALE  
A3  
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CAD FILE NO.  
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**WELSFORD STREET STAGE 5 & 6**  
**SOBRAON STREET / WELSFORD STREET**  
**SHEPPARTON**  
**CONCEPT LAYOUT**

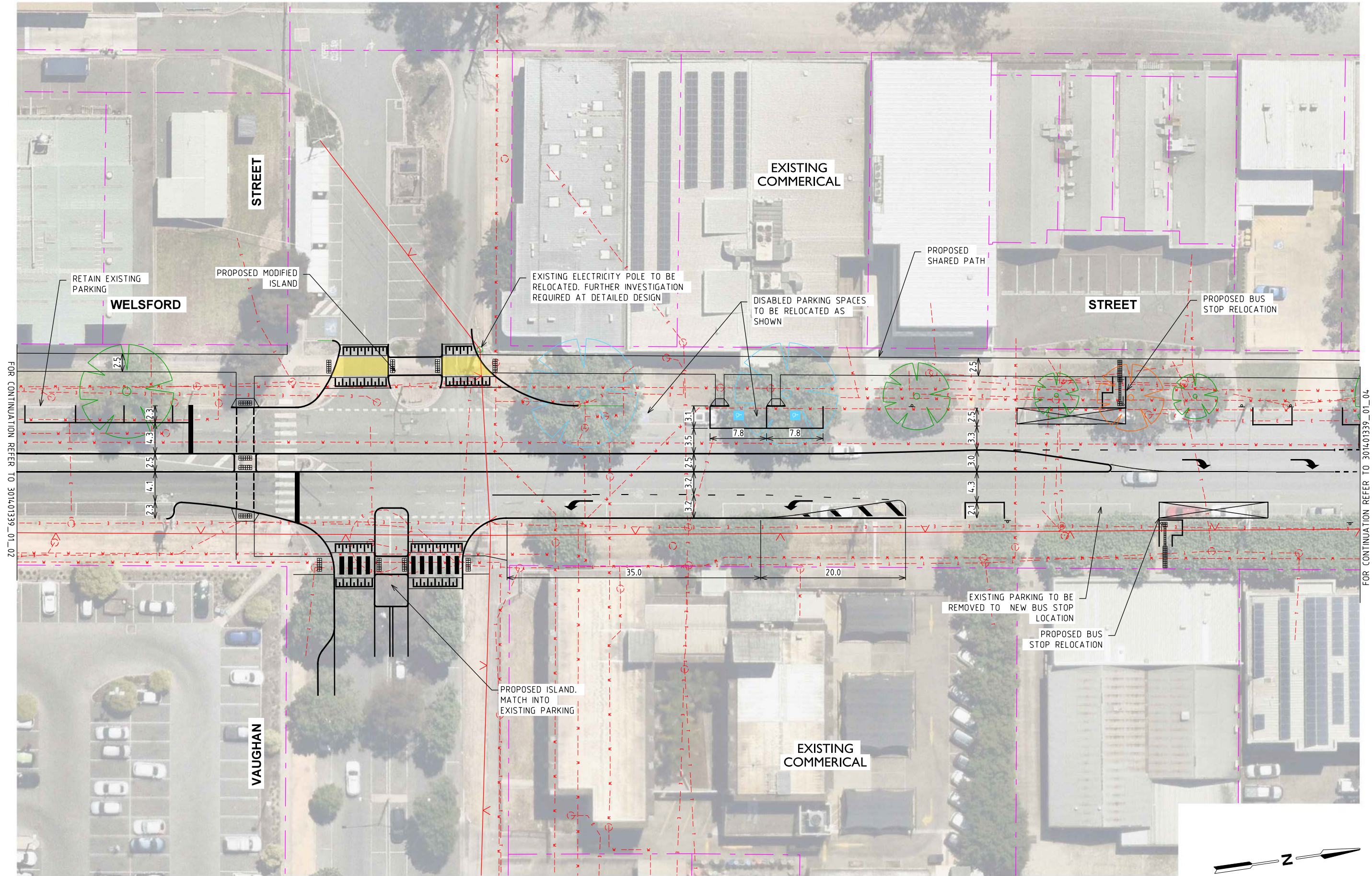
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SHEET 02 OF 09

ISSUE P5



ON 15/06/2023 AT 5:44:29 PM  
PLOTTED BY : h Stevenson



FOR CONTINUATION REFER TO 301401339\_01\_02

FOR CONTINUATION REFER TO 301401339\_01\_04



**PRELIMINARY PLAN**  
FOR DISCUSSION PURPOSES  
ONLY SUBJECT TO CHANGE  
WITHOUT NOTIFICATION

**WARNING**  
BEWARE OF UNDERGROUND SERVICES  
THE LOCATIONS OF UNDERGROUND SERVICES ARE  
APPROXIMATE ONLY AND THEIR EXACT POSITION  
SHOULD BE PROVEN ON SITE. NO GUARANTEE IS  
GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

DESIGNED  
H. STEVENSON

APPROVED BY  
A. BLACKETT

DESIGN CHECK  
A. DELLISOLA

DATE ISSUED  
15 JUNE 2023

SCALE  
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CAD FILE NO.  
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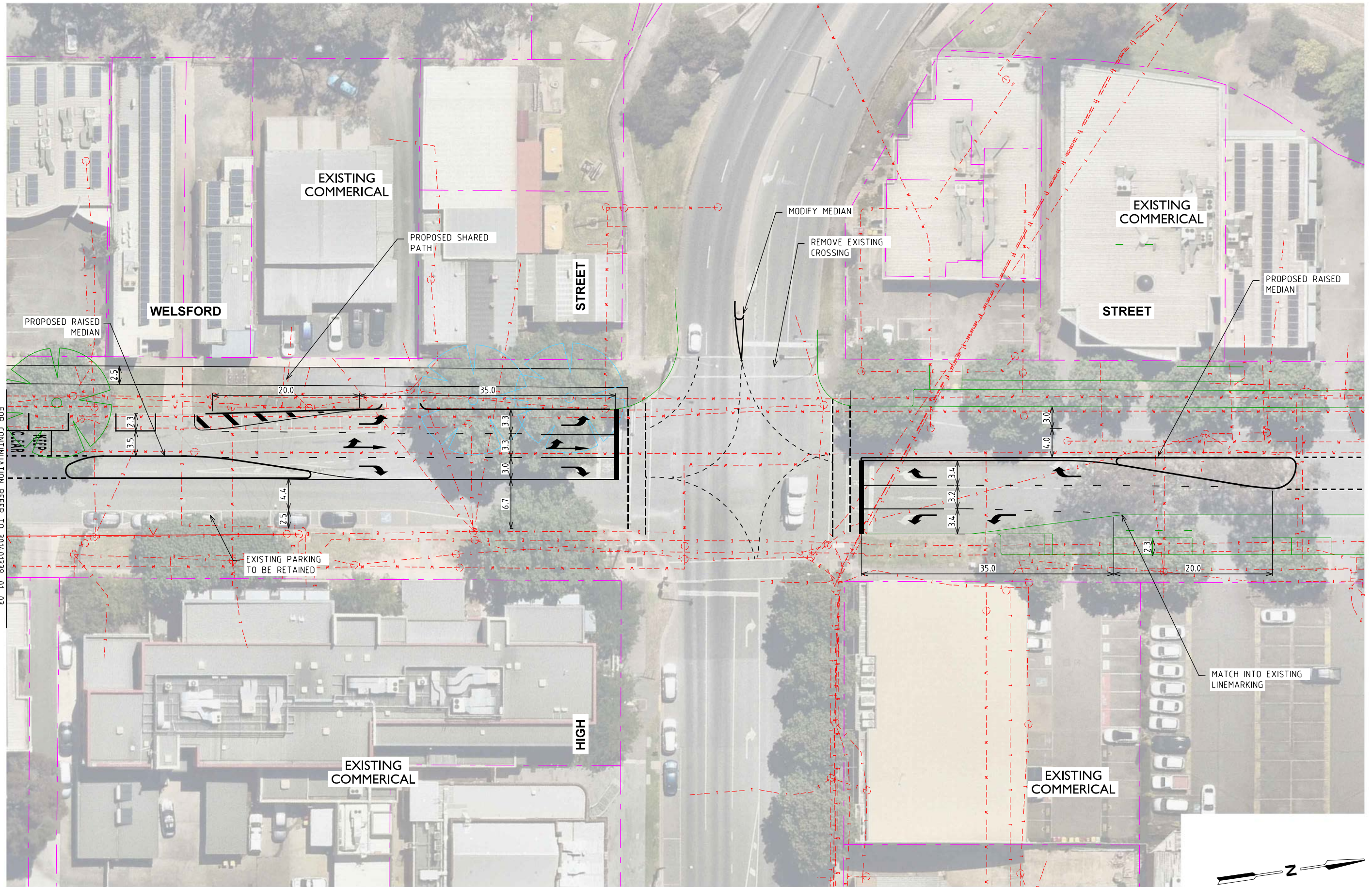
WELSFORD STREET STAGE 5 & 6  
VAUGHAN STREET / WELSFORD STREET  
SHEPPARTON  
CONCEPT LAYOUT

DRAWING NO. 301401339\_03

SHEET 03 OF 09

ISSUE P5





FOR CONTINUATION REFER TO 301401339\_01\_03

ON 15/06/2023 AT 5:44:30 PM

PLOTTED BY : h Stevenson



**PRELIMINARY PLAN**  
FOR DISCUSSION PURPOSES  
ONLY SUBJECT TO CHANGE  
WITHOUT NOTIFICATION

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DESIGNED  
H. STEVENSON

APPROVED BY  
A. BLACKETT

DESIGN CHECK  
A. DELLISOLA

DATE ISSUED  
15 JUNE 2023

SCALE  
A3  
0 5 10  
1:500

CAD FILE NO.  
301401339\_01\_p5.dgn

**WELSFORD STREET STAGE 5 & 6**  
**HIGH STREET / WELSFORD STREET**  
**SHEPPARTON**  
**CONCEPT LAYOUT**  
DRAWING NO. 301401339\_04

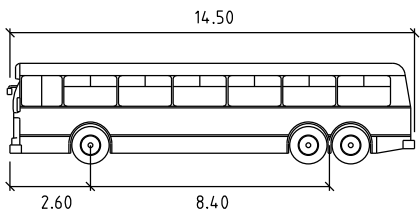
SHEET 04 OF 09

ISSUE P5

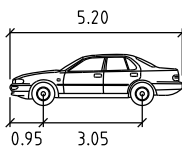


DESIGN VEHICLE

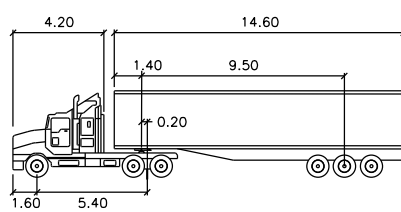
FOR CONTINUATION REFER TO 301401339\_01\_02



LONG RIGID BUS metres  
Width : 2.50  
Track : 2.50  
Lock to Lock Time : 6.0  
Steering Angle : 46.3



B99 6.3mR metres  
Width : 1.94  
Track : 1.77  
Lock to Lock Time : 6.0  
Steering Angle : 34.0

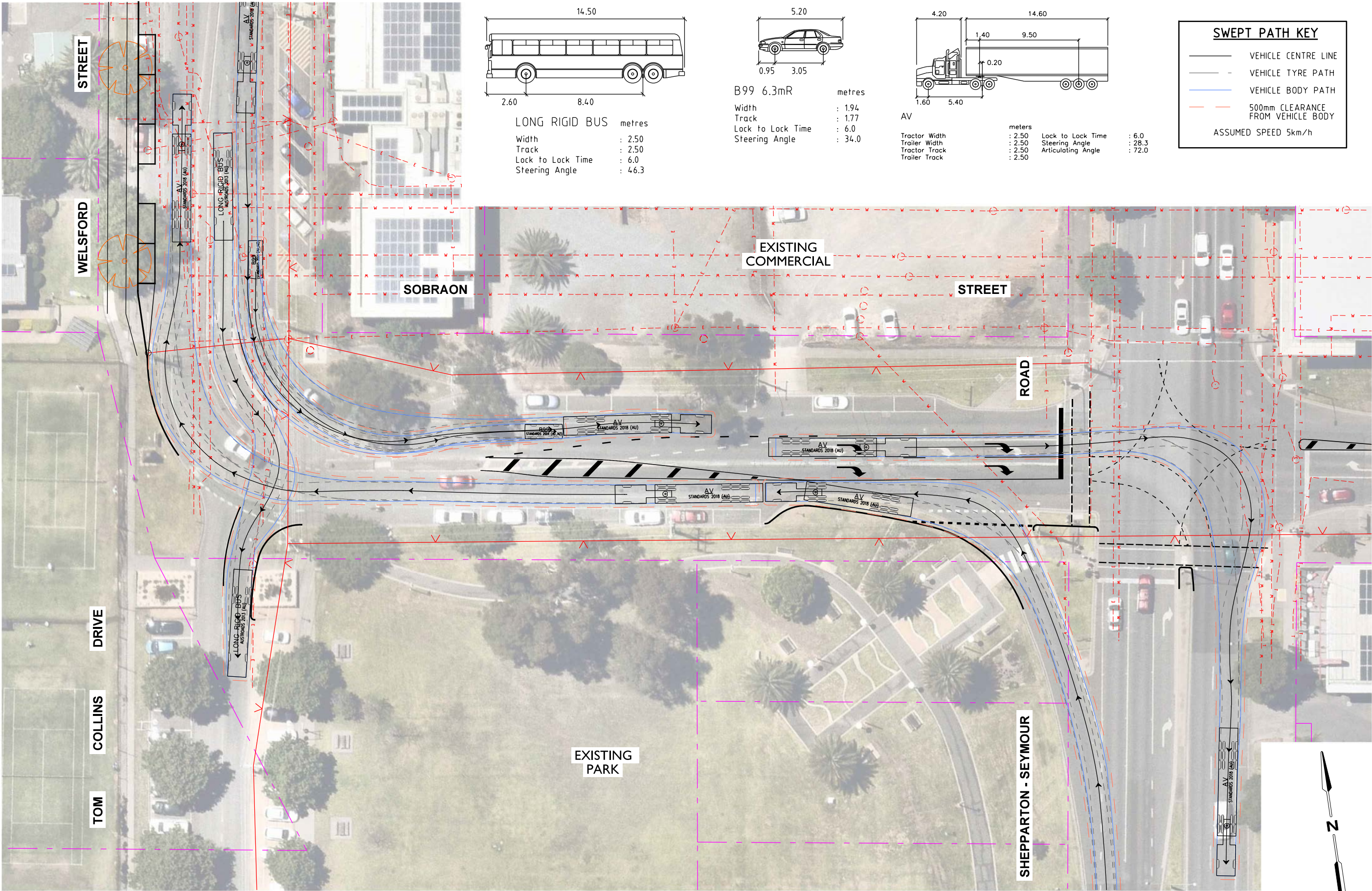


AV metres  
Tractor Width : 2.50  
Tractor Track : 2.50  
Trailer Width : 2.50  
Trailer Track : 2.50  
Lock to Lock Time : 6.0  
Steering Angle : 28.3  
Articulating Angle : 72.0

**SWEPT PATH KEY**

- VEHICLE CENTRE LINE
- - VEHICLE TYRE PATH
- VEHICLE BODY PATH
- - 500mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h



ON 15/06/2023 AT 5:44:32 PM  
PLOTTED BY : h Stevenson



**PRELIMINARY PLAN**  
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DESIGNED  
H. STEVENSON  
  
APPROVED BY  
A. BLACKETT

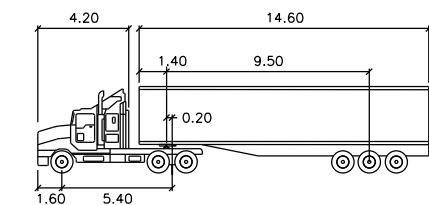
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A. DELLISOLA  
  
DATE ISSUED  
15 JUNE 2023

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CAD FILE NO.  
301401339\_01\_p5.dgn

WELSFORD STREET STAGE 5 & 6  
SOBRAON STREET / WELSFORD STREET  
SHEPPARTON  
SWEPT PATH ASSESSMENT  
DRAWING NO. 301401339\_05

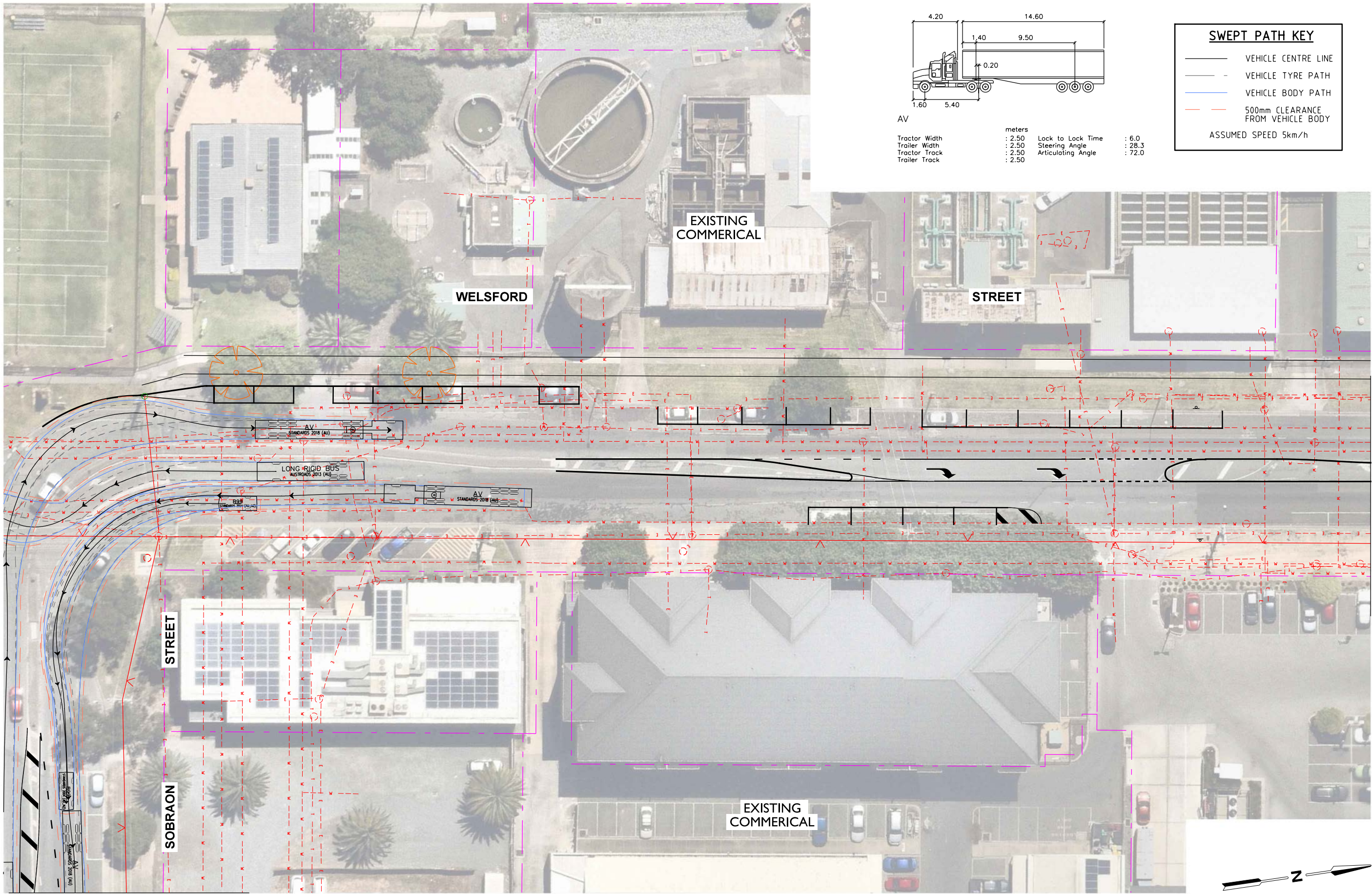


DESIGN VEHICLE



Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Tractor Width	: 2.50	Steering Angle	: 28.3
Tractor Track	: 2.50	Articulating Angle	: 72.0
Trailer Track	: 2.50		

SWEPT PATH KEY	
	VEHICLE CENTRE LINE
	VEHICLE TYRE PATH
	VEHICLE BODY PATH
	500mm CLEARANCE FROM VEHICLE BODY
ASSUMED SPEED 5km/h	



FOR CONTINUATION REFER TO 301401339\_01\_01

FOR CONTINUATION REFER TO 301401339\_01\_03

ON 15/06/2023 AT 5:44:34 PM

PLOTTED BY : h Stevenson



**PRELIMINARY PLAN**  
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DESIGNED  
H. STEVENSON  
  
APPROVED BY  
A. BLACKETT

DESIGN CHECK  
A. DELLISOLA  
  
DATE ISSUED  
15 JUNE 2023

SCALE  
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CAD FILE NO.  
301401339\_01\_p5.dgn

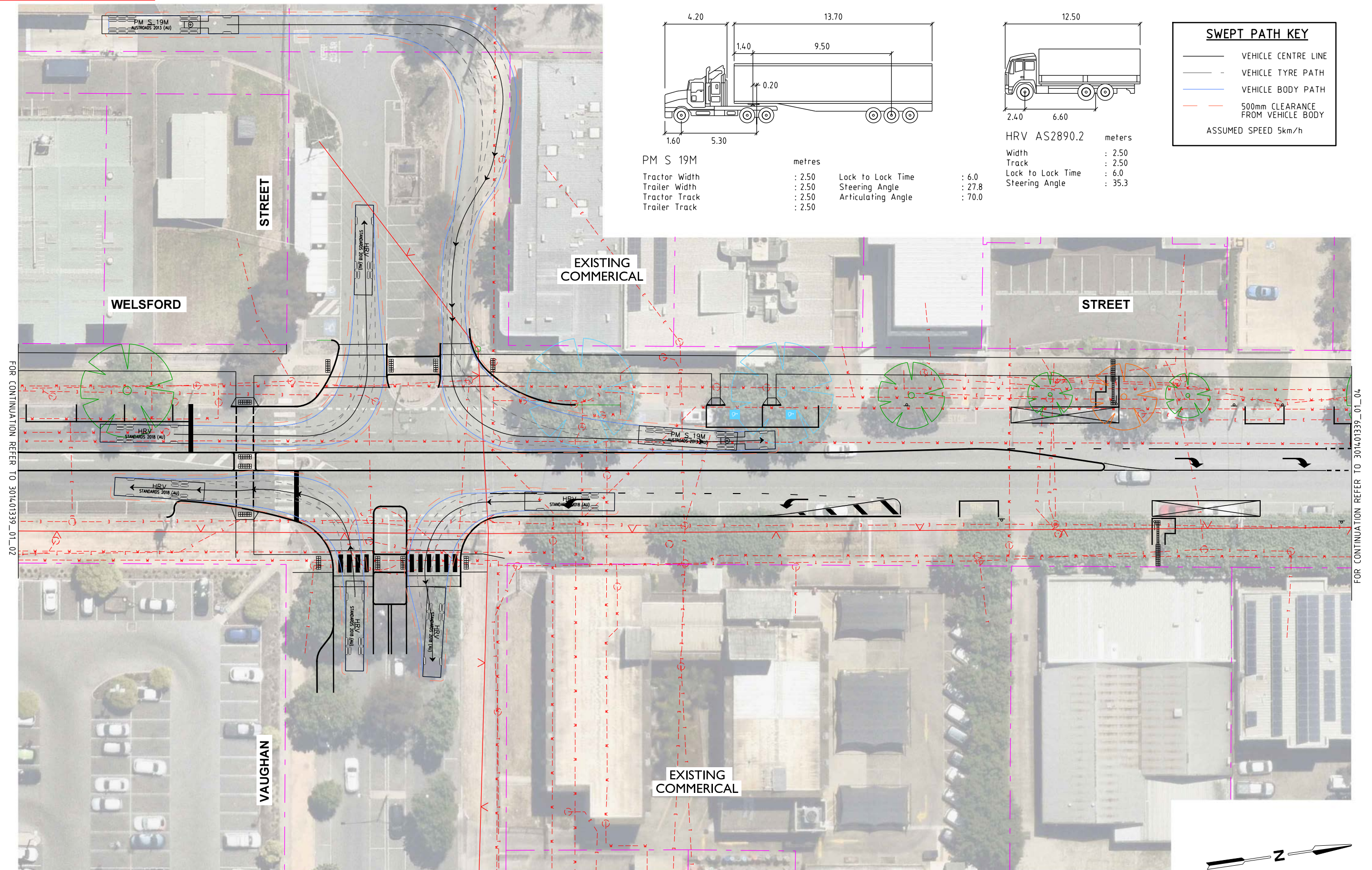
WELSFORD STREET STAGE 5 & 6  
SOBRAON STREET / WELSFORD STREET  
SHEPPARTON  
SWEPT PATH ASSESSMENT  
DRAWING NO. 301401339\_06

SHEET 06 OF 09

ISSUE P5

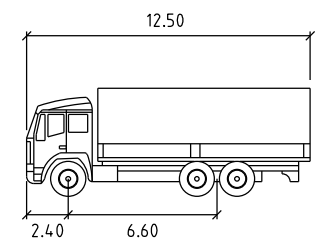
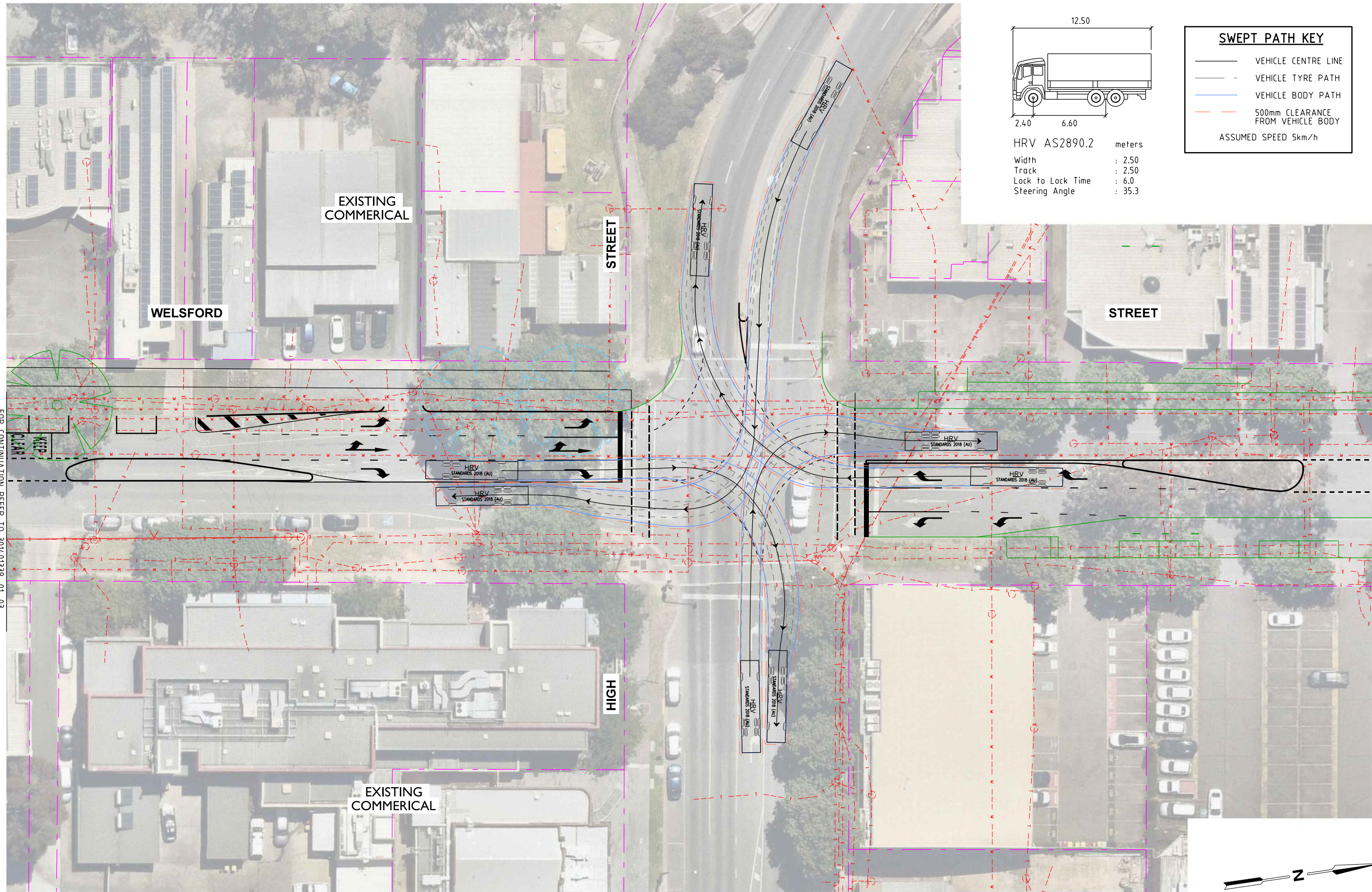


## DESIGN VEHICLE





DESIGN VEHICLE



HRV AS2890.2	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 35.3

SWEEP PATH KEY	
	VEHICLE CENTRE LINE
	VEHICLE TYRE PATH
	VEHICLE BODY PATH
	500mm CLEARANCE FROM VEHICLE BODY
ASSUMED SPEED 5km/h	

FOR CONTINUATION REFER TO 301401339\_01\_03

ON 15/06/2023 AT 5:44:37 PM  
PLOTTED BY : h Stevenson



**PRELIMINARY PLAN**  
FOR DISCUSSION PURPOSES  
ONLY SUBJECT TO CHANGE  
WITHOUT NOTIFICATION

**WARNING**  
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DESIGNED  
H. STEVENSON  
  
APPROVED BY  
A. BLACKETT

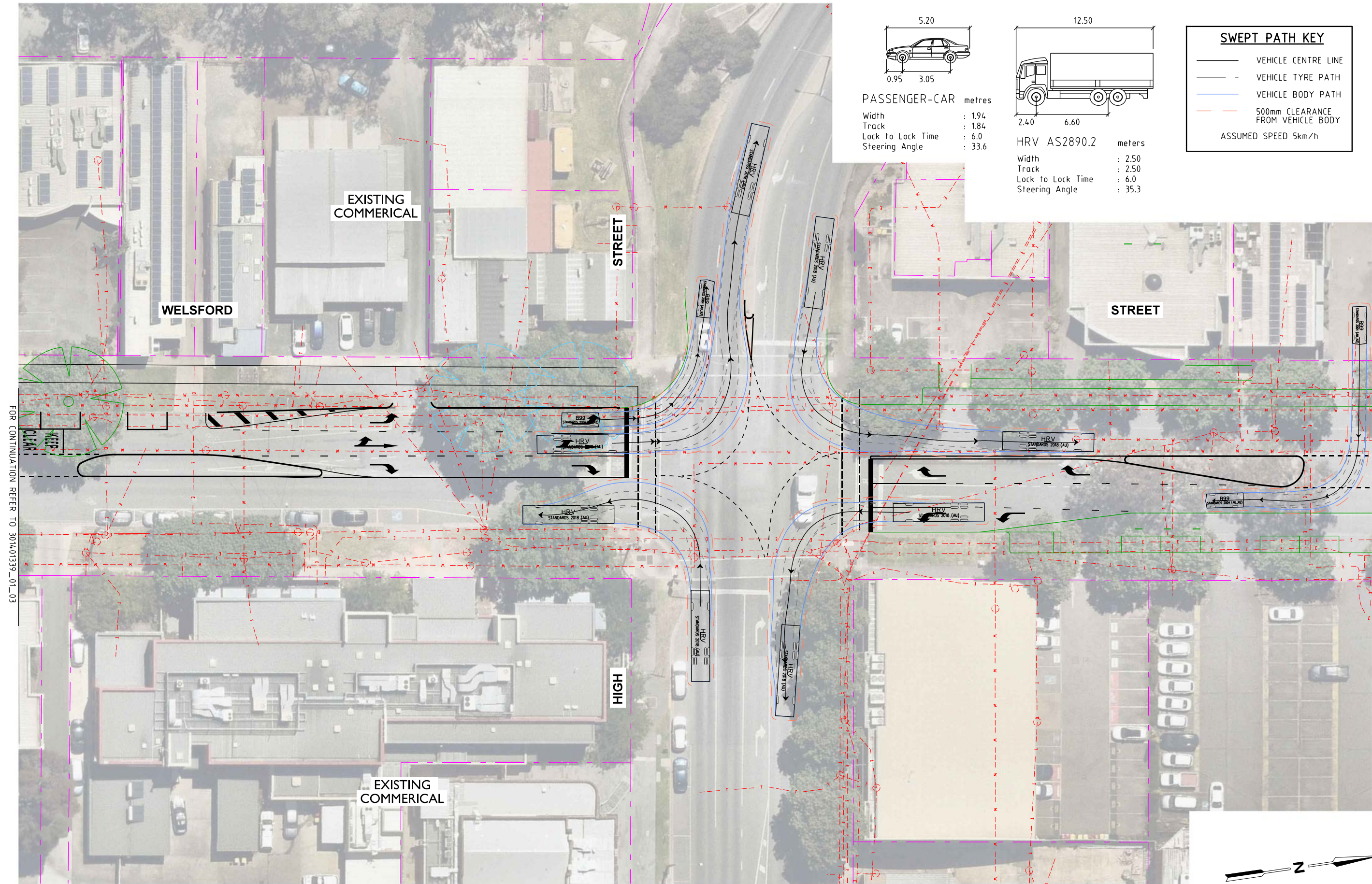
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DATE ISSUED  
15 JUNE 2023

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CAD FILE NO.  
301401339\_01\_p5.dgn

WELSFORD STREET STAGE 5 & 6  
HIGH STREET / WELSFORD STREET  
SHEPPARTON  
SWEEP PATH ASSESSMENT  
DRAWING NO. 301401339\_08  
SHEET 08 OF 09  
ISSUE P5



DESIGN VEHICLE



FOR CONTINUATION REFER TO 301401339\_01\_03

PASSENGER-CAR	metres
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.0
Steering Angle	: 33.6

HRV AS2890.2	metres
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 35.3

SWEEP PATH KEY	
	VEHICLE CENTRE LINE
	VEHICLE TYRE PATH
	VEHICLE BODY PATH
	500mm CLEARANCE FROM VEHICLE BODY
ASSUMED SPEED 5km/h	



**PRELIMINARY PLAN**  
FOR DISCUSSION PURPOSES  
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DESIGNED  
H. STEVENSON  
  
APPROVED BY  
A. BLACKETT

DESIGN CHECK  
A. DELLISOLA  
  
DATE ISSUED  
15 JUNE 2023

SCALE  
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CAD FILE NO.  
301401339\_01\_p5.dgn

WELSFORD STREET STAGE 5 & 6  
HIGH STREET / WELSFORD STREET  
SHEPPARTON  
SWEEP PATH ASSESSMENT  
DRAWING NO. 301401339\_09

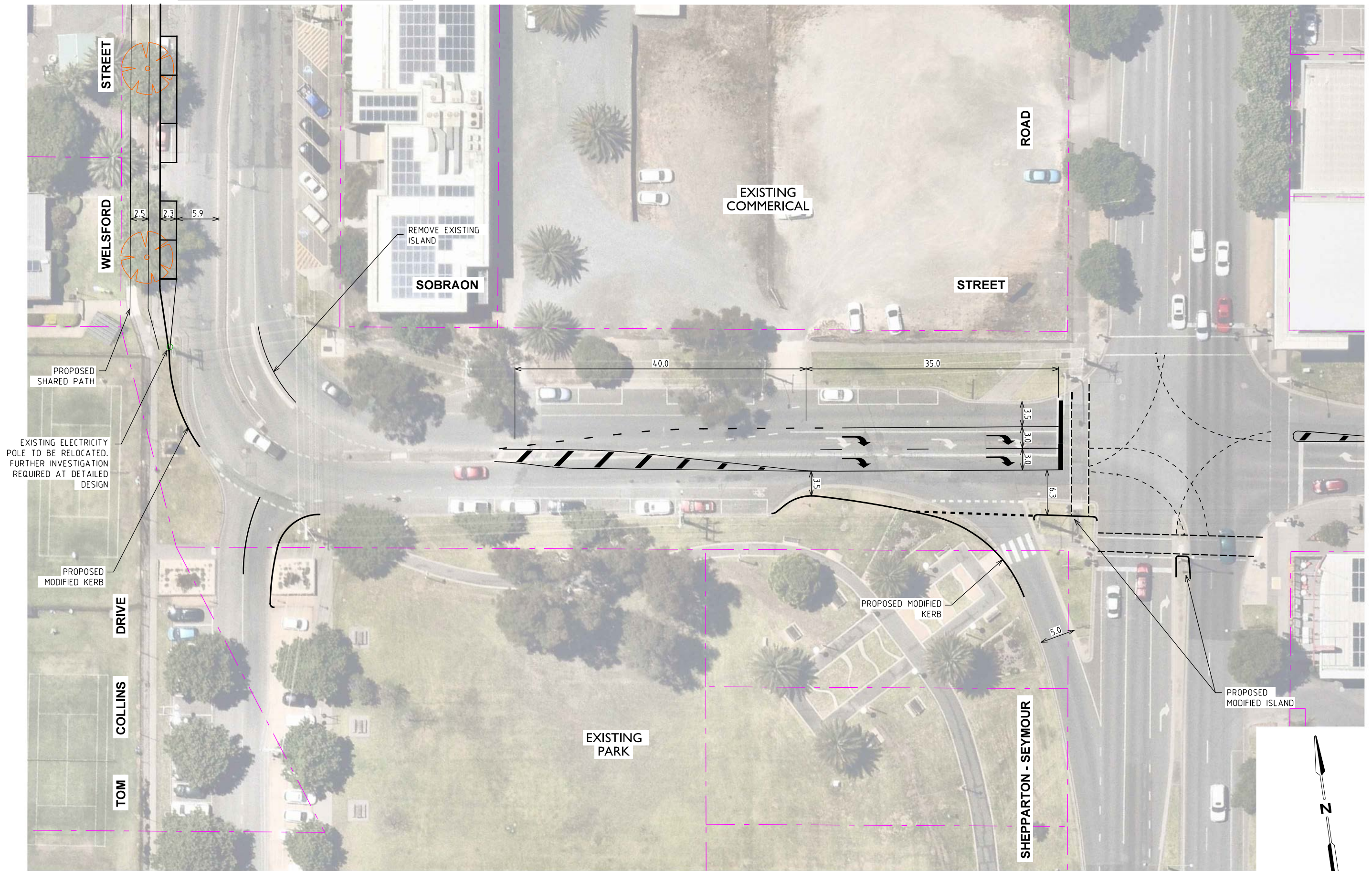
SHEET 09 OF 09

ISSUE P5



## **A2 – Concept Designs without Services**





ON 15/06/2023 AT 5:52:53 PM

PLOTTED BY : h Stevenson



**PRELIMINARY PLAN**  
FOR DISCUSSION PURPOSES  
ONLY SUBJECT TO CHANGE  
WITHOUT NOTIFICATION

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DESIGNED  
H. STEVENSON

DESIGN CHECK  
A. DELLISOLA

APPROVED BY  
A. BLACKETT

DATE ISSUED  
15 JUNE 2023

SCALE  
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1:500

CAD FILE NO.  
301401339\_01\_p5.dgn

WELSFORD STREET STAGE 5 & 6  
SOBRAON STREET / WELSFORD STREET  
SHEPPARTON  
CONCEPT LAYOUT

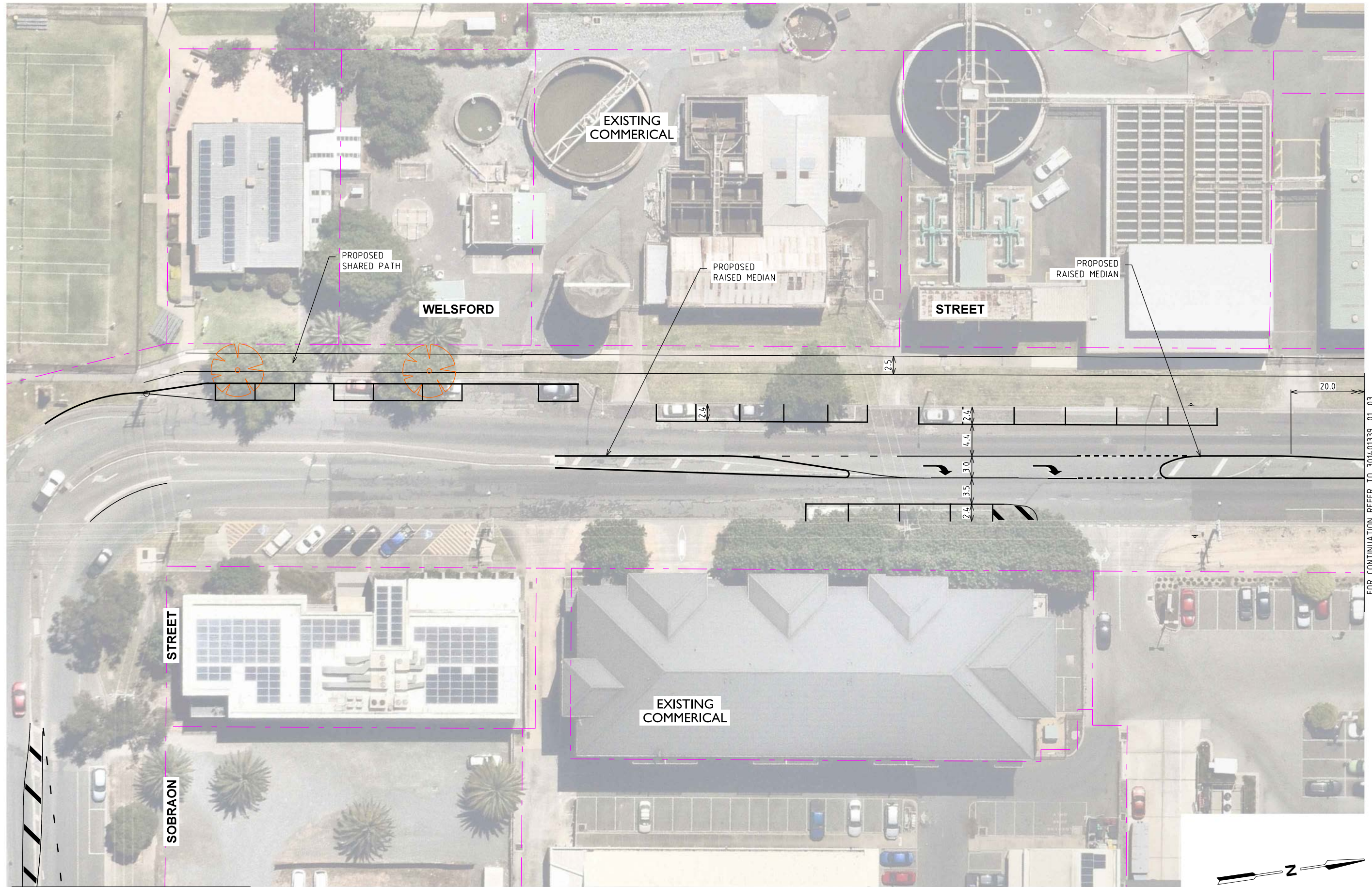
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SHEET 01 OF 09

ISSUE P5



ON 15/06/2023 AT 5:52:55 PM  
PLOTTED BY : h Stevenson



FOR CONTINUATION REFER TO 301401339\_01\_01

FOR CONTINUATION REFER TO 301401339\_01\_03



**PRELIMINARY PLAN**  
FOR DISCUSSION PURPOSES  
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DESIGNED  
H. STEVENSON

APPROVED BY  
A. BLACKETT

DESIGN CHECK  
A. DELLISOLA

DATE ISSUED  
15 JUNE 2023

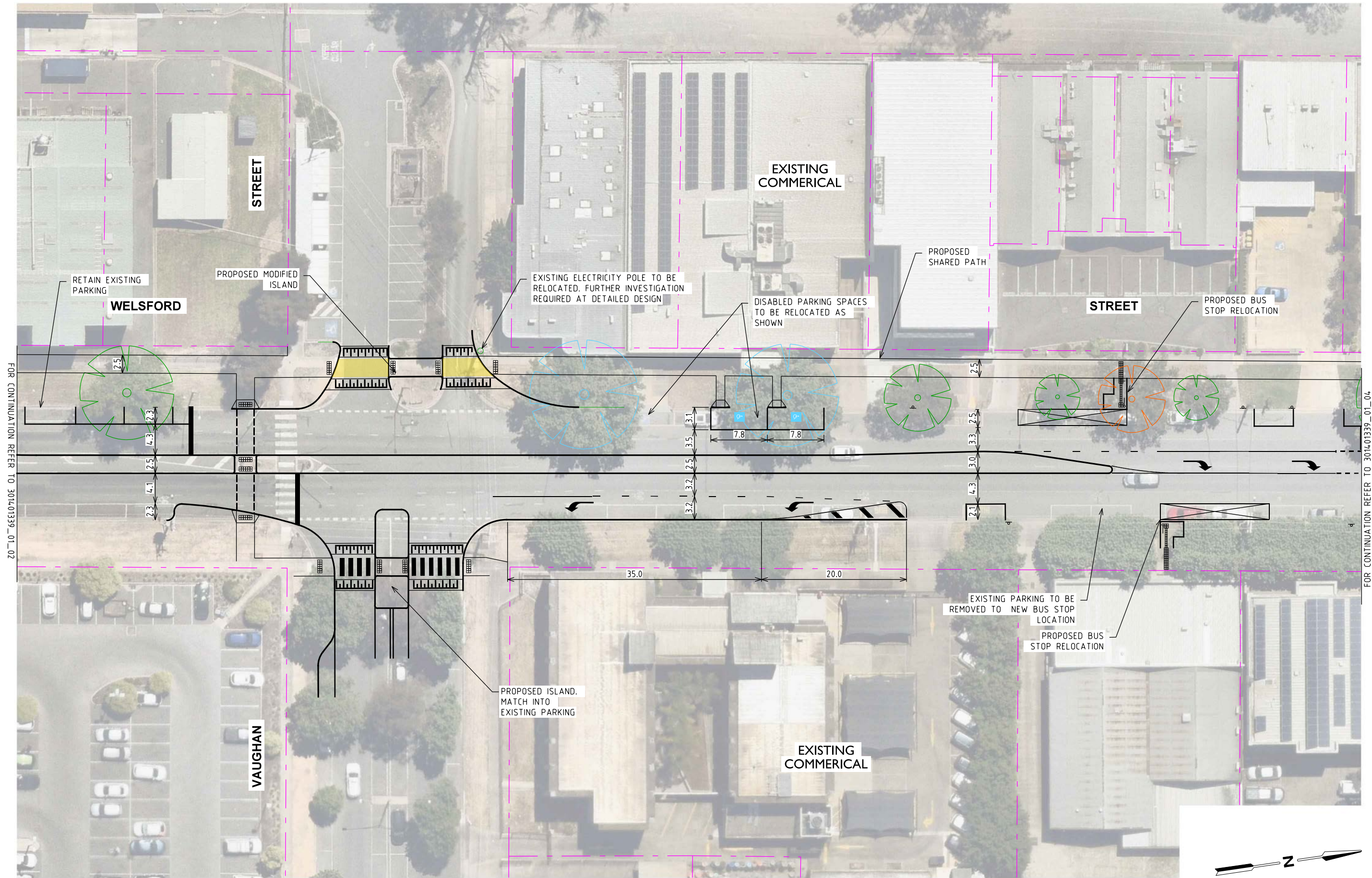
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SOBRAON STREET / WELSFORD STREET  
SHEPPARTON  
CONCEPT LAYOUT  
DRAWING NO. 301401339\_02  
SHEET 02 OF 09  
ISSUE P5



ON 15/06/2023 AT 5:52:57 PM  
PLOTTED BY : h Stevenson



FOR CONTINUATION REFER TO 301401339\_01\_02

FOR CONTINUATION REFER TO 301401339\_01\_04



**PRELIMINARY PLAN**  
FOR DISCUSSION PURPOSES  
ONLY SUBJECT TO CHANGE  
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DESIGNED  
H. STEVENSON  
  
APPROVED BY  
A. BLACKETT

DESIGN CHECK  
A. DELLISOLA  
  
DATE ISSUED  
15 JUNE 2023

SCALE  
A3  
  
CAD FILE NO.  
301401339\_01\_p5.dgn

WELS福德 STREET STAGE 5 & 6  
VAUGHAN STREET / WELS福德 STREET  
SHEPPARTON  
CONCEPT LAYOUT  
DRAWING NO. 301401339\_03

SHEET 03 OF 09  
ISSUE P5



ON 15/06/2023 AT 5:52:58 PM  
PLOTTED BY : h Stevenson



**PRELIMINARY PLAN**  
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DESIGNED  
H. STEVENSON  
  
APPROVED BY  
A. BLACKETT

DESIGN CHECK  
A. DELLISOLA  
  
DATE ISSUED  
15 JUNE 2023

SCALE  
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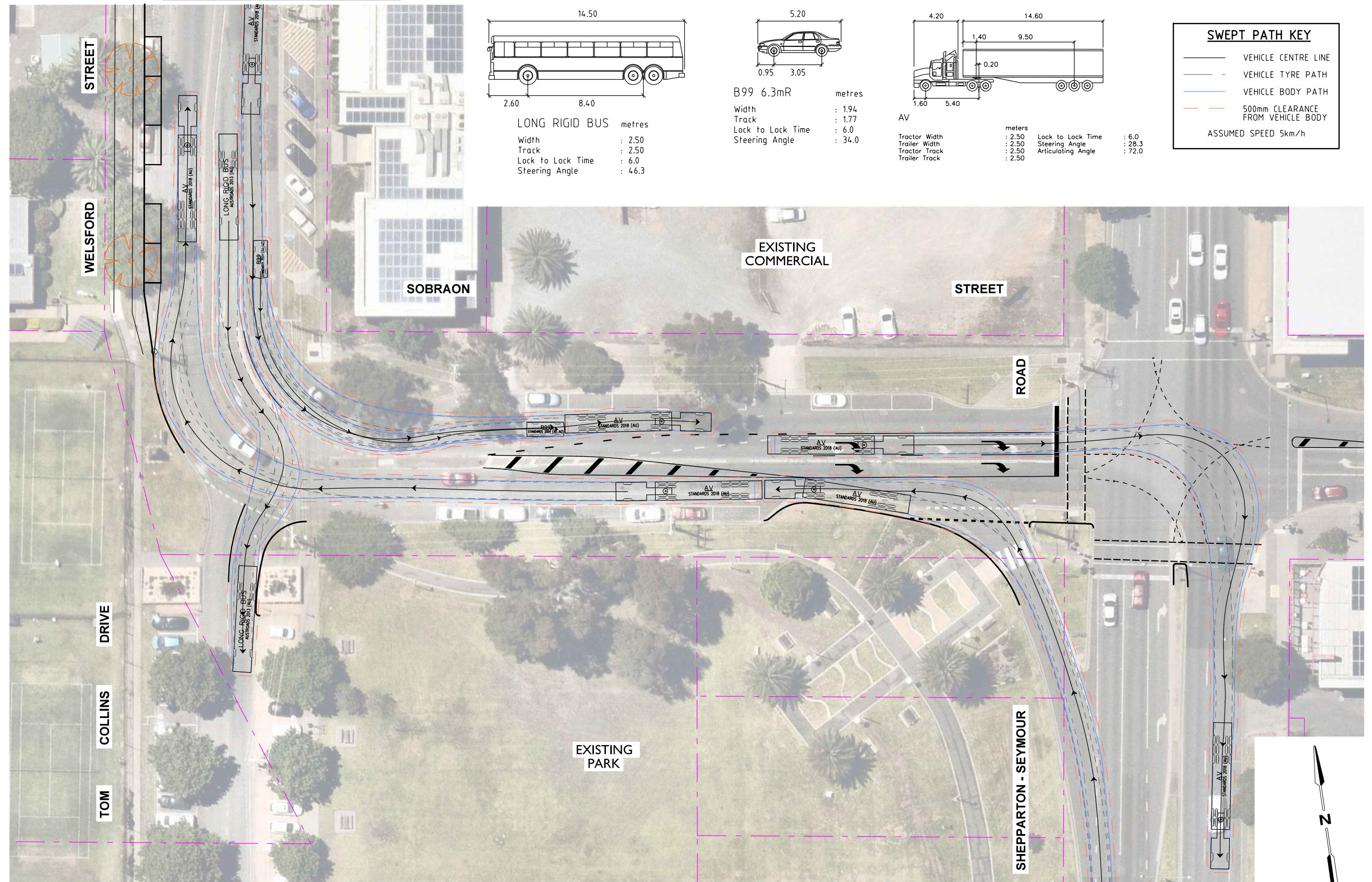
WELSFORD STREET STAGE 5 & 6  
HIGH STREET / WELSFORD STREET  
SHEPPARTON  
CONCEPT LAYOUT  
DRAWING NO. 301401339\_04

SHEET 04 OF 09  
ISSUE P5



## DESIGN VEHICLE

FOR CONTINUATION REFER TO 301401339\_01\_02



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DESIGNED  
H. STEVENSON

APPROVED BY  
A. BLACKETT

DESIGN CHECK  
A. DELLISOLA

DATE ISSUED  
15 JUNE 2023

SCALE  
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1:500

CAD FILE NO.  
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WELSFORD STREET STAGE 5 & 6  
SOBRAON STREET / WELSFORD STREET  
SHEPPARTON  
SWEEP PATH ASSESSMENT

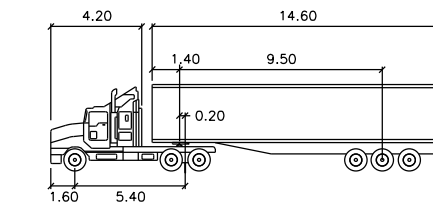
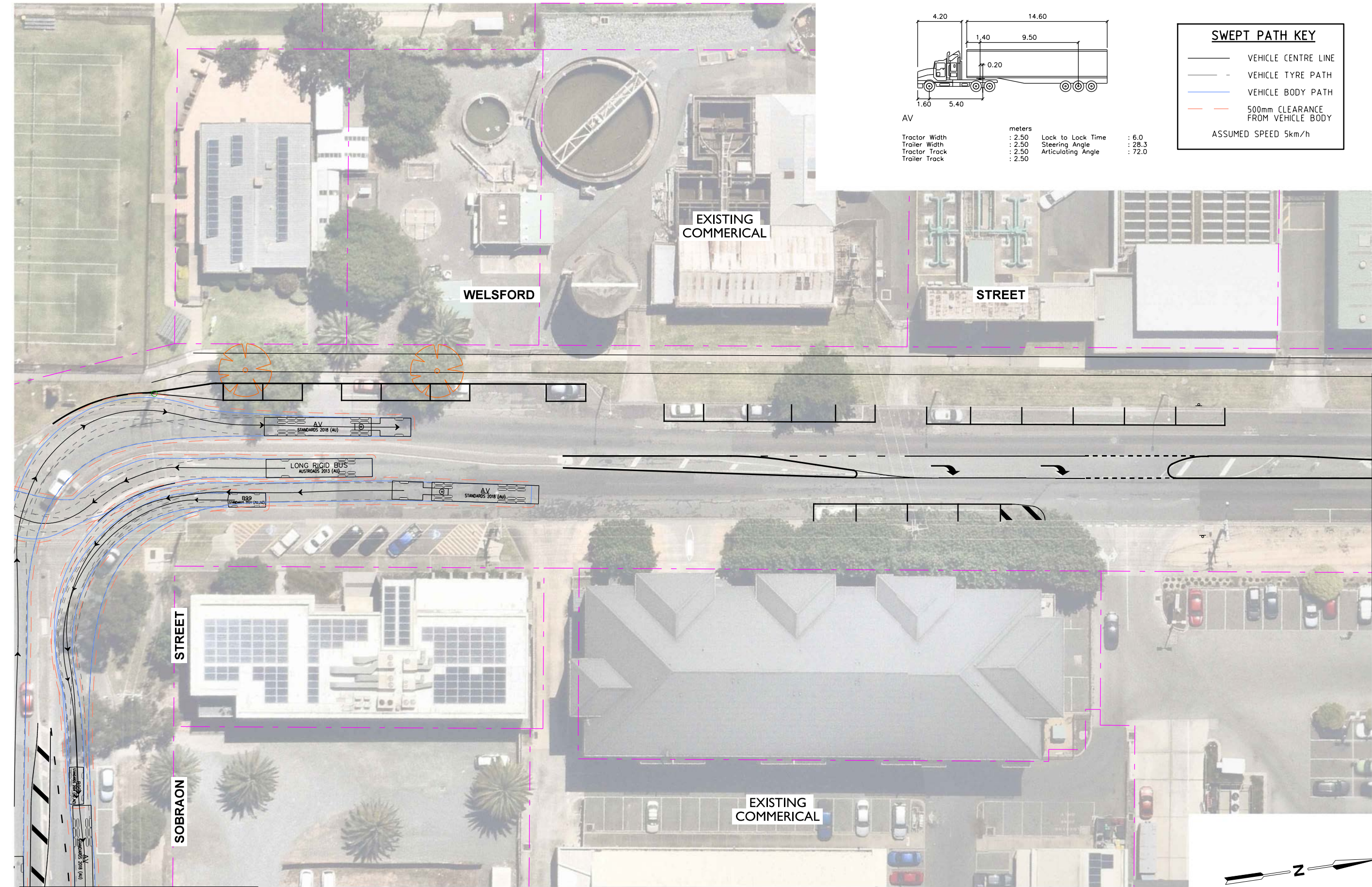
DRAWING NO. 301401339\_05

SHEET 05 OF 09

ISSUE P5



DESIGN VEHICLE



Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Tractor Track	: 2.50	Steering Angle	: 28.3
Tractor Wheelbase	: 2.50	Articulating Angle	: 72.0
Trailer Track	: 2.50		

SWEEP PATH KEY	
—	VEHICLE CENTRE LINE
- -	VEHICLE TYRE PATH
—	VEHICLE BODY PATH
—	500mm CLEARANCE FROM VEHICLE BODY
ASSUMED SPEED 5km/h	

ON 15/06/2023 AT 5:30:02 PM

PLOTTED BY : h Stevenson



**PRELIMINARY PLAN**  
FOR DISCUSSION PURPOSES  
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DESIGNED  
H. STEVENSON

DESIGN CHECK  
A. DELLISOLA

APPROVED BY  
A. BLACKETT

DATE ISSUED  
15 JUNE 2023

SCALE  
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CAD FILE NO.  
301401339\_01\_p5.dgn

WELSFORD STREET STAGE 5 & 6  
SOBRAON STREET / WELSFORD STREET  
SHEPPARTON  
SWEEP PATH ASSESSMENT

DRAWING NO. 301401339\_06

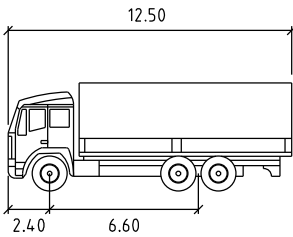
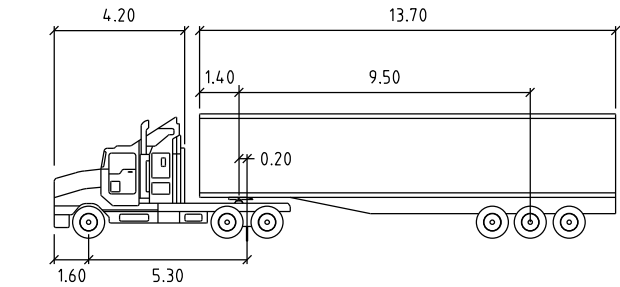
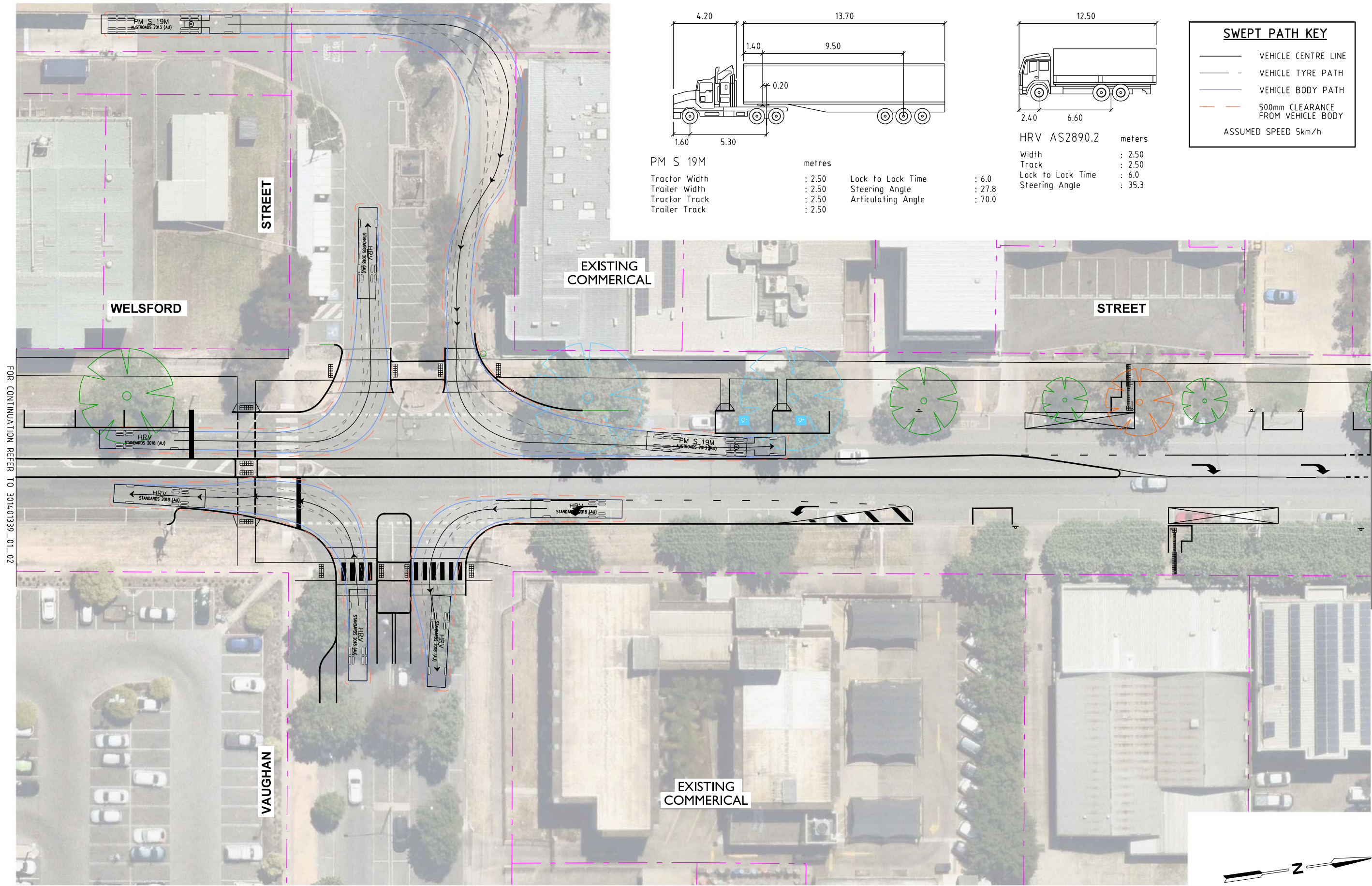
SHEET 06 OF 09

ISSUE P5

FOR CONTINUATION REFER TO 301401339\_01\_03



DESIGN VEHICLE



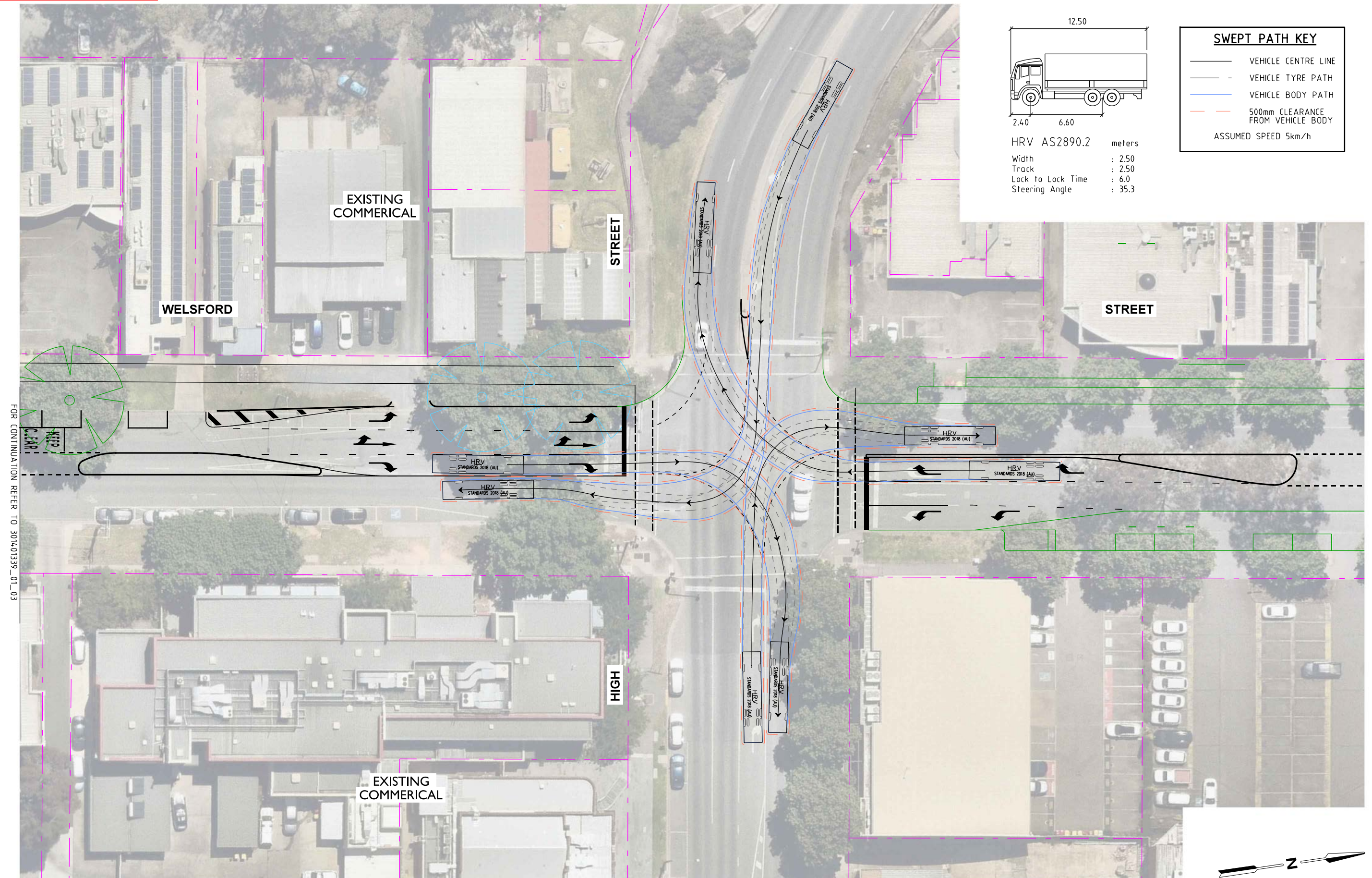
SWEPT PATH KEY	
	VEHICLE CENTRE LINE
	VEHICLE TYRE PATH
	VEHICLE BODY PATH
	500mm CLEARANCE FROM VEHICLE BODY
ASSUMED SPEED 5km/h	

PM S 19M	metres		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 27.8
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

HRV AS2890.2	metres
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 35.3

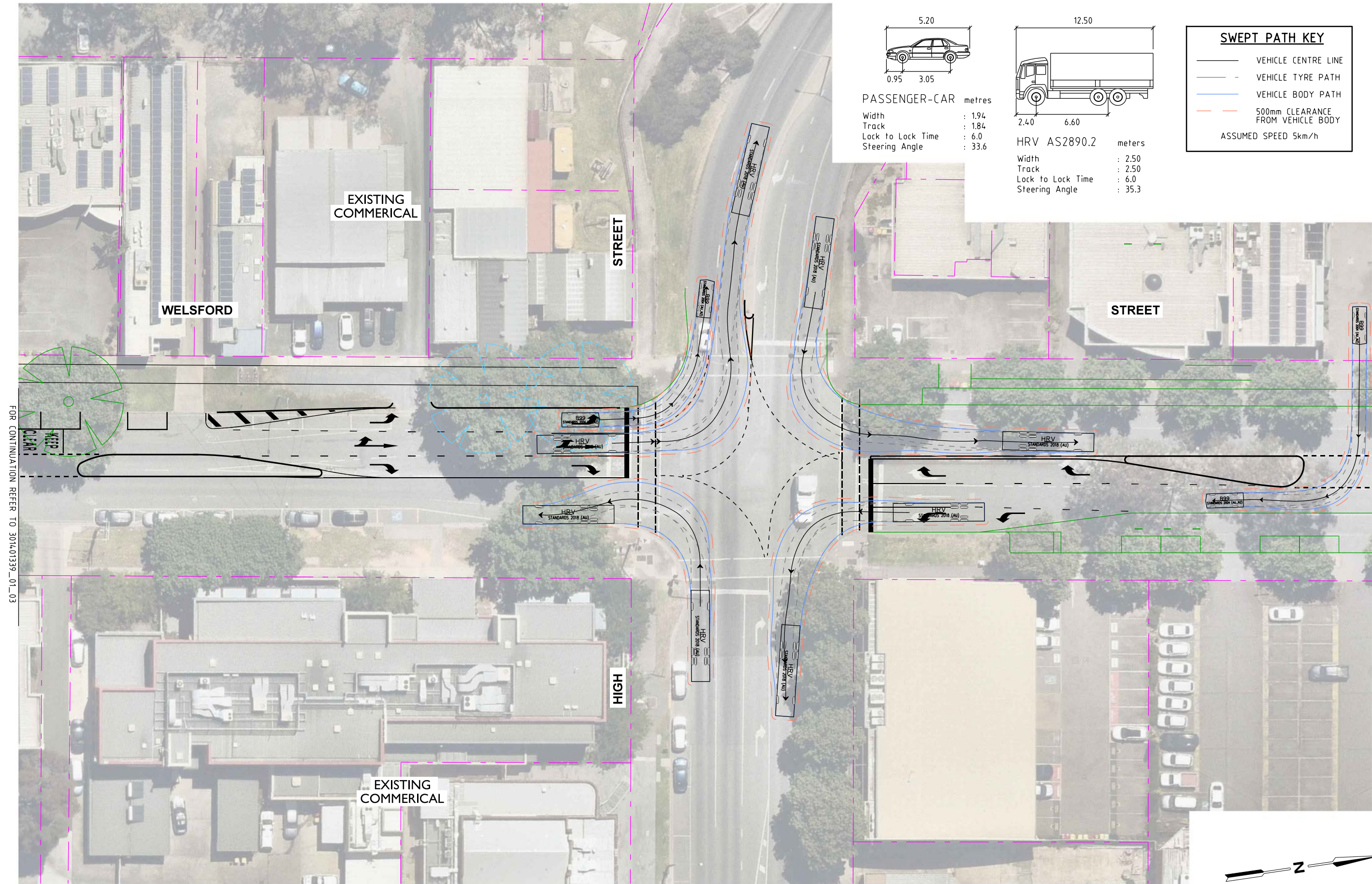


## DESIGN VEHICLE





DESIGN VEHICLE



ON 15/06/2023 AT 5:30:07 PM

PLOTTED BY : h Stevenson



**PRELIMINARY PLAN**  
FOR DISCUSSION PURPOSES  
ONLY SUBJECT TO CHANGE  
WITHOUT NOTIFICATION

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DESIGNED  
H. STEVENSON

DESIGN CHECK  
A. DELLISOLA

APPROVED BY  
A. BLACKETT

DATE ISSUED  
15 JUNE 2023

SCALE  
A3  
0 5 10  
1:500

CAD FILE NO.  
301401339\_01\_p5.dgn

WELSFORD STREET STAGE 5 & 6  
HIGH STREET / WELSFORD STREET  
SHEPPARTON  
SWEPT PATH ASSESSMENT  
DRAWING NO. 301401339\_09

SHEET 09 OF 09

ISSUE P5

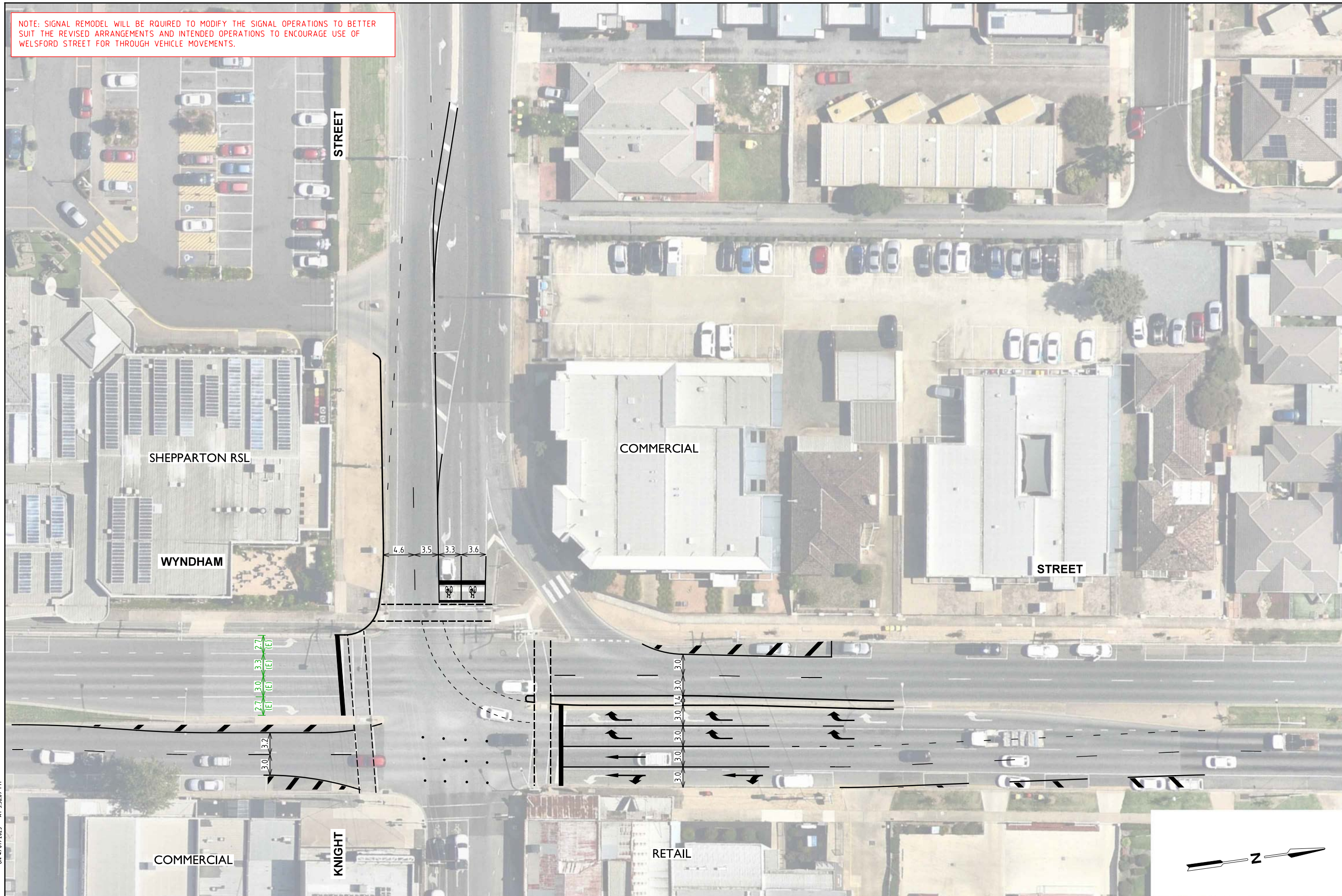


# Appendix B Wyndham Street / Knight Street Concept Design





NOTE: SIGNAL REMODEL WILL BE REQUIRED TO MODIFY THE SIGNAL OPERATIONS TO BETTER SUIT THE REVISED ARRANGEMENTS AND INTENDED OPERATIONS TO ENCOURAGE USE OF WELSFORD STREET FOR THROUGH VEHICLE MOVEMENTS.



ON 4/07/2023 AT 3:38:09 PM

PLOTTED BY : h Stevenson



**PRELIMINARY PLAN**  
FOR DISCUSSION PURPOSES  
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WITHOUT NOTIFICATION

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DESIGNED  
H. STEVENSON

DESIGN CHECK  
H. STEVENSON

APPROVED BY  
A. BLACKETT

DATE ISSUED  
4 JULY 2023

SCALE  
A3  
0 5 10  
1:500

CAD FILE NO.  
301401339\_02\_p1.dgn

WELSFORD STREET STAGE 5 & 6  
KNIGHT STREET / WYNDHAM STREET  
SHEPPARTON  
CONCEPT LAYOUT

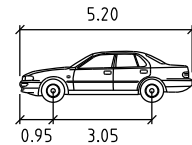
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SHEET 01 OF 02

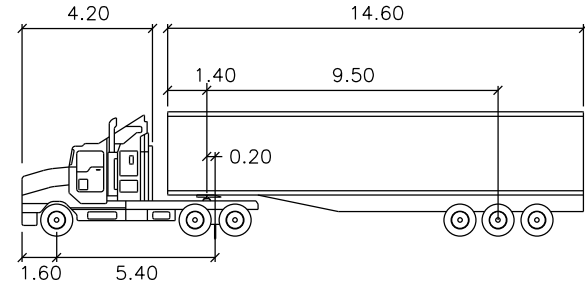
ISSUE P1



NOTE: SIGNAL REMODEL WILL BE REQUIRED TO MODIFY THE SIGNAL OPERATIONS TO BETTER SUIT THE REVISED ARRANGEMENTS AND INTENDED OPERATIONS TO ENCOURAGE USE OF WELSFORD STREET FOR THROUGH VEHICLE MOVEMENTS.



B99 6.3mR metres  
Width : 1.94  
Track : 1.77  
Lock to Lock Time : 6.0  
Steering Angle : 34.0

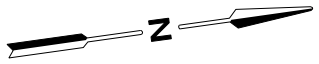
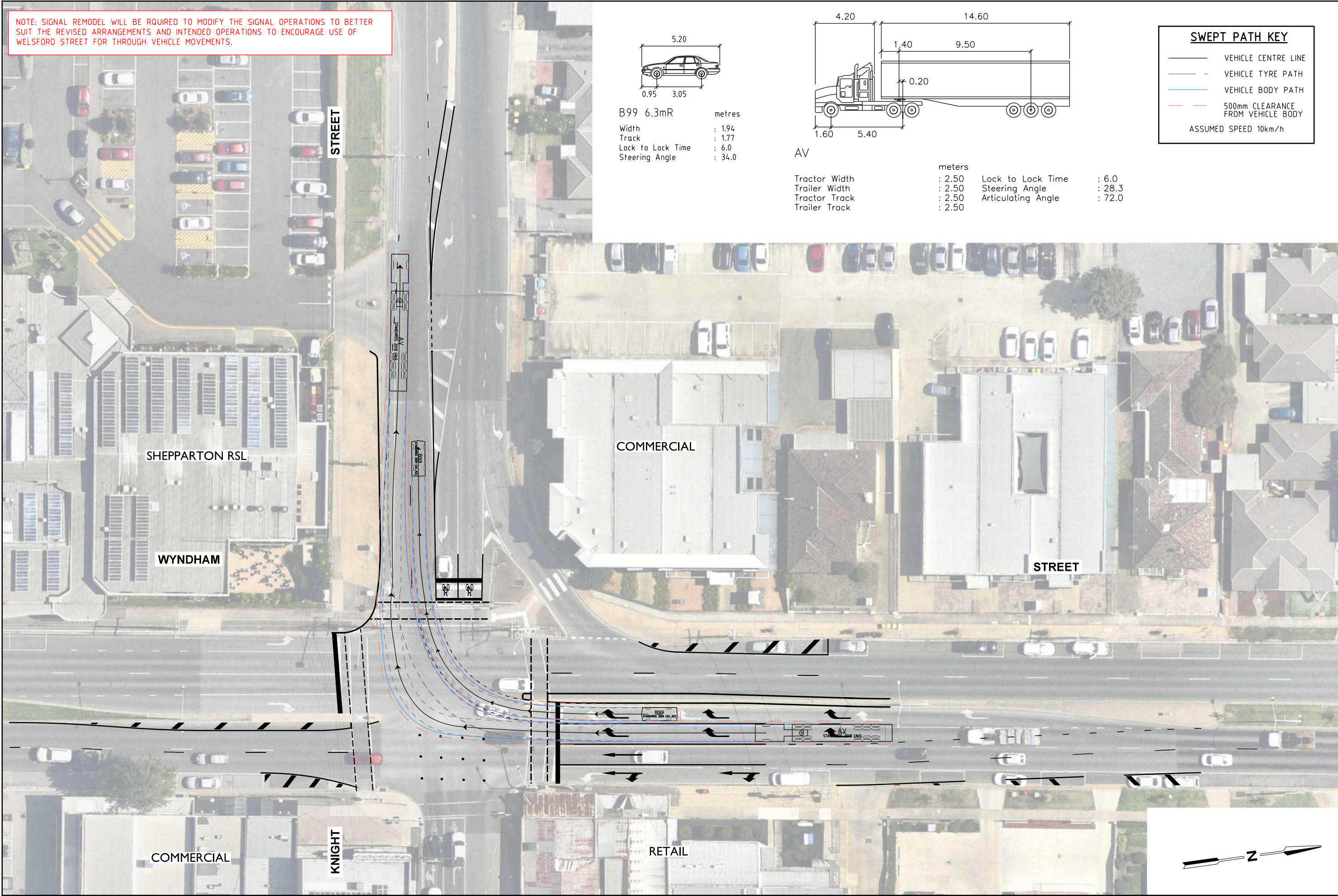


AV metres  
Tractor Width : 2.50  
Trailer Width : 2.50  
Tractor Track : 2.50  
Trailer Track : 2.50  
Lock to Lock Time : 6.0  
Steering Angle : 28.3  
Articulating Angle : 72.0

**SWEPT PATH KEY**

- VEHICLE CENTRE LINE
- - VEHICLE TYRE PATH
- VEHICLE BODY PATH
- - 500mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 10km/h



ON 4/07/2023 AT 3:38:12 PM  
PLOTTED BY : h Stevenson



**PRELIMINARY PLAN**  
FOR DISCUSSION PURPOSES  
ONLY SUBJECT TO CHANGE  
WITHOUT NOTIFICATION

**WARNING**  
BEWARE OF UNDERGROUND SERVICES  
THE LOCATIONS OF UNDERGROUND SERVICES ARE  
APPROXIMATE ONLY AND THEIR EXACT POSITION  
SHOULD BE PROVEN ON SITE. NO GUARANTEE IS  
GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

DESIGNED  
H. STEVENSON  
  
APPROVED BY  
A. BLACKETT  
  
DESIGN CHECK  
H. STEVENSON  
  
DATE ISSUED  
4 JULY 2023

SCALE  
A3  
0 5 10  
1:500  
  
CAD FILE NO.  
301401339\_02\_p1.dgn

WELSFORD STREET STAGE 5 & 6  
KNIGHT STREET / WYNDHAM STREET  
SHEPPARTON  
SWEPT PATH ASSESSMENT  
DRAWING NO. 301401339\_02\_AT01 SHEET 02 OF 02 ISSUE P1



## Appendix C     Costings





**Ref:** 21435 Welsford Street Upgrade\_Basis of estimate

30 June, 2023

Stantec  
Level 25/ 55 Collins Street  
Melbourne  
VIC 3000

Via email          alex.beckett@stantec.com

Attention          Alex Beckett

Dear Alex,

**Project Name – Welsford Street Upgrade**  
**Basis of Estimate Report – Concept Design Estimate**

Please find enclosed cost advice and assumptions.

We trust the enclosed meets with your requirements. Should you require any clarifications or further information please do not hesitate to contact us.

Yours faithfully,  
**Slattery Australia Pty Ltd**

A handwritten signature in black ink, appearing to read "Steve Rowe".

**Steve Rowe**  
Senior Associate  
SR.TS  
encl.



slattery

Welsford Street Upgrade  
Concept Design Estimate  
30<sup>th</sup> June 2023

# Welsford Street Upgrade

## Concept Design Estimate

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# Welsford Street Upgrade

## Concept Design Estimate

### 1. Executive Summary

Slattery have been engaged by Stantec to provide a concept design estimate for the proposed works at Welsford Street, Shepperton. Slattery were issued with the following documents:

- 301401339\_01\_p5 (Drawing files)
- 301401339\_01\_p5\_without services (Drawing files)

A summary of the estimated costs is shown below:

Item	Description	Total Construction Costs Inc Client Costs (exc. GST)
1.	Testing & WAE	\$36,535.00
2.	Direct construction works	\$1,872,789.00
3.	Pedestrian crossing Lights	\$125,000.00
4.	Traffic management	\$437,850.00
5.	Contractor management, Overhead and margin	\$713,508.00
	<b>Overall Project cost</b>	<b>\$3,185,682.00</b>
	<b>Contingency (25%)</b>	\$796,421.00
	<b>Overall Project cost Including contingency (Excl. GST)</b>	<b>\$3,982,103</b>

# Welsford Street Upgrade

## Concept Design Estimate

### 2. Scope of Works

We understand the works to comprise of the following:

- The upgrade of Welsford Street between Shepparton – Seymour Road intersection to High Street intersection including the approaches.
- Estimates will include:
  - Two traffic lanes in each direction,
  - A central median,
  - Intersection treatments,
  - Footpath, drainage, kerb and channel upgrades,
  - General streetscaping improvements,
  - Parking provisions and vehicle access, and
  - Retention / removal of nature strip trees.

We note that the estimate is based on concept level design documentation and is therefore indicative only of the possible order of cost. All components of the estimate will require confirmation once further documentation is available.

### 3. Contingency

The Project Budget Cost Estimate includes a contingency of 25% for resolution of design items and specifications prior to tender, as well as contracts during the construction phase.

The contingency is a deterministic assessment of the potential money needed for the project budget representing a value equivalent to a P90. The value is based upon guidance expected ranges of contingency for Infrastructure projects reflecting the level of design completed.

This contingency is intended for design development and are not for changes in scope.

### 4. Cost Escalation

The estimate is based on costs current as of June 2023. No allowance has been made for cost escalation beyond this date.

### 5. Other Development Costs

We understand other development cost will be undertaken separately as is excluded in the Project Budget Cost Estimate:

- Client Project Management Fees – Excluded
- Authority Charges & Headworks – Excluded
- Design Fees – Excluded

### 6. Property Acquisition

No allowance has been made for property acquisition.



# Welsford Street Upgrade

## Concept Design Estimate

### 7. Assumptions & Exclusions

All components have been taken off the drawing package provided (drawing reference above), in addition to these allowances for any anticipated work not currently shown in the design has been assumed and noted within this table. We note the following assumptions have been made with regards to the estimate:

Component	Inclusion/Exclusion
<b>Project Duration</b>	<ul style="list-style-type: none"><li>16 weeks (normal Working Hours)</li></ul>
<b>Contractors Overheads &amp; Margin</b>	<ul style="list-style-type: none"><li>It is anticipated a small management team will be required to deliver the project:</li><li>General Foreman, Senior Project Engineer, Site Engineer + QA/Safety Engineer and a Surveyor.</li><li>12% Profit has been applied to the estimate.</li></ul>
<b>Works as executed drawings</b>	<ul style="list-style-type: none"><li>1% of the construction costs has been allowed for within the estimate.</li></ul>
<b>Client cost</b>	<ul style="list-style-type: none"><li>10% of the total construction direct cost has been applied to capture the client cost.</li></ul>
<b>Project Accommodation</b>	<ul style="list-style-type: none"><li>An allowance for a project office has been included within the estimate.</li></ul>
<b>Traffic Control</b>	<ul style="list-style-type: none"><li>An allowance for signs, barriers, VMS, temporary traffic lights and a traffic control crew has been allowed for within the estimate to manage local and construction traffic.</li></ul>
<b>Pedestrian Crossing lights</b>	<ul style="list-style-type: none"><li>Due to level of design, an allowance for a 2-way signal has been made for intersection between Welsford street and Vaughan Street (south side) for pedestrians.</li><li>No allowance for alteration to the Traffic Lights at Midland Highway or Sobraon St intersections.</li></ul>

# Welsford Street Upgrade

## Concept Design Estimate

Component	Inclusion/Exclusion
<b>Kerbs</b>	<ul style="list-style-type: none"> <li>An allowance for a sub-contractor to form and pour kerbs to VicRoads specifications has been included within the estimate.</li> <li>We have adopted B3 Type of kerb as stated in the VIC roads standard drawing document – "<i>Standard Drawing 2001 Barrier Semi Mountable Kerb Nov 2018 (1)</i>".</li> <li>For the concrete medians we have adopted SM1 type of kerb around and infill it with concrete. Please refer to the above document for SM1 type specifications.</li> <li>Excluded cost for any traffic barriers or galvanized steel barrier.</li> <li>Production rates and productivity has been assumed based on benchmark of previous similar projects.</li> </ul>
<b>Drainage</b>	<ul style="list-style-type: none"> <li>A new network of pavement drainage (subsoils and outlets) has been priced in accordance with the drawings where there is new Kerbs.</li> <li>Based on assumed standard details for pavement trench drains and connection to the existing storm water drainage system.</li> <li>Existing drainage pipes have been removed where existing Kerbs have been removed.</li> <li>We have allowed for demolition of kerb gully and associated drainage pipe under demolition cost.</li> <li>We have allowed for modification of existing pit to suit the new pavement alignment at Vaughan Street.</li> <li>We have estimated for 3 new kerb gully traps which replace existing due to new kerb alignment.</li> <li>No allowance for intra pavement drains</li> <li>Production rates and productivity has been assumed based on benchmark of previous similar projects.</li> </ul>
<b>Earthworks</b>	<ul style="list-style-type: none"> <li>No allowance has been made for any special contamination disposal costs.</li> <li>The estimate allows for general foundation treatments i.e., loosen and recompact existing ground.</li> <li>Production rates and productivity have been assumed based on benchmark of previous similar projects.</li> <li>We have allowed for clear and grub for areas where the kerb is redesigned.</li> </ul>



# Welsford Street Upgrade

## Concept Design Estimate

Component	Inclusion/Exclusion
<b>Pavement</b>	<ul style="list-style-type: none"> <li>We have only allowed 40mm milling to the existing pavement profile.</li> <li>For existing raised medians which required to be redesigned, we have allowed for asphalt cut/demolish.</li> <li>For new raised medians we have allowed for cutting/demolishing existing asphalt.</li> <li>For wombat crossing between the intersection of Welsford street and Vaughan Street we have allowed the central part to be made with asphalt with depth matching the kerb height and the slope on either end is made with concrete.</li> <li>Production rates and productivity have been assumed based on benchmark of previous similar projects.</li> <li>We have allowed for new asphalt wearing course layer 40mm thick for the measured milling area.</li> <li>No allowance has been made for the corrective course.</li> <li>For pavement widening we has assumed the following pavement profile –               <ul style="list-style-type: none"> <li>65mm tk 20mm Type SS (C600) Asphalt</li> <li>70mm tk 20mm Type SS (C600) Asphalt</li> <li>75mm tk 20mm Type SS (C600) Asphalt</li> <li>150mm tk Class 4 crushed Rock</li> </ul> </li> </ul>
<b>Signposting</b>	<ul style="list-style-type: none"> <li>An allowance for replacement of small sized signs to be supplied and installed is included within the estimate (galvanized steel post and small sign face), for the ones which are affected due to kerb or median demolition.</li> <li>We have allowed for new Bus stop signage based on new location in the estimate.</li> </ul>
<b>Line Marking &amp; Furniture</b>	<ul style="list-style-type: none"> <li>No allowance made for raised pavement markers.</li> <li>We have estimated for new line marking as shown on drawings and to replace all existing line marking.</li> <li>We have not allowed for any furniture.</li> </ul>
<b>Lighting</b>	<ul style="list-style-type: none"> <li>No new lighting poles have been allowed for the estimate.</li> <li>No modification to existing lighting poles has been allowed in the estimate.</li> </ul>

# Welsford Street Upgrade

## Concept Design Estimate

Component	Inclusion/Exclusion
<b>Concrete Paving</b>	<ul style="list-style-type: none"><li>The estimate allows to replace the existing concrete footpath behind the new kerb with a 2.5m wide concrete footpath.</li><li>Allowed for concrete paving based on standard VIC drawings for bus stop. Found on website – <a href="https://www.vicroads.vic.gov.au/business-and-industry/technical-publications/standard-drawings-for-bus-stops- Doc number STD_S0064">https://www.vicroads.vic.gov.au/business-and-industry/technical-publications/standard-drawings-for-bus-stops- Doc number STD_S0064</a></li><li>Production rates and productivity has been assumed based on benchmark of previous similar projects.</li></ul>
<b>Landscaping</b>	<ul style="list-style-type: none"><li>Allowed for removal of 4 large Trees with crew.</li><li>Allowed for 1.5m wide turfing in area between the new concrete shared pavement and road pavement.</li><li>Allowed for 1.5m wide turfing where new kerb is constructed.</li></ul>
<b>Utilities</b>	<ul style="list-style-type: none"><li>We have allowed for relocation of 2 electricity poles as shown on the drawings.</li><li>No allowance for relocation of other utility services.</li></ul>

### 8. Client Cost

We have made provisional allowance of 10% to the construction cost to capture client-related cost. This equates to \$310,538.00

### 9. Clarifications

Costs assume that the project will be competitively tendered to a select list of appropriate and interested contractors.

The estimate assumes that a structured cost planning / value engineering process will be followed throughout the design process and that the project will be appropriately documented prior to tender.

### 10. Main Risk Areas

The main risk areas associated with cost are:

- Scope creep



# Welsford Street Upgrade

## Concept Design Estimate

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- Abnormal site conditions
- Alternative procurement options
- Supply chain distribution
- Trade market escalation
- Site access and buildability
- Traffic Management
- Exclusions (as noted above)

### **11. Purpose of this Document**

Please note, this is a Project Cost Estimate for project purposes and is not intended, and should not be used in any format, as a tender document. The item descriptions and quantities are not intended for the use by others.

### **12. Limitations**

The conclusions presented herein are based on the information made available to us during the current design phase and may be subject to change should the information upon which they are based is determined to be false, inaccurate, or incomplete.

The purpose and contents of this document are intended solely for the recipient. If you are not the intended recipient, you are hereby notified that you must not disseminate, copy, or take any action in reliance on it.

### **13. Appendices**

- Appendix A – Cost Plans Summary breakdown
- Appendix B – Queries (RFI)

# Welsford Street Upgrade

## Concept Design Estimate

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### Appendix A



	Description	Qty	Unit	Rate	Total (\$)	
A	PRECONSTRUCTION AND CONSTRUCTION WORKS					
A1	CONTRACTOR MANAGEMENT					
A1.1	Site Establishment & Dis-establishment	1	Item	\$421,232	\$ 421,232	
A2	CONTRACTOR'S OFFSITE OVERHEAD & MARGIN					
A2.1	Contractors Off-site overhead and margins @12%	1	Item	\$292,277	\$ 292,277	
D1	TESTING & WAE					
D1.1	Prepare & Maintain Quality System	1	Item	\$24,356	\$ 24,356	
D1.2	Work as Executed Drawings	1	Item	\$12,178	\$ 12,178	
D2	SITE PREPARATION					
D2.1	Building Condition Inspections - Commercial	20	no	\$450	\$ 9,000	
D2.2	Demolish Existing Concrete Medians	170	m2	\$204	\$ 34,746	
D2.3	Demolish Existing Concrete kerbs	357	m	\$155	\$ 55,296	
D2.4	Remove Existing Drainage Pipes	357	m	\$170	\$ 60,772	
D2.5	Demolish Existing Concrete Pavement - Shared Path	990	m2	\$91	\$ 90,229	
D3	UTILITY SERVICE RELOCATIONS					
D3.1	Electricity pole (relocation of existing)	2	Item	\$50,000	\$ 50,000	
D4	TRAFFIC MANAGEMENT					
D4.1	Provision for Traffic Control	1	Item	\$437,850	\$ 437,850	
D5	EARTHWORKS					
D5.1	Clearing & Grubbing	430	m2	\$68	\$ 29,167	
D5.2	Foundation Treatment (Loosen and Recompact)	1,861	m2	\$3	\$ 6,086	
D5.3	Demolition of Existing Pavements - Cut to waste (place "off site")	1,169	m2	\$72	\$ 83,869	
D5.4	Import Recycled Road Base	70	m3	\$89	\$ 6,230	
D5.5	Base Course; Class 3 F.C.R Bedding compacted to 97% modified	140	m3	\$159	\$ 22,235	
D5.6	Disposal of non contmainated spoil	642	m3	\$70	\$ 44,940	
D6	DRAINAGE WORKS					
D6.1	Excavation for Subsurface drains	50	m3	\$91	\$ 4,565	
D6.2	Supply & Install Subsurface Drains (Fabric around trench) Type 2	370	m	\$74	\$ 27,258	
D6.3	100 mm Dia Corrugated Non-Perforated Plastic Drainage Pipe	40	m	\$81	\$ 3,237	
D6.4	Modifying Existing stormwater Pit to Suit New Pavement Alignment and Design FSL	2	Item	\$6,000	\$ 6,000	
D6.5	Excavation for Other Drainage Structures - Kerb Gully Inlet	41	m3	\$35	\$ 1,426	
D6.6	Pit with 1800 extended kerb inlet	3	each	\$3,813	\$ 11,440	
D6.7	Drainage Connection	1	Item	\$5,000	\$ 5,000	
D7	PAVEMENT CONSTRUCTION					
D7.1	Milling to Specified Depth of Cut - Nominal 60mm Deep (Item with a provisional quantity)	13,266	m2	\$20	\$ 265,320	
D7.2	Asphalt - Supply & Place Intermediate Asphalt Layer - 1	430	m2	\$46	\$ 19,642	
D7.3	Asphalt - Supply & Place Intermediate Asphalt Layer - 2	430	m2	\$49	\$ 21,087	
D7.4	Asphalt - Supply & Place Base Asphalt Layer	430	m2	\$52	\$ 22,532	
D7.5	Heavy Duty Dense Asphalt In Wearing Course - 14 mm Nominal Size, 40 mm thick	13,775	m2	\$32	\$ 447,535	
D7.6	Supply and Spray Binder - Class 170 Bitumen (Including Adhesion Agent where required and Preparation of Surface)	468	L	\$2	\$ 936	
D8	STRUCTURES & CONCRETE WORKS					
D8.1	Kerb - Type B3 Barrier Kerb	370	m	\$137	\$ 50,681	
D8.2	Shared Footpath - Concrete Paving (125mm depth with Bedding)	1,394	m2	\$170	\$ 237,625	
D8.3	Concrete Raised medians - Type SM1 with infill concrete	748	m2	\$177	\$ 132,525	
D8.4	Wombat crossing - Concrete Paving (250mm depth)	42	m2	\$217	\$ 9,102	
D8.5	Supply and Fix Tactile indicators	20	m2	\$75	\$ 1,500	
D8.6	Supply and Fixing pram crossing	6	each	\$1,500	\$ 9,000	
D8.7	Bus Stop - Concrete paving (125mm)	20	m2	\$170	\$ 3,396	
D9	CROSSING SIGNALS					
D9.1	Pedestrian crossing lights	1	Item	\$125,000	\$ 125,000	
D10	SIGNAGE, LINEMARKING, ROAD FURNITURE					
D10.1	Longitudinal Lines / Transvers	1	m	\$16,800	\$ 16,800	
D10.2	Transverse Lines	1	item	\$18,850	\$ 18,850	
D10.3	Remove Existing Signs - Speed and pedestrains signs	1	Item	\$2,200	\$ 2,200	
D10.4	Small Sign - Speed and pedestrains signs	10	each	\$550	\$ 5,500	
D10.5	Large Sign - Bus stop	2	each	\$3,500	\$ 7,000	
D11	LANDSCAPING WORKS					
D11.1	Landscaping	1	Item	\$50,064	\$ 50,064	
Total Construction Costs					\$ 3,185,681	
Allowance for 10% client costs		1	LS	\$318,568	\$ 318,568	
Total Construction Costs + Client Costs					\$ 3,504,250	

# Welsford Street Upgrade

## Concept Design Estimate

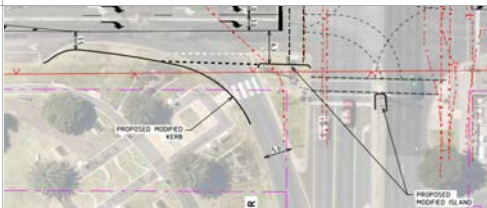
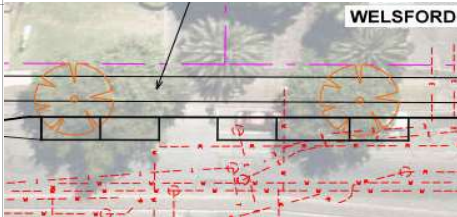

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### Appendix B



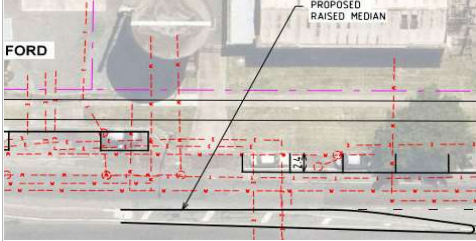



# Query Sheet

<b>Project No:</b>	<b>Welsford street</b>
<b>Project Name:</b>	<b>Shepparton council</b>
<b>Project Phase:</b>	<b>Concept</b>
<b>Date of estimate</b>	<b>Jun/2023</b>

s.no.	Questions / Clarification	Details	Response
1	Please confirm our assumption, if all new kerbs is to be replaced with the existing kerb profile? If not, can we please be provided with more details on type of kerbs for sections where there is modified kerb, new kerb or New island.		Existing kerb types appropriate to use.
2	Please advise, we have assumed to mill and resurface entire section scope of works.		Definitely resurface where the traffic lanes and associated linemarkings are being modified, but if only linemarking changes occurring to parking spaces, then okay to blackout and remark.
3	For the proposed widening and realignment of shared path running along with welsford street, we have allowed for removal of trees @ 3nos.		We are waiting on advise from an arborist about the trees, but intent is to try and retain them - modify path design and adopt construction methods to try retain trees.
4	Please confirm, Is the proposed methodology for new shared path to demo existing and lay new shared path?  We have assumed yes		Yes, remove existing path
5	Between the intersection of Sobraon and Seymour street, for the modified kerb, there is a drainage gully (see image) do we need to relocate this or decommission?  We have assumed this to be relocate and decommission existing.		Yes

# Query Sheet


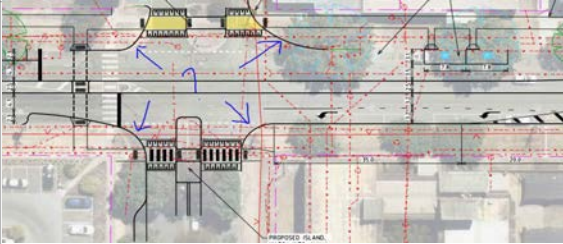
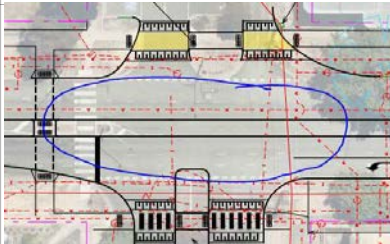

Project No:	Welsford street
Project Name:	Shepparton council
Project Phase:	Concept
Date of estimate	Jun/2023

s.no.	Questions / Clarification	Details	Response
6	We have assumed to demolish a small section of existing to tie in with the new island/median.		Yes
7	Can you please confirm, We have assumed to remove this kerb and reinstate the asphalt underneath it.		Yes
8	Do we need to allow for new road signs or re use the existing road signs? *wherever applicable  we have assumed to allow for new signages		New signs
9	Do we need to allow for new turfing near pram crossings ?  We have assumed yes		Yes



# Query Sheet

Project No:	Welsford street
Project Name:	Shepparton council
Project Phase:	Concept
Date of estimate	Jun/2023

s.no.	Questions / Clarification	Details	Response
10	<p>The existing kerb and pram crossings near the intersection of welsford street and vaughan street needs to be completely removed?</p> <p>We have assumed yes</p>		Yes
11	<p>Please confirm if this crossing shown is a signalised crossing or not? Our assumption is that it is a signalised pedestrian crossing.</p>		<p>The crossing on the southern approach will be signalised. Eastern is a raised zebra crossing (with flashing lights). Western is a raised give-way priority crossing (no signals).</p>
12	<p>The extent of proposed raised median on welsford street crosses over the intersection of Vaughan street. Is this correct?</p> <p>We have assumed that this is a raised median all the way through.</p>		Yes, Vaughn Street will be left-in / left-out only. Median is raised.
13	<p>Please advise, what is the proposed methodology for drainage where new traffic island needs to be provided at the intersection of vaughan and welsford street?</p> <p>We have assumed this to be decommissioned and allowed over the new island.</p>		Yes, new raised pit and lid level to match raised median.

# Query Sheet

<b>Project No:</b>	<b>Welsford street</b>
<b>Project Name:</b>	<b>Shepparton council</b>
<b>Project Phase:</b>	<b>Concept</b>
<b>Date of estimate</b>	<b>Jun/2023</b>

s.no.	Questions / Clarification	Details	Response
14	<p>Please advise, Is this new proposed median to be cut back and construct new proposed design? @High street and welsford street intersection</p> <p>we have assumed yes</p>		<p>Yes. Cut back to suport vehcile movements</p>
15	<p>Can we please be advised on the duration of works? We assume this to be at least 12-16 weeks program with heavy traffic management and no road closures or diversions.</p>		<p>Seems reasonable and consistent with previous stages of works along Welsford Street -  <a href="https://greater-shepparton.com.au/council/major-projects/welsford-street-redevelopment">https://greater-shepparton.com.au/council/major-projects/welsford-street-redevelopment</a></p>



# CREATING COMMUNITIES

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Communities are fundamental. Whether around the corner or across the globe, they provide a foundation, a sense of belonging. That's why at Stantec, we always **design with community in mind**.

We care about the communities we serve—because they're our communities too. We're designers, engineers, scientists, and project managers, innovating together at the intersection of community, creativity, and client relationships. Balancing these priorities results in projects that advance the quality of life in communities across the globe.

**Australian offices:**

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