

Elsternwick Structure Plan Transport Study

29 June 2023

ratio:transport



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Version	Date	Reason for Issue	Prepare By	Check By
D01	6 April 2022	Draft for Client Review	K Harker	B Krastins
F01	10 May 2022	Final	K Harker	B Krastins
F02	1 September 2022	Updated Final	H Jorgensen	B Krastins
F03	29 June 2023	Updated Final (Post Exhibition)	K Harker	B Krastins

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Executive Summary:

Introduction

Ratio Consultants was engaged by Glen Eira City Council (GECC) to undertake a Transport Study as part of the preparation of the revised Elsternwick Structure Plan.

The Transport Study provides the following outputs:

- A review of the background and strategic context, existing conditions and establishment of transport related issues, opportunities and constraints; and
- A logical and defensible evidence base, documenting the analysis, findings and recommendations.

The Elsternwick Structure Plan will be a land use plan that sets a long-term vision for how the Activity Center will develop. These plans outline what changes are expected in terms of (but not limited to) land use and development, transport and parking, building and urban design, heritage and character, employment, open spaces, and infrastructure provision.

Aiding in forming the basis for the Elsternwick Structure plan, the Transport Study has a strong focus on ensuring that 'traffic' is not the driver behind the built form for Elsternwick, but rather understanding how transport will play a supporting role to ensure integrated outcomes and achieving the overall vision for the Activity Centre.

Overarching Transport Vision

The overarching vision for transport within the Activity Centre has been set out within the Glen Eira Integrated Transport Strategy (ITS) where a number of key objectives and actions will aid in achieving the overarching transport goal: **'Strive for a 50:50 Mode Share of Car and Non-Car Trips by 2031'**.

This goal, along with a plethora of state and local government initiatives have been considered or incorporated into the Transport Study assumptions and recommendations in order to provide a focus on sustainable and livable transport outcomes and facilitate network wide efficiency and access for all.

In conjunction with the detailed investigation into policy and design frameworks, an extensive background review was conducted to identify the key issues, opportunities and concerns associated with the Transport Study Area. Here, transport modes associated with the Elsternwick Activity Centre, along with the car parking and existing road and laneway network were reviewed, with potential improvements and initiatives identified to assist in achieving the overarching vision.

Future Development and Trip Generation Assumptions

Future demographic and land use information was provided by Council for the Activity Centre which was utilised to inform what the future transport demand within the Activity Centre could be, and the transport networks, infrastructure and policy considerations required to support them.

The key input into establishing future transport demands were land use assumptions for the year 2036, which included a range of residential dwellings, commercial and retail floor space changes. The information and data provided by Council related primarily to the Built Form Framework (BFF) area. The BFF was used to establish access and street design considerations.

As part of the assessment into transport implications of the BFF and land use assumptions, it was assumed that all additional future trips generated within the Transport Study area would occur with a modal share of 50% private vehicle trips vs 50% sustainable transport modes.

The study into the traffic generation and associated impacts did not consider any changes to mode share for existing users or land uses which are expected to occur with improvements to sustainable transport. Furthermore, future dwelling types are more likely to be higher density and with either lower rates or no vehicle ownership. In this regard, the modal trip generation and traffic assessment could be considered as being somewhat conservative, with higher traffic generation assumed than what could be expected in reality.

Proposed Network Arrangements and Interventions

The development of the Activity Centre will require an integrated multi-modal approach to land use and transport planning. In this regard, and considering the findings of the transport assessment, the network and infrastructure requirements for active transport, public transport and motor vehicles have been developed.

Recommendations for each transport mode have been developed and detailed as part of the report, with key findings shown in Figures E.1 to E.5 respectively.

Figure E.1: Potential Location of Intersection and Road Network Interventions



Figure E.2: Recommended Future Laneway Network and Improvements

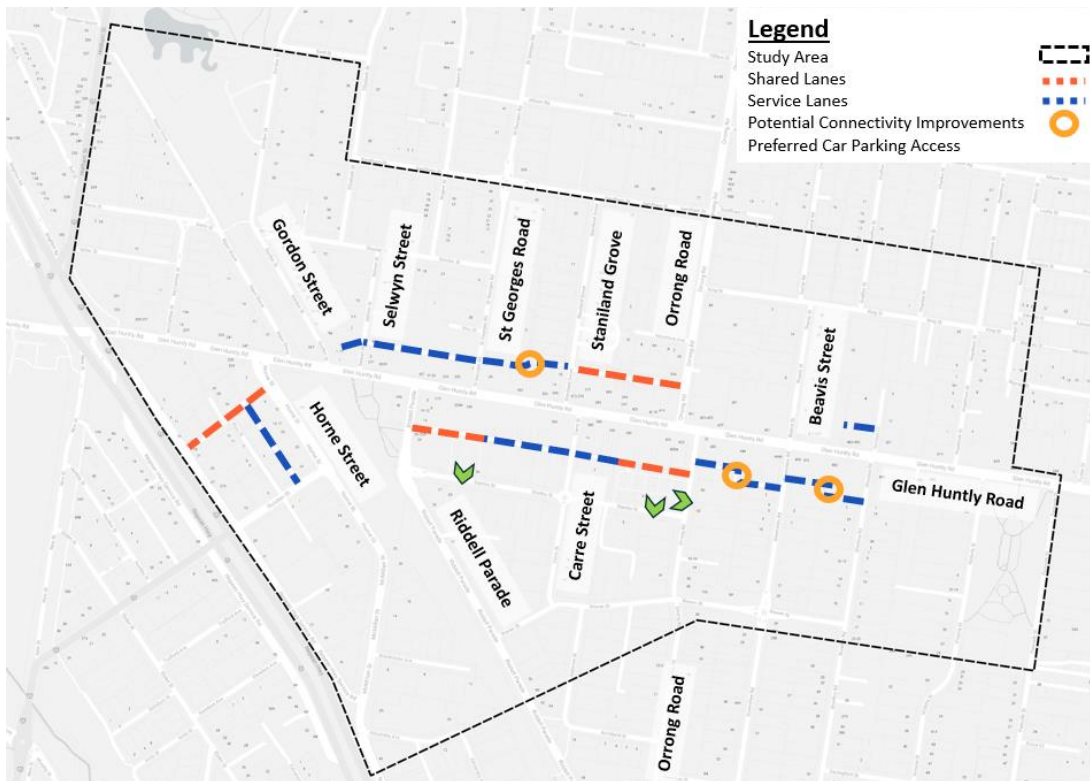


Figure E.3: Recommended Future Pedestrian Network and Improvements

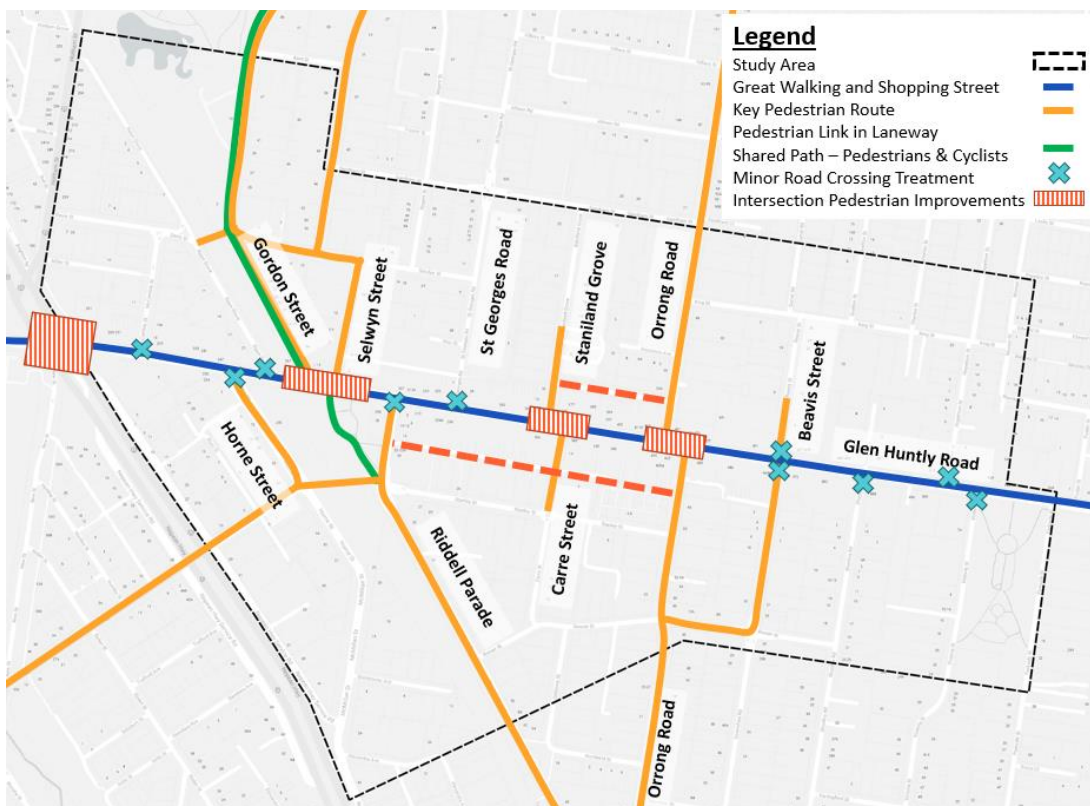


Figure E.4: Recommended Future Cycling Network and Improvements

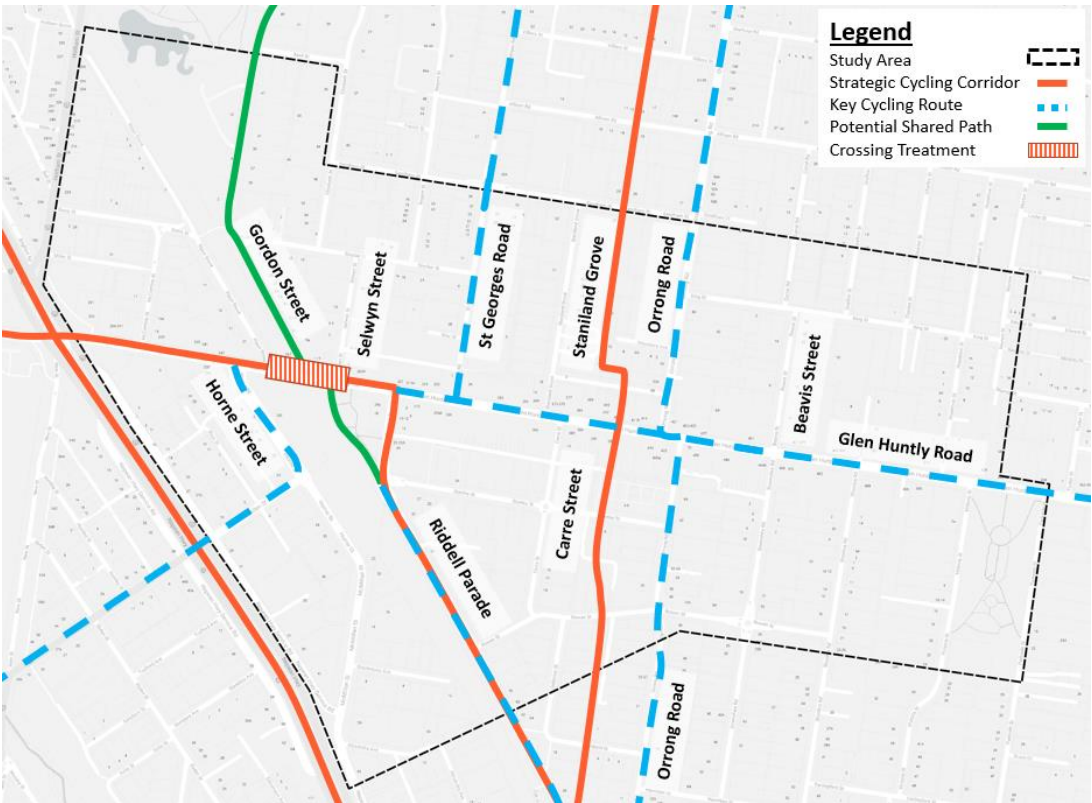


Figure E.5: Public Transport Infrastructure Improvements



In addition to the above recommended future transport networks and interventions, application of future mode share targets in relation to Car Parking was undertaken to broadly understand the impacts of providing car parking at the current Column B rates set out in the Glen Eira Planning Scheme. The assessment both found justification and an identified need to provide car parking for new development at lower rates, including provision of zero car parking developments.

Recommendations relating to car parking included car parking technologies / management, implementation of the Glen Eira Parking Policy and development of a Precinct Parking Plan.

Conclusion

The Elsternwick Activity Centre is well set-up from a transport accessibility perspective, given its proximity to high-quality public transport networks, walking and cycling facilities.

An assessment of the likely traffic impacts resulting from the future land uses based on a range of mode share and trip generation assumptions was undertaken. The assessment found that with a number of road, intersection and laneway based interventions and improvements, the road network could reasonably support the future levels of traffic.

In this regard, the Transport Study found that the land use vision for the Elsternwick Activity Centre can be supported from a transport perspective, by implementing a range of sustainable transport, vehicular and parking recommendations.

There is also an opportunity to increase mode share towards sustainable transport modes for existing users through the implementation of recommendations and interventions, and as a result reducing the number of car trips in the Activity Centre.

As it relates to the implementation of actions and the timing and / or triggers, further detailed analysis at a precinct level will be required, understanding how the land use, transport and public realm visions will progress from a timing perspective between the current day and 2036.

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1 Introduction:

1.1 Introduction

Glen Eira City Council ('Council') is in the process of preparing the Elsternwick Activity Centre Structure Plan (the 'Structure Plan'). The Structure Plan is being largely informed by a Built Form Framework for existing core commercial area within the Elsternwick Activity Centre ('the Activity Centre') which will guide the scale and location of future land use development. Other works being undertaken for the Structure Plan include Housing, Employment and Public Realm studies.

Ratio Consultants has been engaged to undertake a Transport Study to inform the preparation of the Structure Plan, including an assessment of the transport implications of the Built Form Framework and Public Realm recommendations.

1.2 Purpose of this Report

The Elsternwick Transport Study will provide an evidence base and recommendations for the Structure Plan including:

- Review of background strategic and policy context;
- Establishing the transport and parking objectives for Elsternwick;
- Existing conditions assessment including issues and potential opportunities; and
- Assessment of the transport impacts of the Built Form Framework including identifying the transport interventions and any mitigating works.

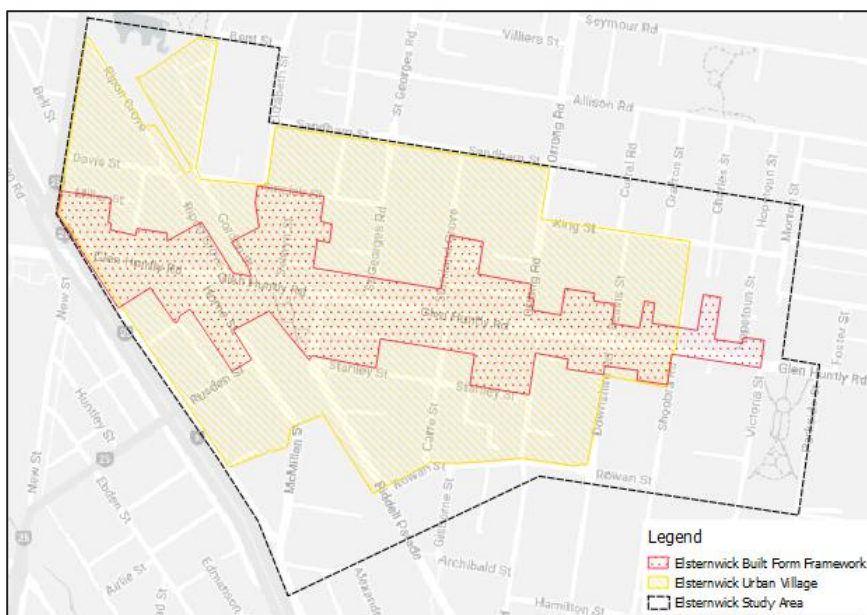
The outcome of the report will be an evidence base, analysis and recommendations to support the Elsternwick Structure Plan, including Built Form Framework and Public Realm initiatives and plans.

1.3 The Transport Study Area

The Elsternwick Activity Centre is located approximately 8.5 kilometers south-east of the Melbourne CBD within the municipality of Glen Eira. The study area incorporates the Activity Centre including existing commercial and mixed-use areas, Elsternwick Railway Station and some surrounding residential areas.

The Elsternwick Transport Study area including the proposed Activity Centre and Built Form Framework boundaries is shown in Figure 1.1.

Figure 1.1: Elsternwick Transport Study Area



1.4 Methodology

The Elsternwick Transport Study was developed in collaboration with Glen Eira Council officers and other consultants engaged to provide input into the Structure Plan.

The overall project was separated into two distinct parts, including:

1. Background, Issues and Opportunities, and input into the Built Form Framework; and
2. Analysis of the Built Form Framework transport impacts, and recommendations to achieve the transport vision for Elsternwick.

The study was developed through a range of workshop discussions, on-site investigations, background review, research, and data collection and analysis.

A brief overview of the approach taken to develop the study is shown in Figure 1.2.

Figure 1.2: Elsternwick Transport Study Methodology

Detailed Background Review

1.5 References

In undertaking this study and preparing this report, the following documents and sources of information were relied upon:

- Relevant local Glen Eira strategies, plans and documents, as referred throughout this report.
- Glen Eira Planning Scheme;
- Movement and Place in Victoria, Department of Transport;
- Car parking and traffic surveys provided by Glen Eira Council;
- Traffic and public transport data provided by Department of Transport;
- ABS Census and VISTA survey data;
- Site observations during November 2021;
- Meeting and workshops with Council officers and other Consultants involved in the preparation of the Elsternwick Structure Plan; and
- other documents as referenced throughout this report.

2 Background and Context:

2.1 Overview

In developing the Elsternwick Transport Study, a detailed review of background information was undertaken, including the relevant transport and parking policy and other strategic work relevant to Elsternwick.

The purpose of this review is to understand the strategic and policy context, including any relevant transport or car parking policy or actions which apply to the Elsternwick Activity Centre including the Built Form Framework.

2.2 State Policy

Transport Integration Act 2010

The Transportation Integration Act (the 'Act') came into effect in July 2010, with the purpose of developing a framework to provide an integrated and sustainable transport system within Victoria. The Act sets out a number of key objectives for the transport system, reproduced as follows:

- Provide means by which persons can access social and economic opportunities to support individual and community wellbeing;
- Facilitate economic prosperity;
- Actively contribute to environmental sustainability;
- Provide for the effective integration of transport and land use and facilitate access to social and economic opportunities;
- Facilitate network wide efficiency, coordinated and reliable movements of persons and goods at all times; and
- Should be safe and support health and wellbeing.

The Act works to ensure all government departments and stakeholders work towards a common outcome, to provide an integrated and sustainable transport system. In addition to the above objectives, some key outcomes and actions which relate to the Elsternwick Activity Centre and Transport Study include:

- Minimise barriers when it comes to access so far as possible to ensure the transport system is available to as many people as wish to use it;
- Provide tailored infrastructure, services and support to any people who may find it difficult to use the transport system
- Protect, conserve and improve the natural environment.

Plan Melbourne 2017-2050

Plan Melbourne (2014) (the 'Plan') was a Metropolitan Planning Strategy which was developed by State Government. The Plan was produced as an integrated land use plan to guide Melbourne and the surrounding suburbs over the course of a 40-year timeframe. The Plan has undergone a refresh from which the Plan Melbourne 2017-2050 was produced.

The 35-year "blueprint" works to guide Melbourne's growth to ensure a more sustainable, productive and liveable city for all. Outcome 3 of the plan focuses on the Transport needs of Melbourne, stating:

'Melbourne has an integrated transport system that connects people to jobs and services and goods to markets'.

This includes four key directions which work to improve and support the transport network as follows:

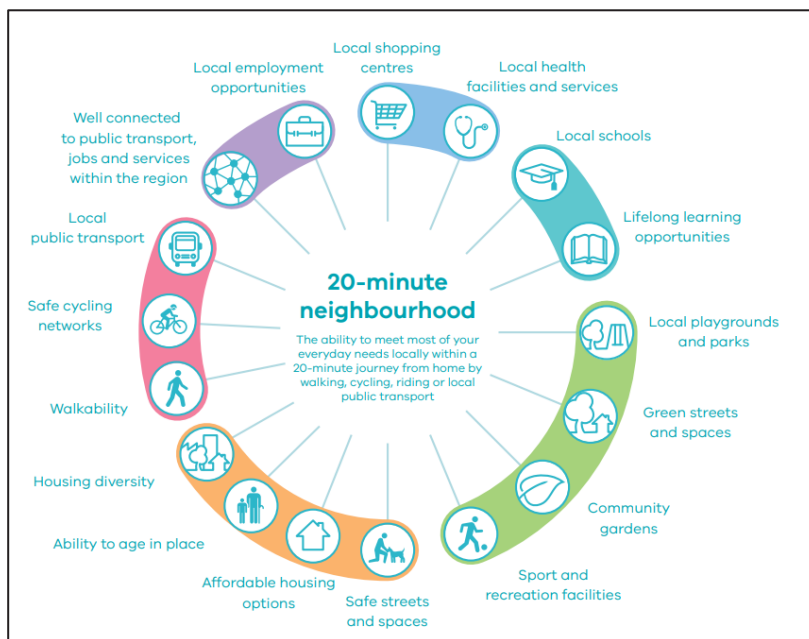
- *Transform Melbourne's transport system to support a productive city;*
- *Improve transport in Melbourne's outer suburbs;*

- *Improve local travel options to support 20-minute neighbourhoods; and*
 - *Improve freight efficiency and increase capacity of gateways while protecting urban amenity.*
- A number of policies are outlined in the Plan, which are relevant to improving local travel options to support Elsternwick as a 20-minute neighbourhood, including:

- *Creating pedestrian-friendly neighbourhoods;*
- *Create a network of cycling links for local trips;*
- *Improve local transport choices; and*
- *Locate schools and other regional facilities near existing public transport and provide safe walking and cycling routes and drop-off zones.*

The key elements of a 20-minute neighbourhood (replicated from Plan Melbourne) are shown in Figure 2.1.

Figure 2.1: The 20-minute neighbourhood



Source: Plan Melbourne 2017-2050 Strategy, DELWP

Movement and Place in Victoria

The Movement and Place in Victoria was developed to address population growth pressures amounting on the transport network in Victoria, the inherent conflict which exists between movement links and streets, which are destinations in their own right. The framework offers a common language for integrated transport and land use planning between different agencies and expertise.

The framework replaces historic and current transport planning practices, by including land use and places of activity when considering the development and testing of potential interventions.

In developing the framework, the Department of Transport in conjunction with local Councils and key stakeholders have been working to classify the existing transport network at a Movement and Place level, by assessing the current network performance in terms of movement, place, safety and environment, develop and assess potential options for future network improvements.

It is understood that Glen Eira are currently in the process of reviewing the Movement & Place aspirations across the municipality. The aspirations will be used to inform the development of transport corridor or street specific interventions in the future, which may build upon recommendations in this Transport Study and subsequent Structure Plan.

Notwithstanding, the existing and proposed classifications are important considerations to ensure that the transport vision for Elsternwick and recommendations of this Study have strategic alignment with the broader network aspirations set out in the Movement & Place framework.

2.3 Glen Eira Council Plan 2021-2025

The Glen Eira Council Plan (the 'Council Plan') sets out the community vision and objectives, including a number of strategies and actions relevant to the development of the Elsternwick Transport Study.

The Glen Eira 2040 Community Vision (the 'Community Vision') was developed and endorsed by Council in March 2021. The Community Vision is as follows:

Our Glen Eira: A thriving and empowered community working together for an inclusive and sustainable future.

The Council Plan includes five strategic directions, including a range of initiatives and supporting strategies and actions. The strategic directions and strategies relevant to the development Elsternwick Transport Study are outlined in Table 2.1.

Table 2.1: Council Plan - Relevant Strategic Directions, Initiatives and Strategies

Strategic Direction	Relevance to Elsternwick Transport Study
Access to well designed and maintained open spaces and places	<p><u>Major initiatives include:</u></p> <p><i>We will complete the detailed design of the Selwyn Street Cultural Precinct, creating a new vibrant space centred on celebrating the rich culture, creating a pedestrian plaza area connecting the community hub, museum and other areas of interest</i></p> <p><i>We will investigate the feasibility of constructing two new multi-deck car parks (fully funded by the federal government) to increase availability of parking for public transport commuters and public use in Bentleigh and Elsternwick; and if deemed feasible and endorsed by Council, will commence construction</i></p> <p><u>Supporting strategies, policies and plans include:</u></p> <ul style="list-style-type: none"> - <i>Activity Centre Structure Plans for Caulfield, Carnegie, Elsternwick, Bentleigh and Glen Huntly</i>
A liveable and well planned City	<p><u>Major initiatives include:</u></p> <p><i>We will prepare updated Structure Plans for Carnegie, Elsternwick and Bentleigh Activity Centres and seek authorisation from the Minister for Planning for planning scheme amendments for permanent controls.</i></p> <p><i>We will develop a four-year program of initiatives to inform future budget allocations for improved cycling infrastructure and a linked cycling network.</i></p> <p><u>Supporting strategies, policies and plans include:</u></p> <ul style="list-style-type: none"> - <i>Integrated Transport Strategy</i> - <i>Cycling Action Plan</i> - <i>Activity Centre Structure Plans for Caulfield, Carnegie, Elsternwick, Bentleigh and Glen Huntly</i>

2.4 Glen Eira Community Wellbeing Plan 2021-2025

The Community Wellbeing Plan 2021-2025 sets out the priorities and actions for implementation that will guide planning for health and wellbeing in Glen Eira.

Priorities 3: *Enhance Active Living*, outlines a number of objectives and actions which support the use of more sustainable and active transport modes, including:

1. *Increase rates of participation in physical activity.*
2. *Enhance accessibility, safety, walkability and interconnectedness across the built environment*
3. *Maximise opportunities for an active community through capacity building and partnerships*
4. *Campaigns that promote active healthy lifestyles*

The Integrated Transport Strategy is listed as a key supporting Council strategic document for the above priority and objectives.

2.5 Our Climate Emergency Response Strategy 2021-2025

At a Council meeting on 5 May 2020, Glen Eira passed a motion to declare a climate emergency including committing to the following carbon emission targets as follows:

- Zero net corporate emissions by 2025; and
- Zero net community emissions by 2030.

The Glen Eira *Our Climate Emergency Response Strategy 2021-2025* sets out how Council will:

- *Respond to the climate emergency in our own operations;*
- *Support the community to take actions; and*
- *Advocate to, and partner with governments to drive stronger action.*
- The Strategy outlines a number of key challenges, including Transport and Parking, stating:
- *How people travel in our municipality is closely tied to the climate emergency.*
- *Eighteen per cent of local emissions come from transport.*
- *Historically, our cities were designed to prioritise cars, trucks and buses but with population growth it is becoming mathematically impossible to fit more vehicles on our fixed road network, and still get around easily and efficiently.*
- *Supporting the community to significantly reduce or cease the use of internal combustion engine cars, and instead access more local services, use active and public transport, and switch to electric vehicles is a challenge that requires support from councils, State and Federal Governments.*

The Strategy also includes a number of goals and objectives which are supported by specific actions and strategies, with those relevant to the Elsternwick Transport Study summarised in Table 2.2.

Table 2.2: Climate Emergency Response Strategy - Relevant Goals and Actions

Goal	Relevance to Elsternwick Transport Study
1.2 – Make climate action a priority consideration in every strategy, plan and policy	<p>1.2.1 Update all plans, policies and strategies so they make a positive contribution to climate emergency action – <i>Timing: Ongoing</i></p> <p>1.2.2 Use a climate emergency as a lens to support the development and implementation of every new Council Plan, strategies and policies – <i>Timing: Ongoing</i></p>
1.4 – advocate for stronger climate change action by other levels of government	<p>1.4.2 Ensure the climate emergency is embedded into related areas of advocacy (e.g. transport, social and affordable housing) – <i>Timing: ongoing</i></p>
6.2 – Support the community to choose zero or low emissions transport	<p>6.2.1 Implement the Integrated Transport Strategy to prioritise walking, cycling and public transport trips, and support the uptake of electric vehicles – <i>Timing: Ongoing</i></p> <p>6.2.2 Through education, planning mechanisms, bulk buys and preferential parking, encourage the uptake of electric vehicles and bikes – <i>Timing: 2023-24 onwards</i></p> <p>6.2.3 Through implementation of the Integrated Transport Strategy, install public charging stations in appropriate off-street locations such as Council-owned multi-deck car parks or at key Council facilities – <i>Timing: 2023-24 onwards</i></p> <p>6.2.4 Through implementation of the Integrated Transport Strategy, rapidly increase the quantity and quality of walking and cycling paths along major transport routes – <i>Timing: Ongoing</i></p>

2.6 Clause 52.06 - Glen Eira Planning Scheme

Clause 52.06 of the Glen Eira Planning Scheme sets out, amongst other items, the statutory car parking requirements for new developments, including car parking provision rates by land use, design requirements and decision guidelines.

Unless an exemption to the requirement exists elsewhere, Clause 52.06-2 of the Glen Eira Planning Scheme states that before:

- a new use commences;
- or the floor area or site area of an existing use is increased;
- or an existing use is increased by the measure specified in Column C of Table 1 in Clause 52.06-5 for that use,

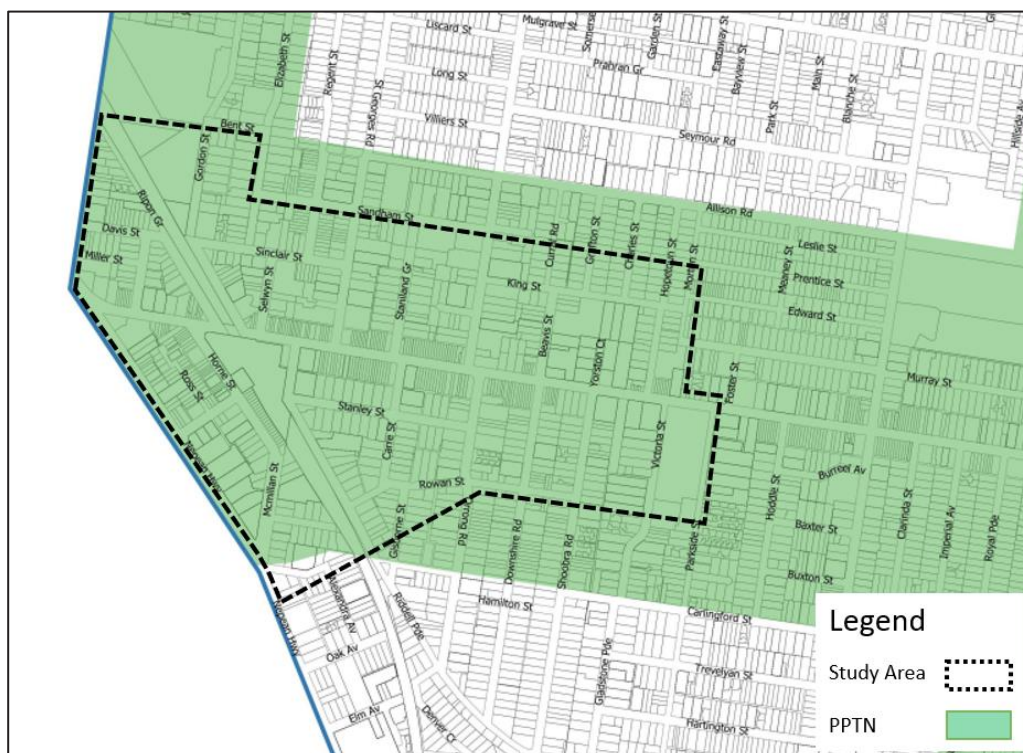
the number of car parking spaces required under Clause 52.06-5 or in a schedule to the Parking Overlay must be provided to the satisfaction of the responsible authority in one or more of the following ways:

- *on the land;*
- *or in accordance with a permit issued under Clause 52.06-3;*
- *or in accordance with a financial contribution requirement specified in a schedule to the Parking Overlay.*

Clause 52.06-5 of the Glen Eira Planning Scheme states that Column B rates apply if part of the land is identified as being within the Principal Public Transport Network Area (PPTN), or a Parking Overlay applies to the land.

The PPTN map, shown for the area including Elsternwick study area in Figure 2.2 incorporates land within 400 metres of public transport routes within Metropolitan Melbourne. The PPTN reflects the routes where high-quality public transport services are or will be provided. It supports integrated transport and land use planning, by encouraging more diverse and dense development near high quality public transport to help support public transport usage.

Figure 2.2: Principal Public Transport Network



Source: DELWP, August 2018

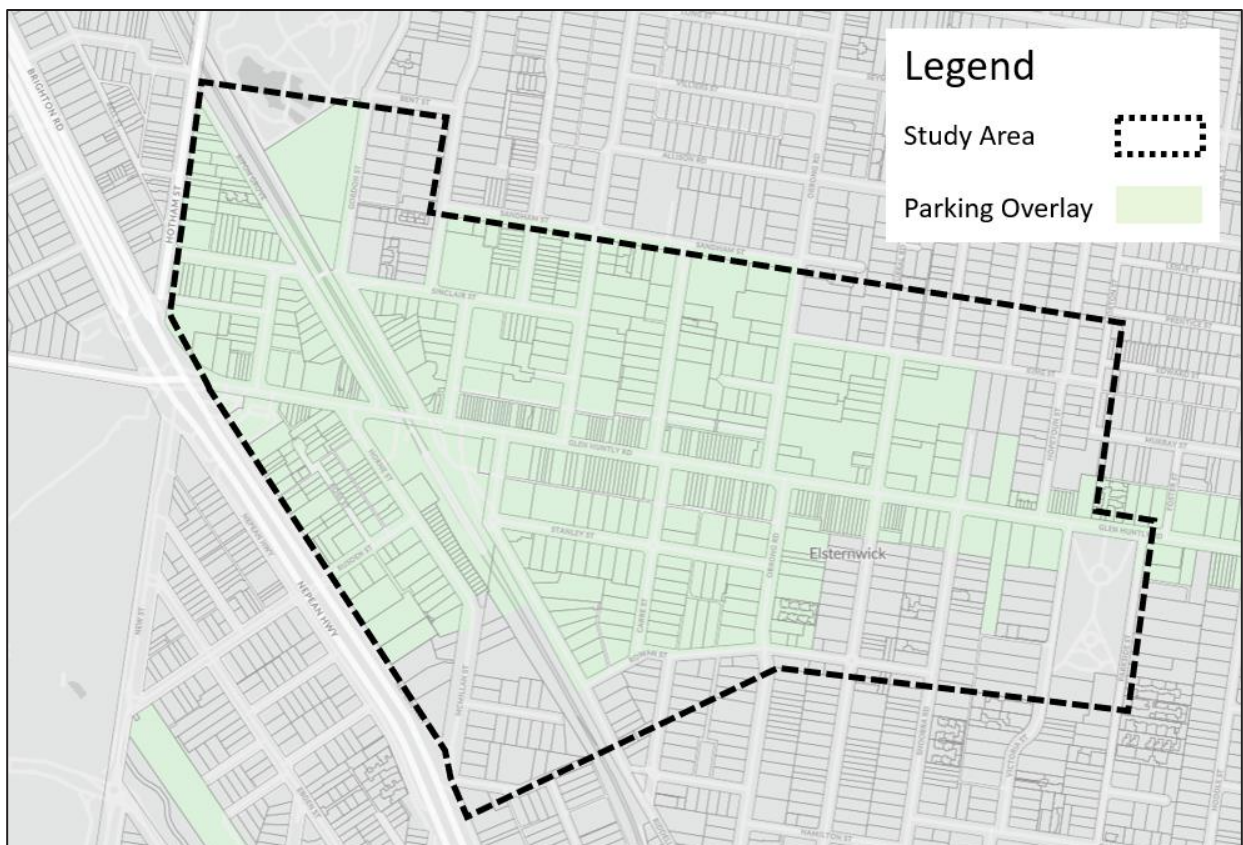
Schedule 2 to Clause 45.09 Parking Overlay within the Glen Eira Planning Scheme also applies to part of the Elsternwick Activity Centre for “Student Housing in Specific Areas”.

The objectives of the Parking Overlay is to direct student housing towards locations near tertiary education facilities within Glen Eira, which have good access to public transport amongst other items.

The subsequent statutory parking rates set out in the Schedule relate to Student Housing only. For all other uses listed within Clause 52.06 however, the Rate in Column B of Clause 52.06-5 applies as described above.

The extent of the Parking Overlay applicable to Elsternwick, listed as PO2-3 (Precinct 2-3) is shown in Figure 2.3.

Figure 2.3: Precinct 2 of Schedule 2 to Clause 45.09 - Parking Overlay



Source: Glen Eira Planning Scheme / Landchecker (accessed 16/12/2021)

2.7 Integrated Transport Strategy 2018-2031

Glen Eira City Council produced an Integrated Transport Strategy in 2018 which aims to set priorities aligned with the 15-year vision for Transport in Glen Eira.

The strategy sets out a number of key objectives and actions which aid to achieve the overarching transport goal:

‘Strive for a 50:50 Mode Share of Car and Non-Car Trips by 2031’.

Encompassed within the strategy is an Integrated Transport Strategy Vision and nine guiding principles which are outlined below.

VISION — Integrated Transport Strategy 2018–2031

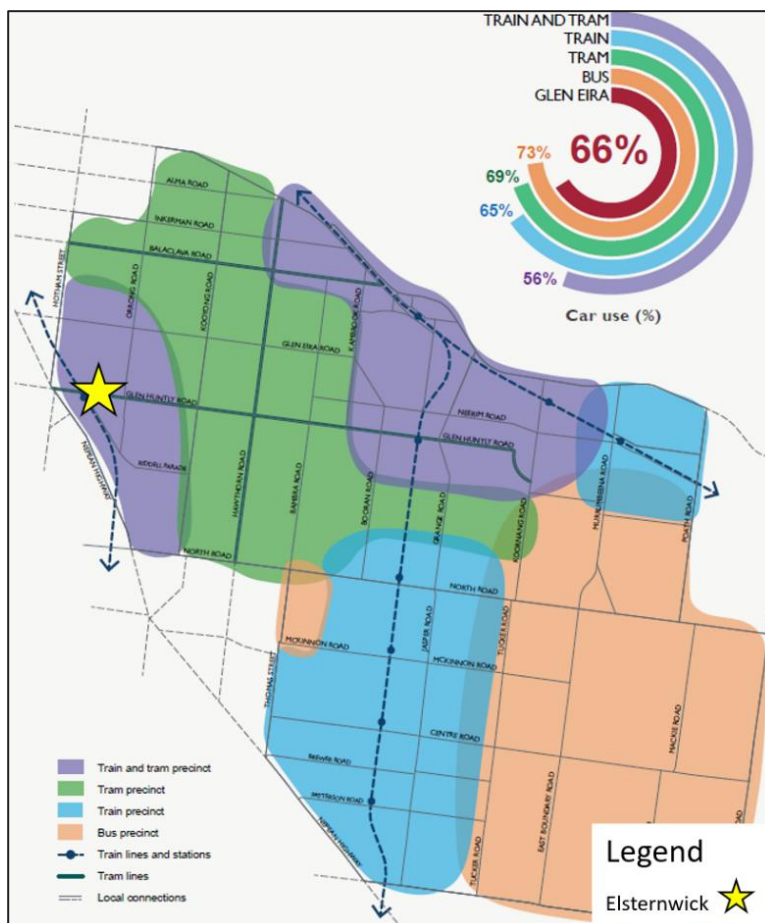
Glen Eira will be a City of child friendly neighbourhoods that are connected to a network of vibrant and well designed walkable activity centres. The community will have a range of travel options to service their daily needs. This Strategy aims to reduce car use to 50 per cent of all trips.

1. Transport is for people – a range of transport options are required
 2. The majority of the community currently relies on the car
 3. Continued growth in car use will increase traffic congestion and parking concerns
 4. Parking should complement the transport system
 5. Not all Glen Eira residents have the same access to the transport network
 6. Peak hour travel movements should be efficient and as fast as possible
 7. Streets are the defining feature of Glen Eira neighbourhoods
 8. Car alternatives can improve health and the environment
 9. The future presents significant changes and opportunities to reimagine how Glen Eira moves.
- The Strategy identifies a framework which sets out the different characteristics and responses for various areas of the municipality, based broadly on their access to public transport. In this regard, Elsternwick is identified as a Train and Tram Precinct, as replicated in Figure 2.4.

TRAIN AND TRAM PRECINCT

The neighbourhoods located within the northern half of Glen Eira experience excellent access to public transport with access to all three tiers (train, tram and bus). The suburbs include Elsternwick, Ripponlea, Gardenvale, St Kilda East, Glen Huntly and around Caulfield Station.

Figure 2.4: Transport Access Precincts



Source: Glen Eira Integrated Transport Strategy

In addition to the above 'precincts', a set of maps showing premium transit corridors were developed. Relevant to Elsternwick including Glen Huntly Road, Orrong Road and other key roads, Table 2.3 outlines the four transit corridor types and which roads they apply to in the study area.

Table 2.3: Elsternwick Key Transit Corridors

Transit Type	Corridor	Nepean Hwy	Glenhuntly Road	Orrong Road	Riddell Parade	Hotham Street
Efficient Routes	Driving	X				X
Express Transport Routes	Public	X				
Safe Cycling Streets		X		X	X	
Great Walking and Shopping Streets			X			

In addition to the above, the precinct immediately surrounding Elsternwick Railway Station is identified as a 'great walking area'. For each premium transit corridor, a number of potential interventions and improvements are identified.

The Strategy also identifies key 'place' types and the transport interventions including key objectives and elements for each. The three key 'place' types are:

- Child Friendly Neighbourhood
- Safe School Zones
- Walkable Activity Centre

A detailed set of actions and strategies is outlined in the Strategy, including an evaluation of their impact on achieving the vision of a 50:50 mode share of car and non-car trips by 2031. A number of the actions, including those within the 5-year action plan 2018-2023 have either commenced or been completed.

2.8 Glen Eira City Council Parking Policy 2020

To address concerns surrounding the equitably of increasing demands for access and parking within Glen Eira, the 2020 Parking Policy was developed. The Parking Policy was a key action of the Integrated Transport Strategy to achieve the transport vision of 50:50 mode share of car and non-car trips by 2031.

The policy addresses the desired parking, public transport and general road reserve requirements for different place and transport route types within Glen Eira, aligning with the Integrated Transport Strategy.

The study area includes the following Parking Policy parking management approaches:

- **Places – Neighbourhoods:** residential areas surrounding the Elsternwick Activity Centre core retail area, on both sides of Glenhuntly Road.
- **Places - Activity Centres:** Elsternwick Activity Centre as a Major Activity Centre per the Parking Policy.
- **Corridors:** Glenhuntly Road as a Great Walking and Shopping Street, plus other key streets and corridors as per Table 2.3.
- **On-street and Off-street parking.**
- **Parking for new developments.**
- **Future needs and technology.**

Incorporated into the above approaches, the Parking Policy gives guidance on the management and allocation of parking including consideration of the Glen Eira Planning Scheme and other requirements.

2.9 Summary

A number of key themes have been identified through the above background and policy review which support the sustainable development and broader objectives for the Elsternwick Activity Centre.

The key themes identified include:

- Strong support for a mode shift towards sustainable transport, including both active and public transport;
- Improved walkability and places, both within the Activity Centres and neighbourhoods, as well as connecting areas; and
- A focus on sustainable development located within areas of access to good-quality public transport.

The review and above themes give strong support for the development of the Activity Centre including built form, public realm and transport changes, to achieve the Transport goals and vision for the Elsternwick Activity Centre and Glen Eira more broadly.

3 Elsternwick Activity Centre:

3.1 Overview

The Elsternwick Activity Centre is located approximately 8.5 kilometers south-east of the Melbourne CBD. The Activity Centre extends from Nepean Highway to the west and Hopetoun Gardens in the east, and generally includes the commercial, mixed-use and residential land uses either side of Glenhuntly Road.

The Elsternwick Activity Centre is listed as a Major Activity Centre at both a state strategic and local Council level. In this regard, Plan Melbourne lists Elsternwick as a key location to encourage job growth and housing development near existing public transport. In addition, Glen Eira's Integrated Transport Strategy designates the area as a train and tram priority precinct, with a strong focus on safety and improved connectivity.

Glen Eira City Council acknowledges the Elsternwick Activity Centre as a cultural and heritage precinct of significance should be maintained and retained.

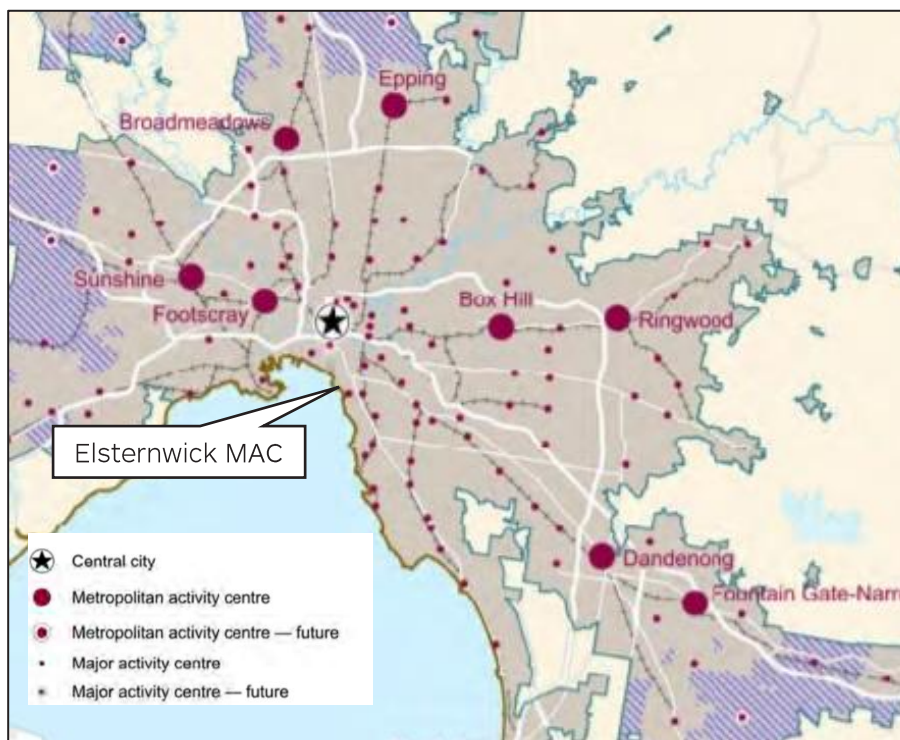
3.2 Broader Context

As outlined in the previous section, the Elsternwick Activity Centre is a Major Activity Centre, providing a wide range of goods and services outside of the CBD. Other nearby Major Activity Centres include Balaclava and Bay Street – Brighton situated along the Sandringham Railway Line, and St Kilda to the west on the edge of Port Phillip Bay.

In the broader metropolitan Melbourne context, Elsternwick is relatively close to the Melbourne CBD, less than 30 mins by bike or train.

Figure 3.1 shows the Elsternwick Activity Centre in relation to other Metropolitan and Major Activity Centres as listed within Plan Melbourne.

Figure 3.1: Elsternwick within the Plan Melbourne Activity Centre Hierarchy



Source: Plan Melbourne 2017-2050, DELWP

3.3 Land Uses

The Elsternwick Activity Centre comprises a diverse range of land uses. Most notably, Glenhuntly Road and the Selwyn Street Cultural and Entertainment Precinct are key attractors for nearby residents and visitors.

Key land uses within the Elsternwick Activity Centre include:

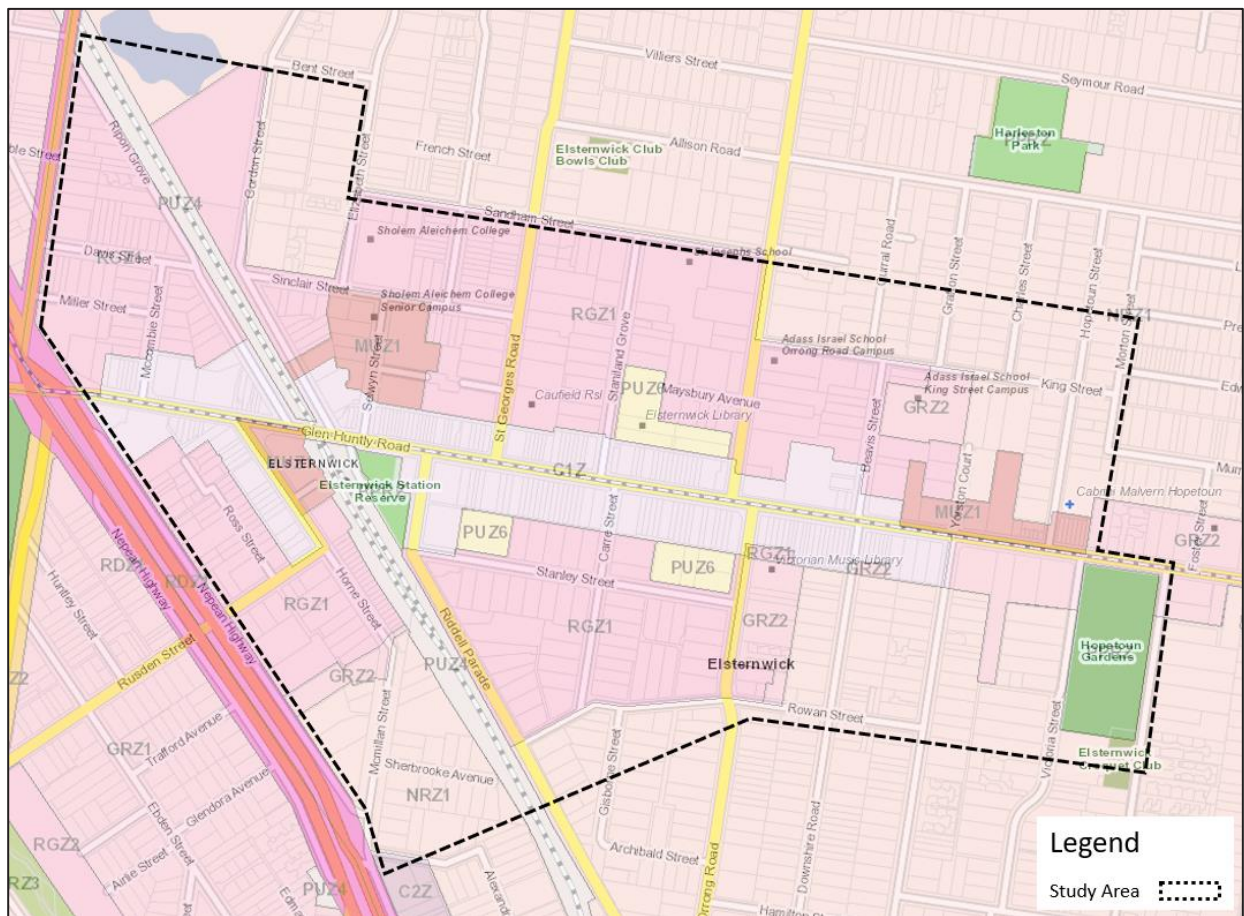
- Commercial and Retail, including a range of specialty and major retailers;
- Education, including Sholem Aleichem College, Adass Israel School and St Joseph's Primary School
- Elsternwick Library
- The Graceland Manor and Victoria By the Park aged care facilities,
- Cabrini Elsternwick Women's Mental Health Hospital;
- Residential, including a mix of low to high density dwellings; and
- Open Space / Recreational land uses including Elsternwick Station Reserve and Hopetoun Gardens.

Figure 3.2 show the key land uses within and nearby to the Elsternwick Activity Centre, and Figure 3.3 shows the current land use zoning as per the Glen Eira Planning Scheme.

Figure 3.2: Key Land Uses and Trip Generators



Figure 3.3: Current Land Zoning - Elsternwick



Source: Glen Eira Planning Scheme

3.4 Places and Streets

Open Spaces

Elsternwick Activity Centre has a variety of off-street attractions which link the road network with the wider Elsternwick precinct and add to the quality to the public realm within the Activity Centre. These include multiple public open spaces including parks, gardens and playgrounds.

Two key public parks are located within the Elsternwick Activity Centre including Elsternwick Station Reserve / Elsternwick Plaza and Hopetoun Gardens. Both public parks contain children's playground equipment, water fountains, seating and shaded coverings with Hopetoun Gardens providing access to public toilets.

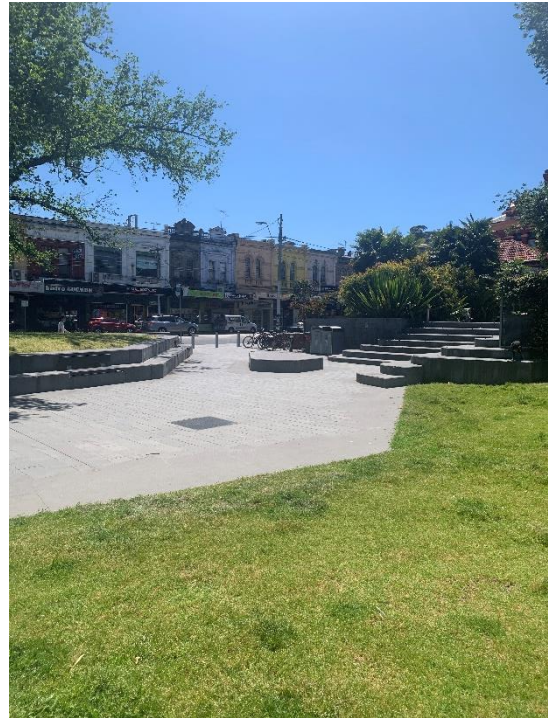
In addition, both public parks are in close proximity to pedestrian operated crossings on Glenhuntly Road and public transport stops for both the train and tram network.

Figure 3.4 and Figure 3.5 show the existing infrastructure and amenities located within the Elsternwick Station Reserve / Elsternwick Plaza.

Figure 3.4: Available Shading and Park Infrastructure – Looking South



Figure 3.5: Elsternwick Plaza looking north toward Glenhuntly Road



Glenhuntly Road – Shopping Strip / Core Commercial Precinct

Frontages along Glenhuntly Road provide space (between the kerb and property line) to accommodate pedestrian movement and a range of supporting amenities and outdoor dining and trading opportunities.

Some of the key amenities provided within the public realm include, and are not limited to:

- Seating
- Rubbish Bins
- Street Lighting
- Public Toilets
- Public Drinking Fountains
- Outdoor Dining for businesses

Figure 3.6 through to Figure 3.9 show some examples of infrastructure provided within the public realm along Glenhuntly Road and the surrounding network within the Elsternwick Activity Precinct.

Figure 3.6: Glenhuntly Road Looking West



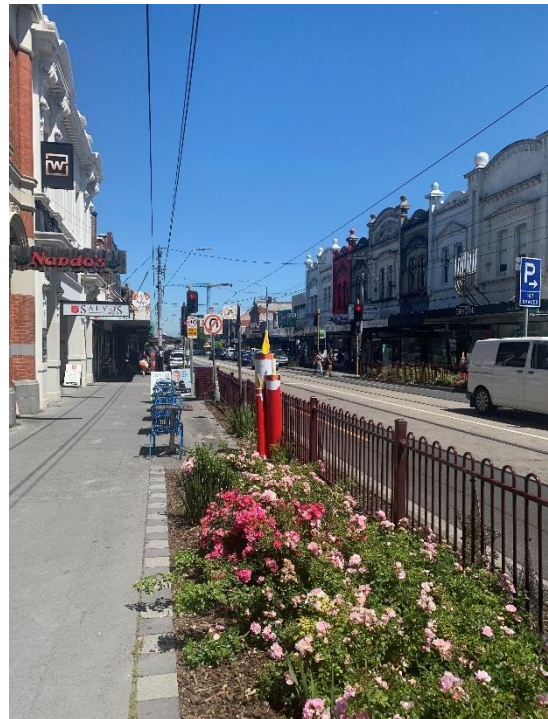
Figure 3.7: Staniland Grove Looking North



Figure 3.8: St Georges Road Looking North



Figure 3.9: Glenhuntly Road Looking West



Wayfinding and Signage

Wayfinding and directional signage is present in the Activity Centre to assist with movement and access between available amenities, on and off street parking and public transport infrastructure. Figure 3.10 and Figure 3.11 show examples of the wayfinding and signage provided on Glenhuntly Road.

Figure 3.10: Elsternwick Activity Precinct Wayfinding Signage – ‘Elsternwick Village’



Figure 3.11: Selwyn Street Cultural and Entertainment Precinct Signage



3.5 Summary

Elsternwick is a hub of significant local activity, and an important place for local residents and businesses. The Activity Centre is designated as a Major Activity Centre within Plan Melbourne, providing a range of employment, living and convenience needs.

The Activity Centre, which is centered around Glenhuntly Road and Elsternwick Railway Station has good access to other nearby Activity Centres and the Melbourne CBD through a range of key road and transport connections.

The Activity Centre and key land uses are supported by a range of open space and public realm amenities which serve as generators of transport movements.

4 Existing Transport Conditions:

4.1 Overview

The following section outlines a detailed review of the existing transport conditions including networks and infrastructure within the Transport Study Area. The section is structured by key transport themes or modes.

The assessment has taken into consideration a range of data sources, background information (including plans and strategies) and site observations.

For each transport mode or theme, a set of issues and potential opportunities or improvements have been identified to inform the Structure Plan and next stages of the Elsternwick Transport Study.

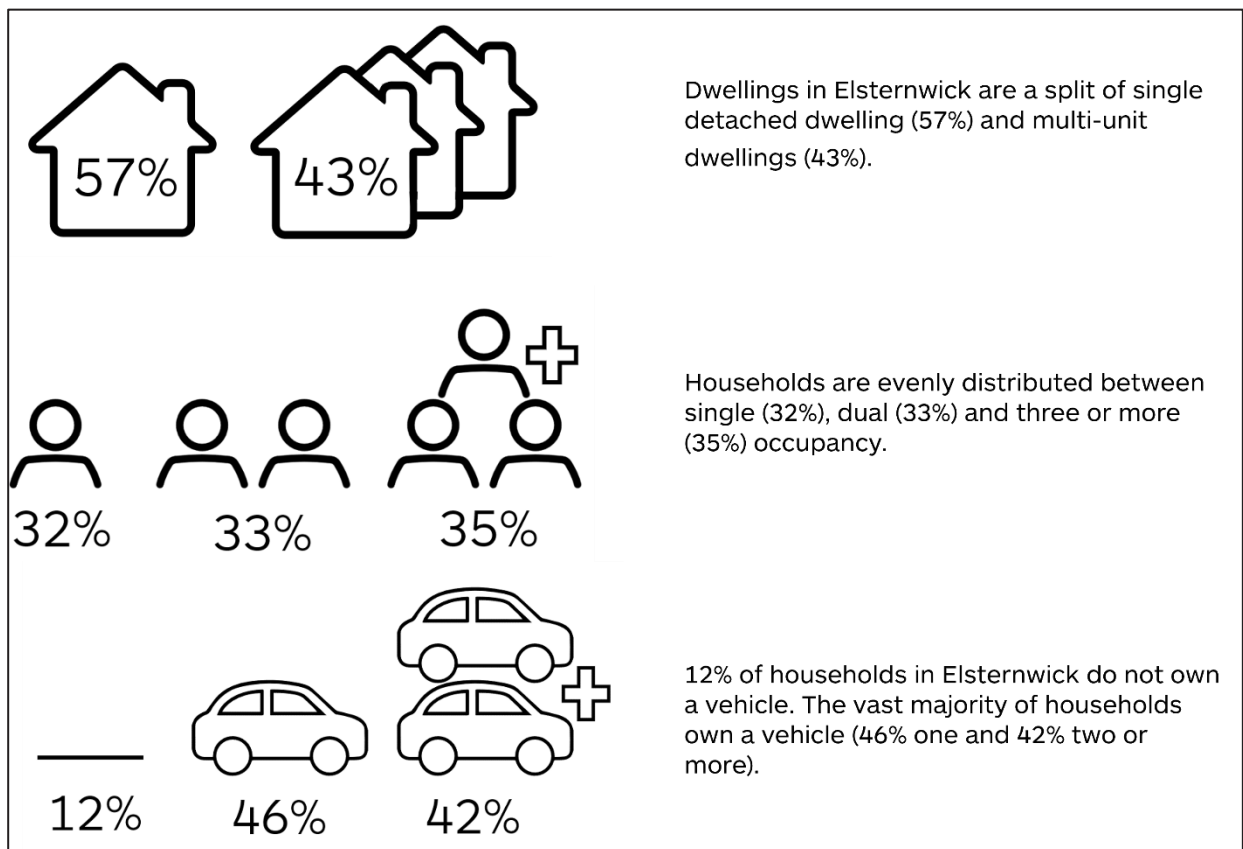
4.2 Travel Behaviour and Characteristics

The existing travel behaviours and characteristics for Elsternwick were established using the ABS 2016 Census data and discussed as follows.

Household Types and Car Ownership in Elsternwick

A summary of the household and car ownership characteristics for the suburb of Elsternwick are shown in Figure 4.1.

Figure 4.1: Overview of Elsternwick Household and Car Ownership Characteristics

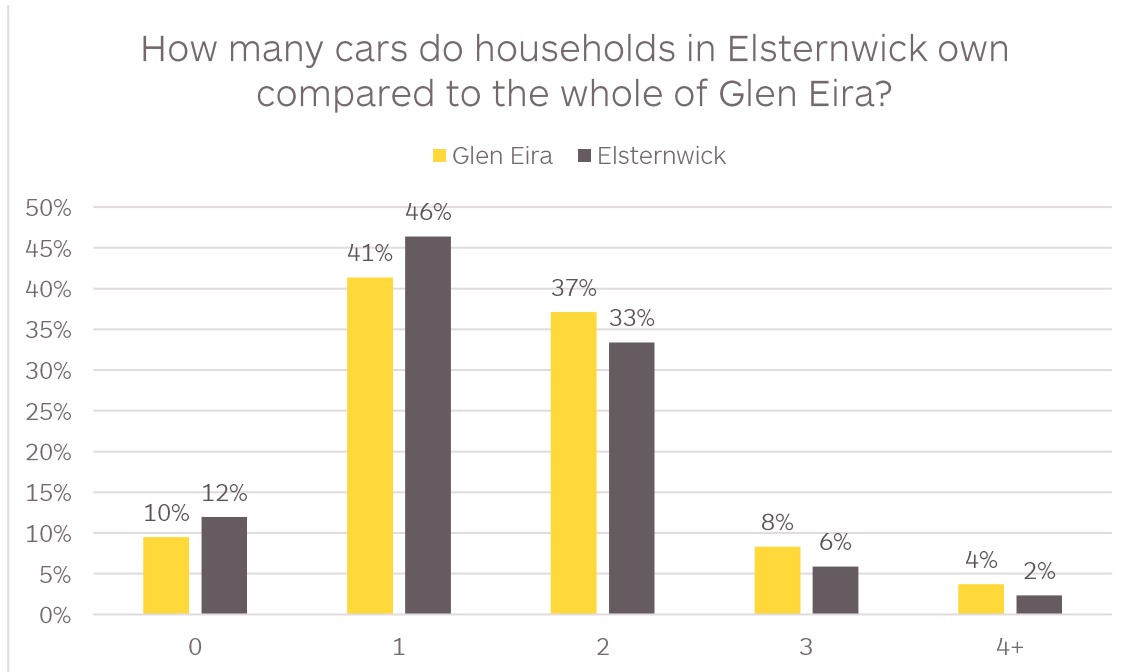


The suburb of Elsternwick is mostly composed of single dwelling households (57%). The balance of dwellings is mostly made up of units and apartments in buildings under four stories, with only 2% of dwellings in apartment buildings with four or more levels.

12% of all households within the suburb of Elsternwick do not own a car. Of the remaining households that own a vehicle, 46% own one vehicle, and 42% two or more vehicles.

Further to the above, a high-level comparison was undertaken of the car ownership characteristics for Elsternwick and the municipality of Glen Eira, which is presented in Figure 4.2.

Figure 4.2: Elsternwick and Glen Eira Car Ownership Characteristics

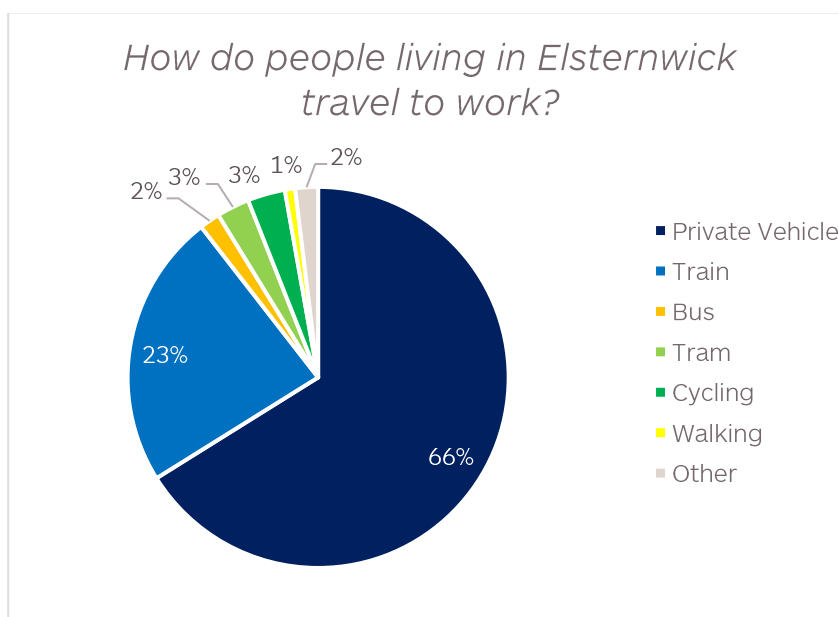


The data which is presented in Figure 4.2 above indicated that a larger proportion of residents of Elsternwick do not own a vehicle or own one vehicle, when compared to the whole municipality of Glen Eira.

How do people living in Elsternwick currently travel to work?

To gain a high-level understanding of current mode splits and choices for Elsternwick, the ABS Census Journey to Work data was reviewed for employees residing in Elsternwick, with the results presented in Figure 4.3.

Figure 4.3: Elsternwick Journey to Work Mode Share

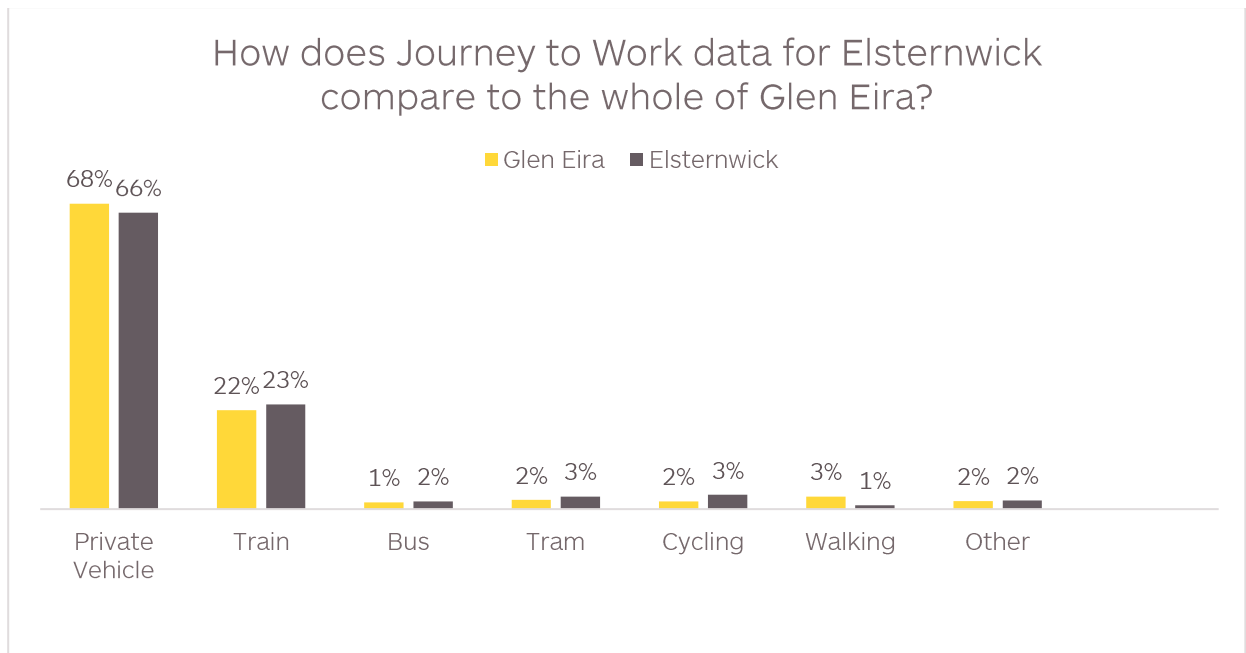


The above data indicates that the majority of trips to places of employment are by private motor vehicle (66%) followed by train (23%). A total of 34% of trips to work are via sustainable transport modes, including 3% via riding, plus 1% by walking (noting this does not include trips via public transport linked with active transport trips).

How does that compare to the whole of Glen Eira?

A comparison of Journey to Work characteristics between Elsternwick and the whole municipality of Glen Eira is shown in Figure 4.4.

Figure 4.4: Elsternwick and Glen Eira Comparison: JtW Mode Share



Although minor, residents of Elsternwick are more likely to use sustainable transport to travel to work, and less likely to drive to work, than the municipality wide averages.

Discussion: Travel Behaviours and Characteristics

As highlighted in Section 2 of this report, the overarching goal of the Glen Eira Integrated Transport Strategy is to achieve a 50:50 more share between car and non-car trips by the year 2031.

While not inclusive of all trip types and purposes, the Journey to Work data presents a picture of existing mode choice in Elsternwick, which includes a diverse range of housing types. This data indicates that 34% of trips are currently made by non-car modes, which is substantially less than the 50% goal.

In order to reduce this gap and achieve the vision for the municipality as a whole, intervention will be required to encourage existing users to change mode and to also ensure that new users have access to safe and efficient sustainable transport options. These may include, but are not limited to:

- Increased density and diversity of housing around key public transport facilities, where people can live, work and exercise in the same local area;
- Improved public transport facilities, including increased frequencies, shorter journey times, more flexible options;
- Connected and safe cycling routes and facilities within the area, including connections to nearby major cycling infrastructure;
- Improved pedestrian connections and footpath facilities between precincts or key pedestrian generators; and
- Car parking management or policy mechanisms to reduce reliance on car parking and private vehicle usage in Major Activity Centres.

4.3 Pedestrians

Existing Pedestrian Infrastructure

The Elsternwick Transport Study area provides a permeable and relatively connected network of pedestrian paths connecting public transport, retail and commercial services, residential areas and nearby schools.

Footpaths are provided on both sides of the majority of streets with built form frontages. These footpaths are typically wide enough to support two-way movements of pedestrians or other footpath users. Within higher activity areas, footpaths are either wider or provided at full width from property line to the kerb, such as in Glenhuntly Road along commercial frontages.

The pedestrian path network is supported by priority and safe pedestrian crossing points, comprising:

- pedestrian operated signals;
- pedestrian crossings at signalised intersections; and
- pedestrian refuges.

Figure 4.5 shows the locality of key pedestrian infrastructure within the transport study area.

Figure 4.5: Existing Pedestrian Infrastructure and Local Area Traffic Management

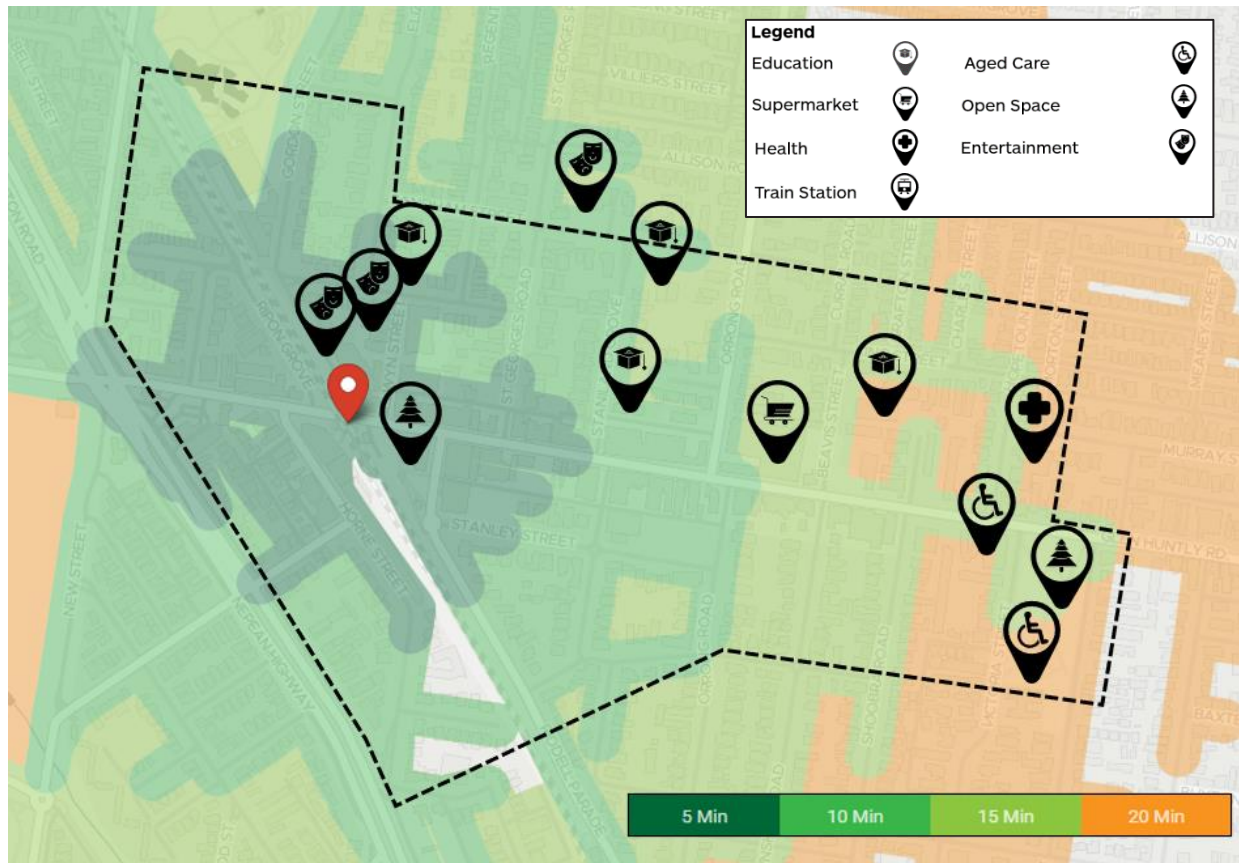


Accessibility

The Elsternwick Activity Centre encompasses a wide range of land uses, connected via a permeable pedestrian path network. The majority of key attractions and pedestrian generators are located north of Glenhuntly Road.

The 5, 10 and 20 minutes travel time catchments surrounding the Elsternwick Railway Station, including location of key pedestrian generators are shown below in Figure 4.6.

Figure 4.6: Pedestrian Connectivity to Internal Attractions



Source: Targomo

The above analysis shows that the majority of key pedestrian generating land uses within Elsternwick are accessible via a 5–10-minute walk. Additional land uses further east are still within a reasonable walking distance which could be supplemented with a short tram trip on Glenhuntly Road.

Outside of the study area, pedestrian trips are also generated from other land uses including to places of residence and public transport (train and tram) routes, including:

- Elsternwick Park;
- Rippon Lea Estate;
- Caulfield Grammar School;
- Shelford Girls' Grammar School;
- Caulfield Hospital; and
- Wesley College Elsternwick Campus.

Issues and Opportunities: Pedestrians

Having consideration of the above data and information, background review and on-site observations, the issues and potential opportunities for pedestrians within the Elsternwick Transport Study area are outlined in Table 4.1.

Table 4.1: Issues and Potential Improvements for Pedestrians

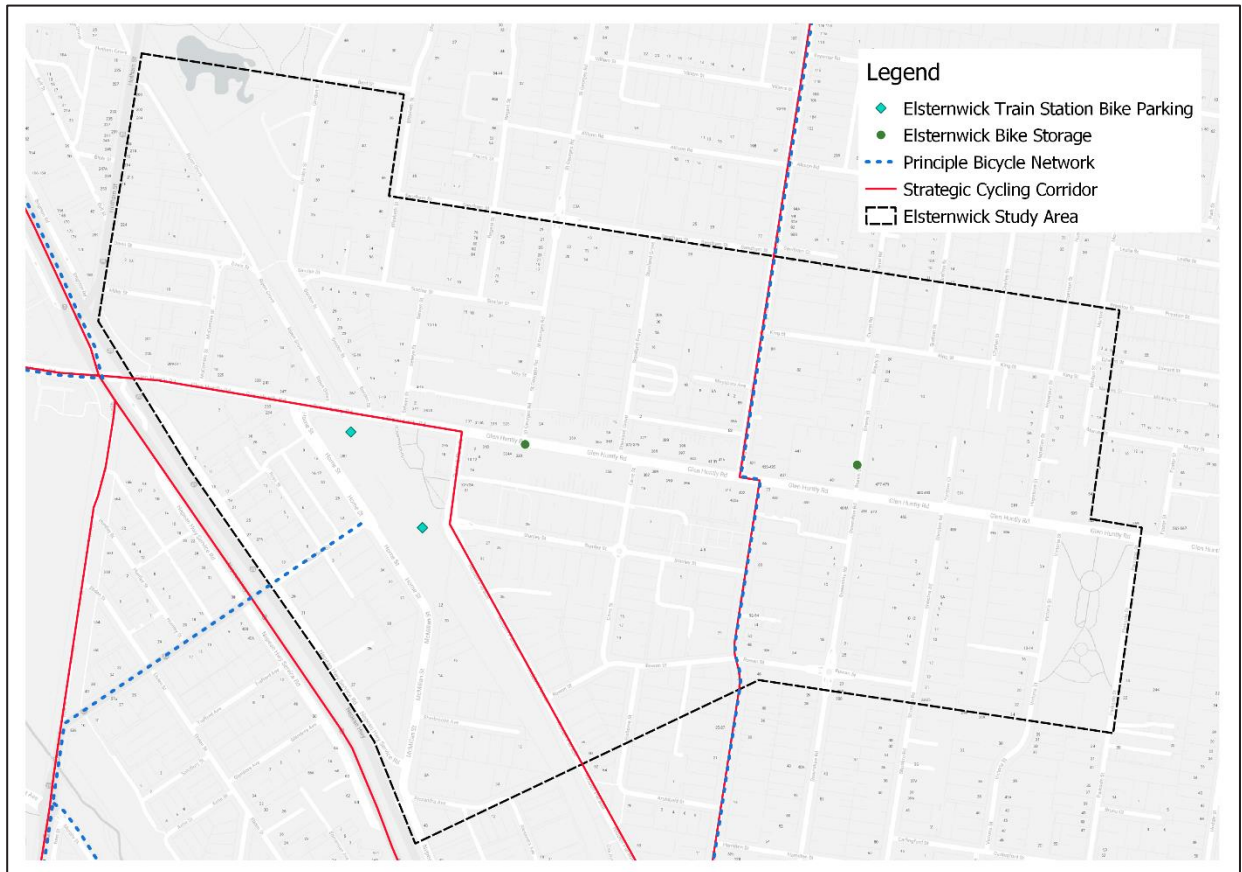
Item	Description of Issue	Potential Improvement or Intervention
PN1	Glenhuntly Road presents as a barrier for pedestrians crossing from either side of the road.	Consider additional or improved priority pedestrian crossing opportunities on Glenhuntly Road, along existing or future desire lines. Consideration of additional kerb outstands directly adjacent to minor road intersections, to facilitate shorting crossing distances.
PN2	There is a lack of priority at intersecting streets for pedestrians travelling along Glenhuntly Road.	Consider opportunities to implement Road Safety Platform threshold treatments at minor road approaches to enhance pedestrian priority along Glenhuntly Road. Investigate opportunities to ban right-hand turns to improve safety of pedestrians crossing minor road approaches to Glenhuntly Road. Possible road closures to create pedestrianised areas along Glenhuntly Road, enhancing walkability.
PN3	Relatively narrow footpaths and priority crossings hinder accessibility between schools, the Activity Centre and Public Transport.	Create safe school / neighbourhood zones in and around school frontages including wider footpaths, raised school crossings, threshold treatments and reduce speeds (i.e. 30/40km zones) Investigate potential school-time based road closures at high-demand locations.
PN4	The speed limit on Glenhuntly Road is only limited to 40km/h between 8am and midnight between Monday – Saturday, while high pedestrian activity is present at other times, in particular the morning commuter peak and on Sunday's.	Possibility to make Glenhuntly Road 40km/h speed limit permanently.
PN5	Limited connectivity across the Sandringham Railway Line	Explore options and possible locations to provide additional railway pedestrian bridges, particularly to the south of Glenhuntly Road Improve amenity and safety around the rail corridor, including increasing pedestrian activity, active frontages, lighting and DDA accessibility.
PN6	Nepean Highway is high volume traffic route, operating with generally long cycle times, including staged pedestrian crossings at the intersection with Glenhuntly Road.	Work with DOT to modify pedestrian phasing to ensure pedestrians are able to cross the intersection within one cycle.

4.4 Cycling

Within the transport study area, Glenhuntly Road (part) and Orrong Road are listed as Strategic Cycling Corridors (SCC) by the Department of Transport (DOT), and thus being the arterial level cycling connections and routes. The Principal Bicycle Network (PBN) which sets out the existing and proposed on and off-road cycling infrastructure, includes both Orrong Road and a section of Rusden Street, east of the Nepean Highway.

The DOT SCC and PBN within the transport study area are presented in Figure 4.7.

Figure 4.7: Existing Cycling Infrastructure, Networks and Strategic Routes



The cycling infrastructure on these routes is limited to on-road cycling lanes and symbols, and bicycle storage boxes at signalised intersections. On Orrong Road, the on-road cycling lanes stop at the approaches to Glenhuntly Road, where cyclists are required to use the vehicular traffic lanes.

On-road bike lanes are also provided down Rusden Street with an informal cycling route nominated along Riddell Parade and Clarence Street.

Within the road reserve and public spaces, there is limited dedicated bicycle parking, with limited locations throughout the transport study area, as shown in Figure 4.7.

Bicycle Counts

The Bicycle Network Australia undertakes annual commuter and recreational cycling survey data, more commonly known as 'Super Tuesday'. Conducted on the first Tuesday of every year (with the exception of COVID impacted years), the total number of cyclists within the morning peak period of 6:30am to 9:00am are recorded at each survey site.

Three survey sites within the vicinity of the study area have been assessed, with the locations and survey results from 2019 presented in Table 4.2.

Table 4.2: Super Tuesday Cycling Counts

Site	2019 Cycling Counts (all directions)
Glenhuntly Road / Orrong Road	72 cyclists
<i>Glenhuntly Road / Hawthorn Road</i>	<i>58 cyclists</i>
<i>Glen Eira Road / Hotham Street</i>	<i>195 cyclists</i>

Source: *Bicycle Network*

The survey recorded a total of 72 cyclists through the intersection of Glenhuntly Road / Orrong Road which is inside the study area.

Outside of the study area, further to the east, a total of 58 cyclists were observed at the intersection of Glenhuntly Road and Hawthorn Road during the survey period.

By way of comparison, a total of 195 cyclists were observed at the intersection of Glen Eira Road and Hotham Street, to the northeast of the study area, during the survey period.

Rosstown Rail Trail

It is understood that Glen Eira City Council is developing the Rosstown Rail Trail improvement plan. The Rosstown Rail Trail is an existing cycling and pedestrian trail which follows the historic alignment of the Rosstown Railway. The trail is generally flat in nature and follows linear street and parks within the wider Glen Eira Area.

Operating between Elsternwick Station and Oakleigh Junction, the trail is approximately 8.5km in length and takes approximately 1.5 hours when cycling or 3.5 hours when walking.

Within the transport study area, the Rosstown Rail Trail operates along Riddell Parade from Glenhuntly Road to Orrong Road, however with no formal separated cycling infrastructure.

Issues and Opportunities: Cyclists

Having consideration of the above data and information, background review and on-site observations, the issues and potential opportunities for cyclists within the Elsternwick Transport Study area are outlined in Table 4.3.

Table 4.3: Issues and Potential Improvements for Cycling

Item	Description of Issue	Potential Improvement or Intervention
CN1	There are gaps in the network of on-road cycling lanes, between eastern and western sides of the Elsternwick Activity Centre.	Introduction of on-road cycling infrastructure on key cycling routes, including Horne Street and Riddell Parade (Rosstown Rail Trail).
CN2	General lack of bicycle parking and other cycling amenities within the Activity Centre.	<p>Increase in cycling amenities such as bicycle parking in the public realm / road reserve, maintenance stations to encourage bike use.</p> <p>Ensure the adequate provision of end of trip facilities in new developments, including bike parking and e-bike / e-scooter infrastructure.</p>
CN3	Current on road cycling lanes on Orrong Road terminate on the approach to the intersection with Glenhuntly Road forcing cyclists into trafficable lanes.	Investigate safer intersection designs for the continuation of cycling lanes through intersections in the north-south direction (Orrong Road) to separate cycling and general traffic.

4.5 Public Transport

Existing Public Transport Networks

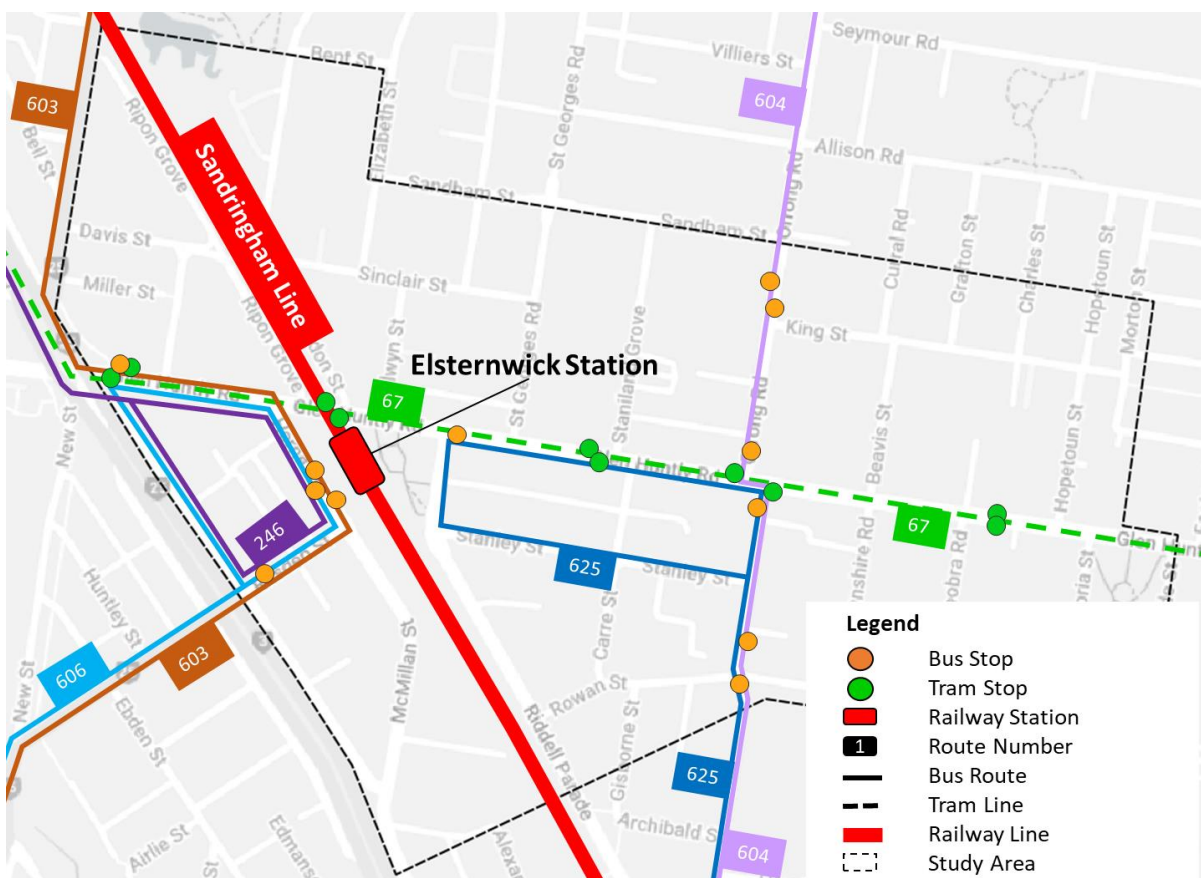
The Elsternwick Activity Centre and immediately surrounding areas are served by all three public transport modes, including rail, tram and bus.

The key services which operate through the transport study area, including location of public transport stop infrastructure are listed in Table 4.4 and shown in Figure 4.8.

Table 4.4: Existing Public Transport Services

Mode	ID.	Service	Approx. Frequency during peak period
Train	-	Sandringham Line (Elsternwick Station)	8 min
Tram	67	Melbourne University – Carnegie	10-20 min
Bus	246	Elsternwick – Clifton Hill via St Kilda	10-20 min
	603	Brighton Beach – Alfred Hospital via Elsternwick Station	15-20 min
	604	Gardenvale – Alfred Hospital via Toorak Station	20-30 min
	606	Elsternwick Station – Fishermans Bend	30-40 min
	625	Elsternwick – Chadstone via Ormond & Oakleigh	30 min

Figure 4.8: Existing Public Transport Routes and Stops



Public Transport Access and Supporting Infrastructure

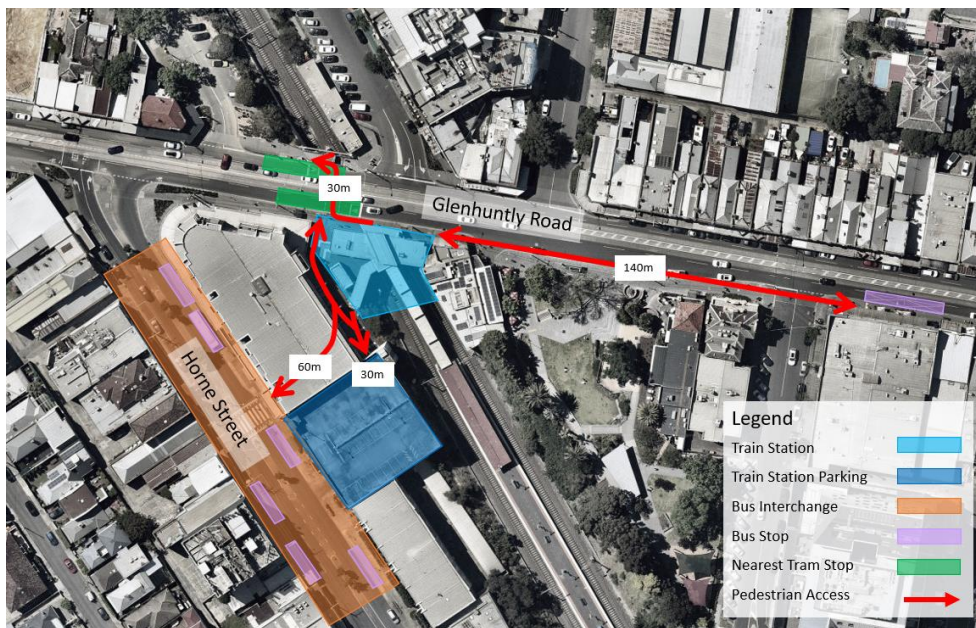
Elsternwick Railway Station

Elsternwick Station, which is grade separated via a cutting in the rail corridor and hence underneath the road, is on the southern side of Glenhuntly Road. Pedestrian access into the Station is via both Glenhuntly Road and through a public mall off Horne Street, connecting to the bus interchange.

All day Train Station parking is also provided off Horne Street, and bicycle storage is also provided within the Station.

Access to the Elsternwick Railway Station including location of nearby bus interchange, car parking and tram stops is shown in Figure 4.9.

Figure 4.9: Elsternwick Railway Station Access



Tram Stops

Tram stops within the study area on Glenhuntly Road are provided within the footpath, with no formal accessible stop infrastructure (such as raised platforms or kerb outstands). Tram stops are typically supported by a green PTV tram 'flag', tactile indicators and seating. Shelter to the weather and elements is provided by virtue of being located underneath shop canopies.

An example of a typical tram stop on Glenhuntly Road is shown in Figure 4.10.



Figure 4.10: Example of Typical Tram Stop on Glenhuntly Road

Bus Stops

Bus infrastructure is provided in a similar manner to tram services, with curbside stops provided along with seating and shelters. A bus interchange is located within Horne Street, a short distance from Glenhuntly Road, which provides access to multiple bus services through the area.

As shown in Figure 4.9 above, a pedestrian walkthrough is provided between Elsternwick Station and bus interchange on Horne Street to connect rail and bus passengers.

With exception of a bus stop located immediately east of the intersection of Glenhuntly Road and Nepean Highway, there is one other bus stop located on Glenhuntly Road near the intersection of Riddell Parade. The bus stop acts as the end of the line for bus route No. 625. The location of the stop is on the approach side of the intersection, blocking the view of right turn movements out of Riddell Parade. In addition, on-site observations noted buses waiting with engines on, which provided a poor environmental and amenity outcome for adjacent footpath users and businesses.

A photo of the bus stop on Glenhuntly Road immediately east of Riddell Parade is shown in Figure 4.11.

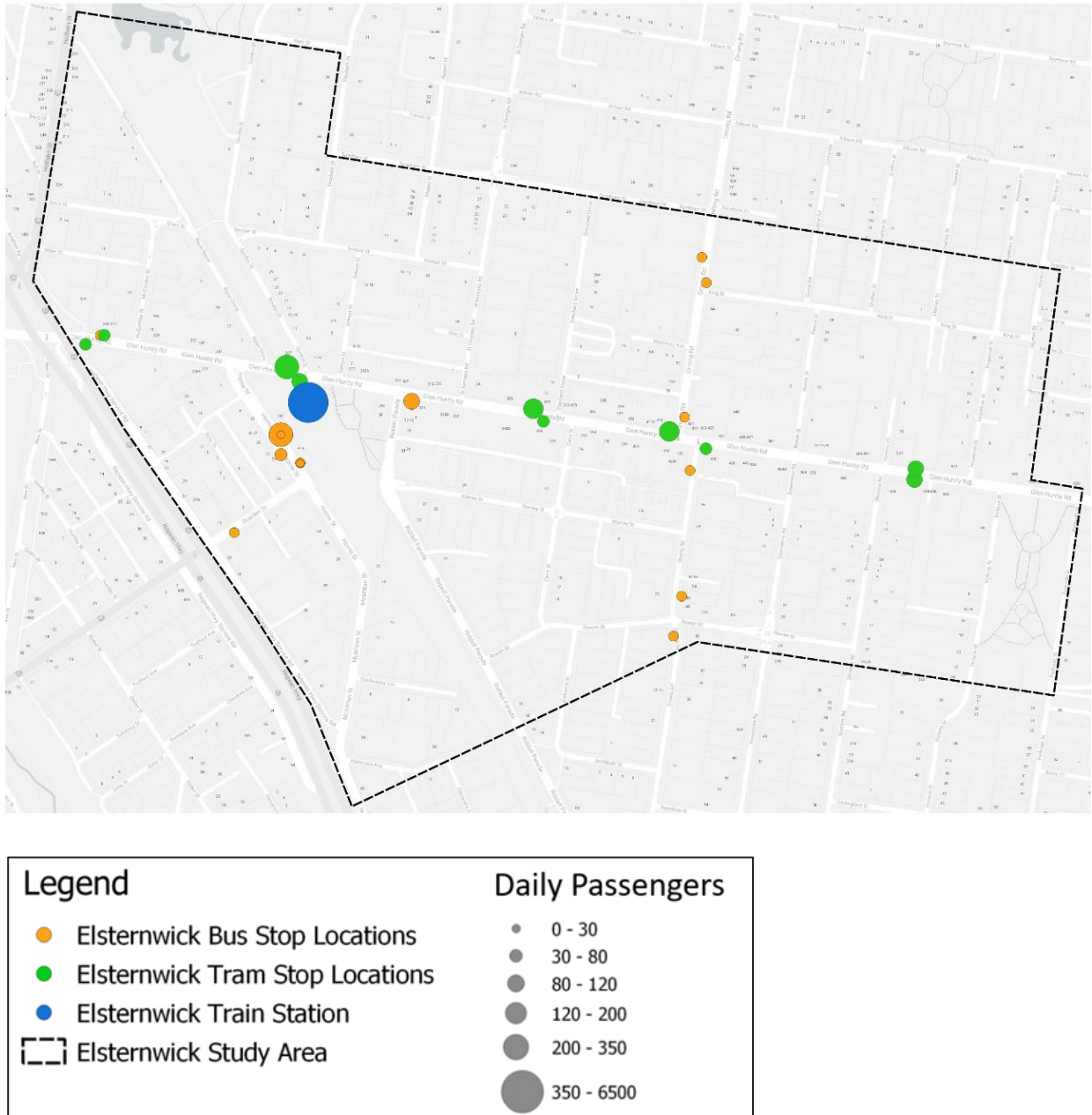
Figure 4.11: Termination Bus Stop for Bus Route No. 625



Public Transport Usage

Average patronage data for 2019 was sourced from the Department of Transport (DOT) to observe peak periods, travel patterns throughout the day and which mode / location patrons prefer. The data, which includes Myki activity by stop location for all three modes, is shown in Figure 4.12.

Figure 4.12: Average Daily Public Transport Patronage Data for 2019



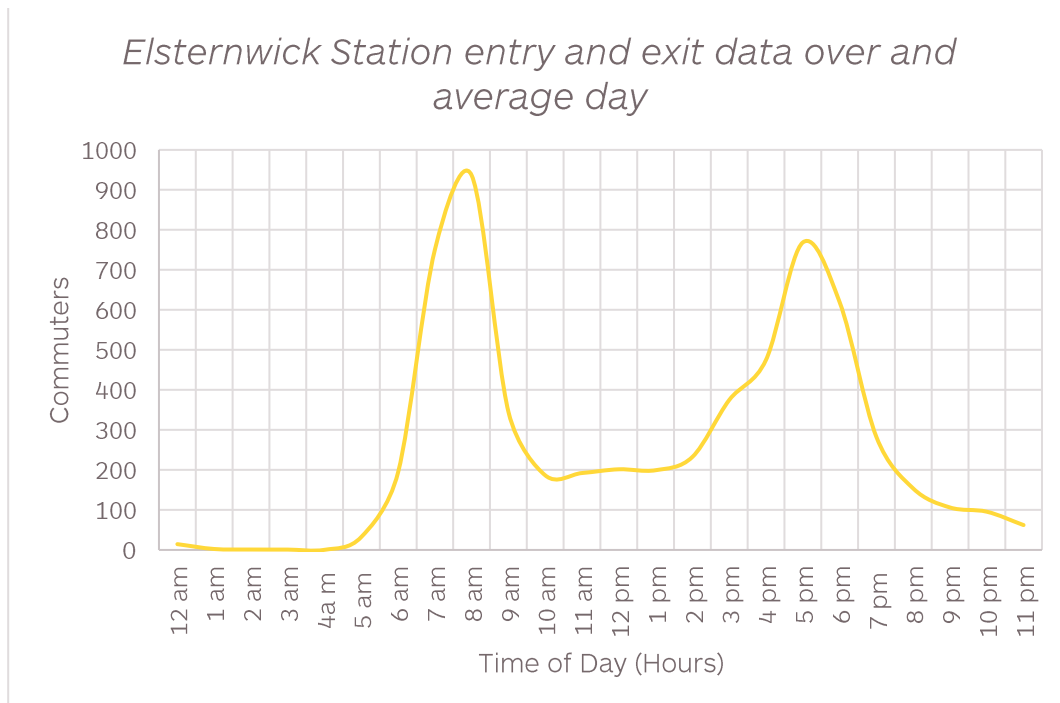
The above data includes all touch-on / touch-off activity at the railway station, collected at the entrance to the railway station, while tram and bus data is average patron data only, not total movements.

Based on the available data, key results and findings include:

- on average around 6,000 daily trips to or from Elsternwick Station on the Sandringham Railway Line, split approximately 50:50 entering and leaving the station (daily patronage volumes are similar to that of Windsor Station or Prahran Station, with Balaclava and South Yarra recording reasonably higher daily volumes);
- tram stops located between Elsternwick Station and Orrong Road experience higher demand than trams located further east or west;
- tram stops in the east-bound direction experience higher levels of touch-on activity than in the west-bound direction; and
- buses are the least popular public transport mode, with all routes and stops experiencing relatively low average daily touch-on activity,
- the exception to this is bus stop 894 (which accommodates a number of different bus routes), located within the Horne Street bus interchange.

To observe the temporal profile of public transport use in Elsternwick, the hourly data was analysed for Elsternwick Station being the key public transport node. The analysis, shown in Figure 4.13 indicates that the AM peak and PM peak occurred between 8-9am and 5-6pm respectively.

Figure 4.13: Elsternwick Railway Station Entry and Exit Profile



Public Transport Walking Access Catchments

Catchment maps showing the reasonable walking distance to public transport stops (400 metres or 5 minutes for bus and trams, and 800 metres or 10 minutes for rail) for the transport study area were developed and are shown in Figure 4.14 to Figure 4.16 respectively.

Figure 4.14: 400 metre bus stop catchments

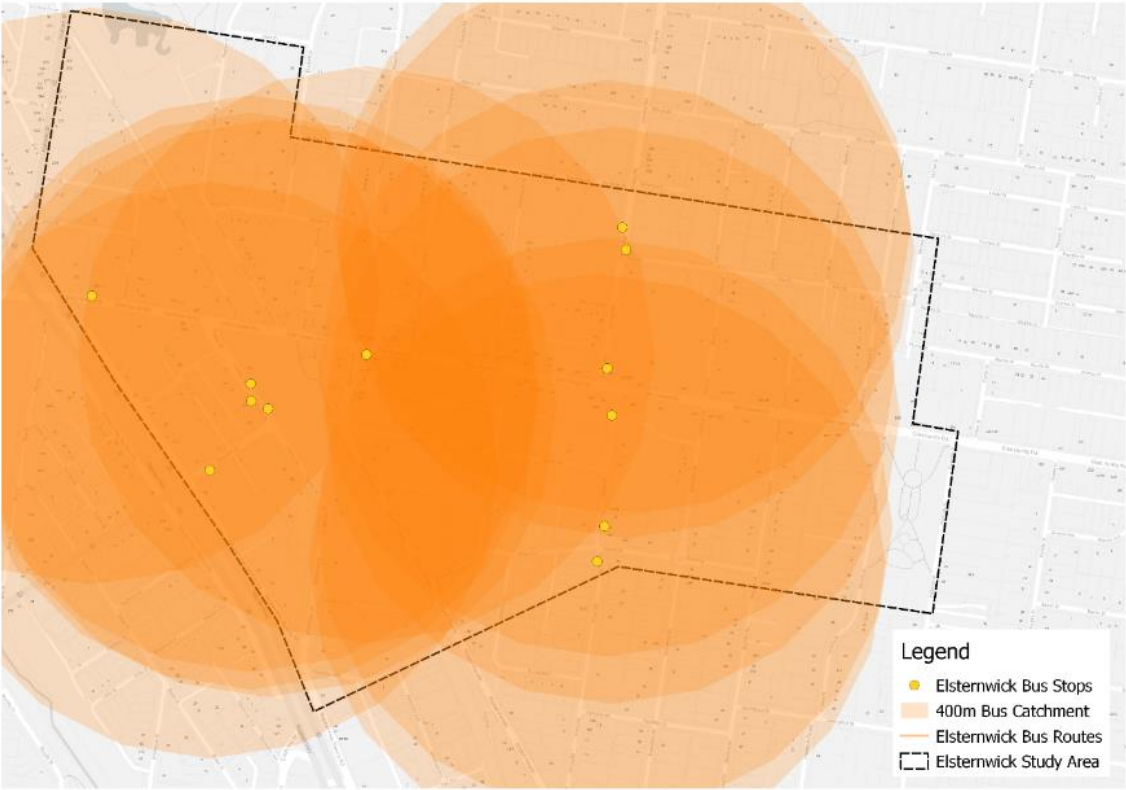
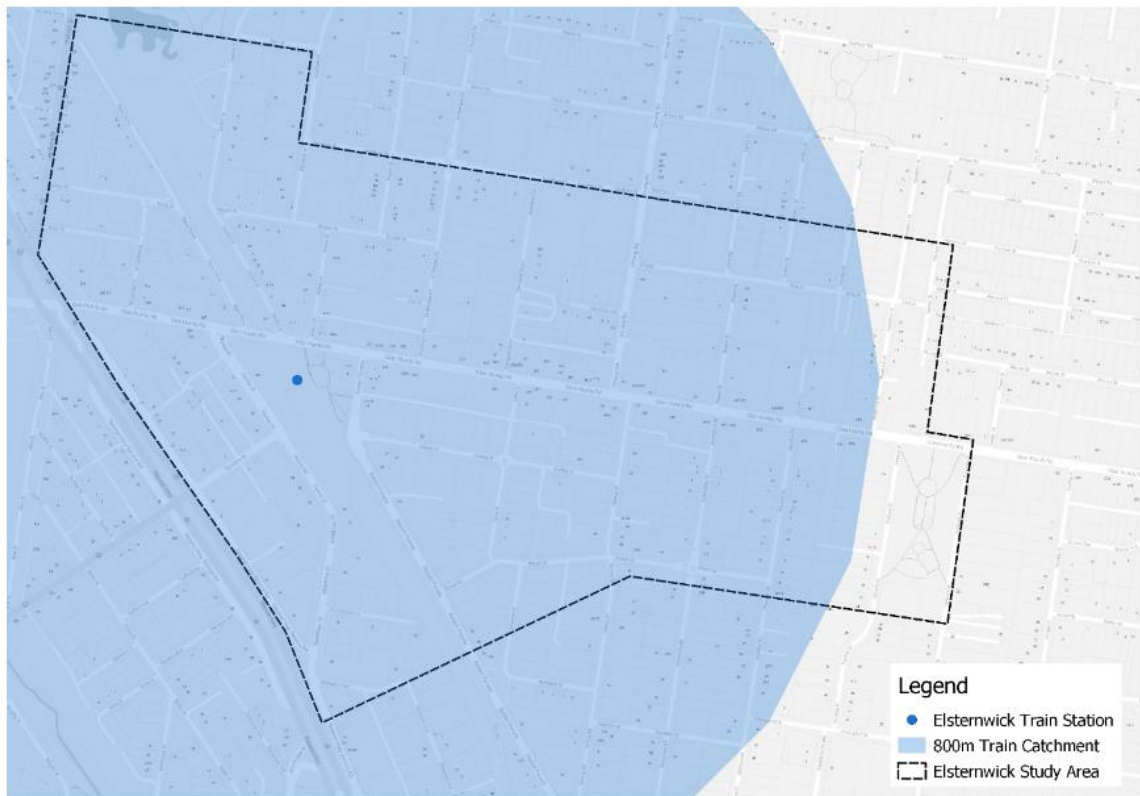


Figure 4.15: 400 metre tram stop catchments



Figure 4.16: 800 metre railway station catchment



The above catchment maps show that all three modes of transport are accessible to the majority of the study area, with the exception of train and a lesser extent buses where the far eastern extent sits outside the 400 metre or 5 minute radius and 800 metre or 10 minute radius catchments respectively.

In these instances, it could be reasonable for users to take the tram along Glenhuntly Road and change modes closer towards Elsternwick Railway Station.

Issues and Opportunities: Public Transport

Having consideration of the above data and information, background review and on-site observations, the issues and potential opportunities for Public Transport within the Elsternwick Transport Study area are outlined in Table 4.5.

Table 4.5: Issues and Potential Improvements to Public Transport

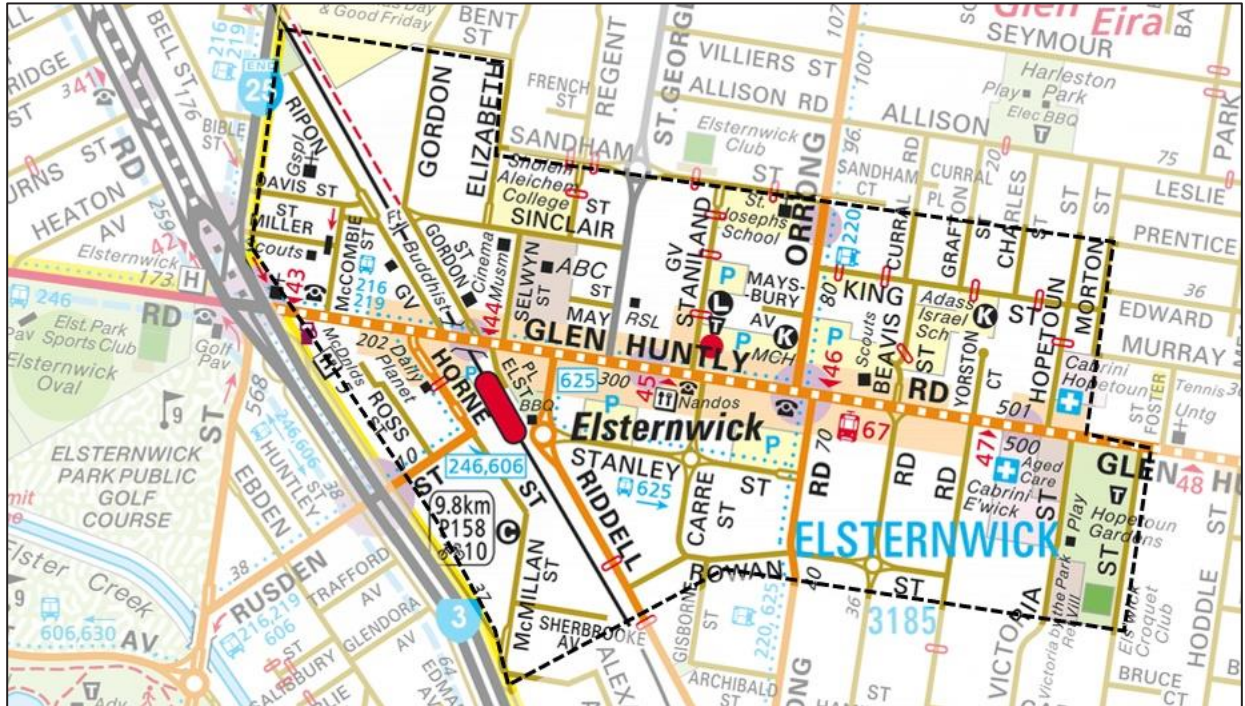
Item	Description of Issue	Potential Improvement or Intervention
PT1	Tram services within the Elsternwick Activity Precinct are currently not DDA compliant with curb side boarding and raised floor trams. As per DSAPT requirements, upgrades are required to ensure all tram stops are accessible with appropriate facilities such as shelters and signage.	As part of broader municipality wide advocacy, undertake a study to identify gaps and priorities and work with the State Government and DOT for the upgrade of tram stops to meet DDA compliancy, including provision of low-floor trams.
PT2	The 625 bus currently terminates at the Riddell Parade / Glenhuntly Road bus stop which is a poor location in terms of amenity impacts to nearby businesses and footpath users.	Advocate and work with the State Government and DOT for: <ul style="list-style-type: none"> Relocation of the 625 bus terminus away from Glenhuntly Road. Adoption of electric buses to reduce air and noise pollution within the immediate vicinity of patrons and passengers.
PT3	Glenhuntly Road currently provides shared through lanes for vehicles and trams. As a result, trams are often delayed behind turning and parking vehicles.	Investigate opportunities to ban right-hand turning vehicles from Glenhuntly Road into side streets, at unsignalised intersections. Investigate improvements to signal phasing and intersection performance to further prioritise bus and tram movements.
PT4	The Sandringham Railway Line currently operates under a 'stopping all stations' basis, with no express services to the CBD from Elsternwick.	<i>Metro Tunnel works will increase passenger capacity on the Sandringham line by 48% in peak periods.</i> Future advocacy may include to investigate additional operational improvements along the corridor to decrease travel times and improve efficiency of train services.
PT5	Tram stops in the vicinity of Elsternwick Railway Station highly utilised relative to other stops due to the proximity to a connecting rail service. Passengers are required at this location to cross a trafficable lane to enter the tram which presents a pedestrian safety issue.	Investigate the potential opportunity to improve tram accessibility at key locations on Glenhuntly Road in particular in front of Elsternwick Railway Station. This may be done through the use of kerb outstands or similar.

4.6 Road Network

Overview

The Elsternwick Activity Centre is centered around Glenhuntly Road which operates in an east-west alignment and provides the only connection over the Sandringham Railway Line within the transport study area. The internal road network comprises a range of local access and connector streets. The road network in context of the study area is shown in Figure 4.17.

Figure 4.17: Existing Road Network



Source: Melway Online

Key Roads

Key roads within the study area are outlined as follows:

Nepean Highway is a Primary State arterial road under the control of the Department of Transport (DOT) and runs in a south-east to north-west direction. Abutting the study area, Nepean Highway has 4-lanes in each direction and a central median which contains tram access north of Glenhuntly Road. Service roads are provided on either side, providing separate access to abutting properties.

Glenhuntly Road is a Council Link road with a single shared tram and vehicle through lane in each direction. Glenhuntly Road generally operates in an east-west direction, and provides car parking on both sides of the road.

Orrong Road is a Council Link road which runs in a north-south direction. Orrong Road provides a single through traffic lane in each direction, plus on-road bicycle lane and parking lanes in both directions.

Riddell Parade is a Council Collector road which generally runs in a north-south direction between Glenhuntly Road in the north before turning into Clarence Street in the south. Riddle Parade provides a single through traffic lane in each direction with parking on both sides of the road.

Horne Street is classified as a Council Link road within the immediate vicinity of Glenhuntly Road and Elsternwick Station. Horne Street operates in a north-south direction and accommodates both vehicles and bus parking on both sides of the road. A central median is provided along Horne Street in the immediate vicinity of Glenhuntly Road.

The general cross section of the key roads within the study area are shown in Figure 4.18 to Figure 4.21.

Figure 4.18: Glenhuntly Road looking East



Figure 4.19: Orrong Road looking North



Figure 4.20: Riddell Parade looking South



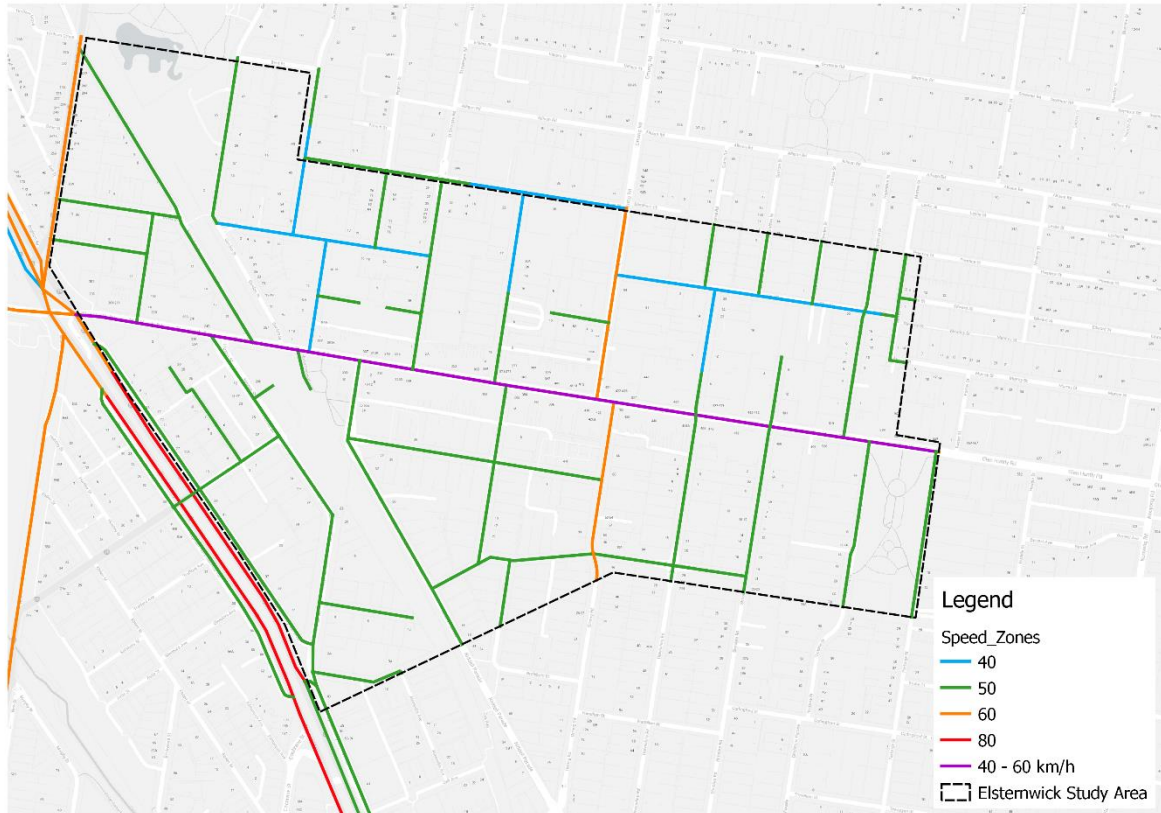
Figure 4.21: Horne Street looking South



Existing Speed Limits

Posted and default speed limits within the Elsternwick Activity Centre range between 40km/h to 60km/h and are presented in Figure 4.22.

Figure 4.22: Existing Speed Limits



Speed limits in local residential streets are typically set at a default 50km/h, with some 40km/h speed limits on roads fronting school access points. Posted speed limits of 80km/h operate along Nepean Highway abutting the transport study area.

Glenhuntly Road operates with a 40km/h speed limit between 8am to midnight, Monday to Saturday, and 60km/h outside of these times.

Existing Traffic Volumes

Traffic volume data was collated from a number of sources, including traffic classifier data and turning movement counts (provided by Glen Eira Council) and SCATS data obtained from signalised intersections and pedestrian operated crossing points.

In instances where 2022 data was not available, previous survey data used was reviewed to ensure it was suitable for use. Similarly, 2022 data was reviewed against historic data, where available, to confirm its suitability in context of any potential impacts created by Covid-19 and a shift away from office working and in-person retail activities. In this regard, the majority of data used was from 2022 (via SCATS or traffic surveys), or from 2019.

The available volume data used for this assessment is shown in Figure 4.23 with the relevant sources and dates listed within Table 4.6.

Figure 4.23: Location and Type of Available Data



Table 4.6: Type of Available Traffic Data

Data Type	Description	Source	Date
Traffic Classifier Data	Tube count data records the number of vehicles as well as the class and speed of vehicles for a 24-hour period, generally over the course of a full week.	Traffix Group	2018
		One Mile Grid	2019
		Ratio Consultants	2019
			2022
Turning Movement Counts	Camera footage is used to count vehicle turning movements at intersections	GTA Consultants	2017
		One Mile Grid	2017
			2019
		Ratio Consultants	2019

Theoretical Road Capacity

An assessment was undertaken of individual roads theoretical traffic carrying capacities, having regard to the definitions outlined in AustRoads¹. The assessment has consideration of the typical mid block capacities for various types of urban roads with interrupted flows. In this regard, AustRoads sets out a capacity of 900 vehicles per lane per hour. Assuming that 10% of traffic occurs within the peak hour, this equates to 9,000 vehicles per separate lane of traffic per day.

Table 4.7 below sets out the key roads within the study area, their Planning Scheme definition for indicative daily maximum traffic volumes, AustRoads theoretical capacity based on geometrical attributes (e.g. number of lanes), and existing volumes.

It is noted that all key roads presented below have 2-lanes of traffic, equating to a daily capacity of 18,000 vehicles per day.

Table 4.7: Austroads Theoretical Capacity Assessment for Key Roads

Road Name	No. of Lanes	Planning Scheme Indicative Daily Maximum Traffic Volumes	Austroads Theoretical Road Capacity	Existing Daily Traffic Volume (vehicles per day)
Glenhuntly Road	2	>7,000	18,000 vehicles per day	16,000
Orrong Road – North	2	3,000 – 7,000		9,000
Orrong Road - South	2	3,000 – 7,000		4,200
Horne Street	2	3,000 – 7,000		6,550
Riddell Parade	2	3,000 – 7,000		4,550
Rusden Street	2	3,000 – 7,000		5,280
St Georges Road	2	3,000 – 7,000		4,010

Based on the AustRoads guidance and definitions, all roads are operating within their theoretical midblock traffic carrying capacity.

It is noted that for Glenhuntly Road the daily volumes of 16,000 vehicles per day is approaching the upper limit of this capacity. A review of historic data for Glenhuntly Road has shown that traffic volumes have remained largely consistent in the past 10-15 years.

The indicative maximum traffic volumes outlined in the Glen Eira Planning Scheme are considered to be a road's 'environmental capacity'. These volumes, which are broadly adopted across jurisdictions including around Australia and New Zealand, are less than the theoretical capacity, and consider a range of other factors including resident's expectations as they relate to amenity and safety.

A number of key findings were established when comparing the Planning Scheme 'indicative maximum daily traffic volumes' to recorded existing volumes:

- Orrong Road (north of Glenhuntly Road) is exceeding the upper limit for the definition of a Connector Street;
- Horne Street and Rusden Street are approaching their upper limit of 7,000 vehicles per day for Connector Roads; and
- Selwyn Street, Gordon Street, Staniland Grove, and Beavis Street are approaching the upper limit of 3,000 vehicles per day for Local Access Streets.

It is noted that while environmental capacities for local streets are based on a range of research and evidence, they rely on community expectations and anecdotal evidence. Where volumes exceed the environmental capacity, there are typically two scenarios:

- increase the roads environmental capacity, by changing the road classification; and / or

¹ Austroads Guide to Traffic Management Part 3 – Transport Study and Analysis Methods

- implement local area traffic management to discourage non-local through traffic volumes, improve amenity and safety.

The response for each street needs to be considered on a case-by-case basis, balancing a range of other land use factors, as well as the relevant movement & place classifications.

Issues and Opportunities: Road Network

Having consideration of the above data and information, background review and on-site observations, the issues and potential opportunities for the road network within the Elsternwick Transport Study area are outlined in Table 4.8 below.

Table 4.8: Road Network Issues and Opportunities

Item	Description of Issue	Potential Improvement or Intervention
RN1	Glenhuntly Road, a local road, carries high traffic volumes, with queueing and congestion observed on site.	Work with other road authorities to prioritise movements on the State Arterial Road network to remove non-local through traffic from Glenhuntly Road.
RN2	Relatively high traffic volumes and 50km/h speed limits on a number of key local residential streets.	Introduce traffic calming measures and lower speed limits on local access streets to deter non-local traffic.
RN3	Additional development traffic is likely to change the classification of roads based on their Planning Scheme definitions.	Improving access to sustainable transport modes, including parking policy levers will reduce the number vehicular trips generated by new developments.

4.7 Laneways

Multiple laneways are provided throughout the transport study area, providing rear vehicular and service access to properties, including both sides of Glenhuntly Road. The laneways also provide alternate vehicular and pedestrian access to a number of public car parks.

Examples of typical laneways within the study area are provided in Figure 4.25 to Figure 4.28.

Figure 4.25: Laneway between Selwyn Street and St Georges Road



Figure 4.26: Laneway between Staniland Grove and Orrong Rd proving Delivery Access



Figure 4.27: Laneway between Staniland Grove and Orrong Rd with Private Car Park Access



Figure 4.28: Laneway between Orrong Road and Carre Street Providing Through Vehicle Access



Surveys of key laneways within the Study Area, to capture the typical day-time volumes of pedestrians and vehicles were undertaken, with locations presented in Figure 4.29 survey results presented in Table 4.9.

Figure 4.29: Laneway Survey Locations

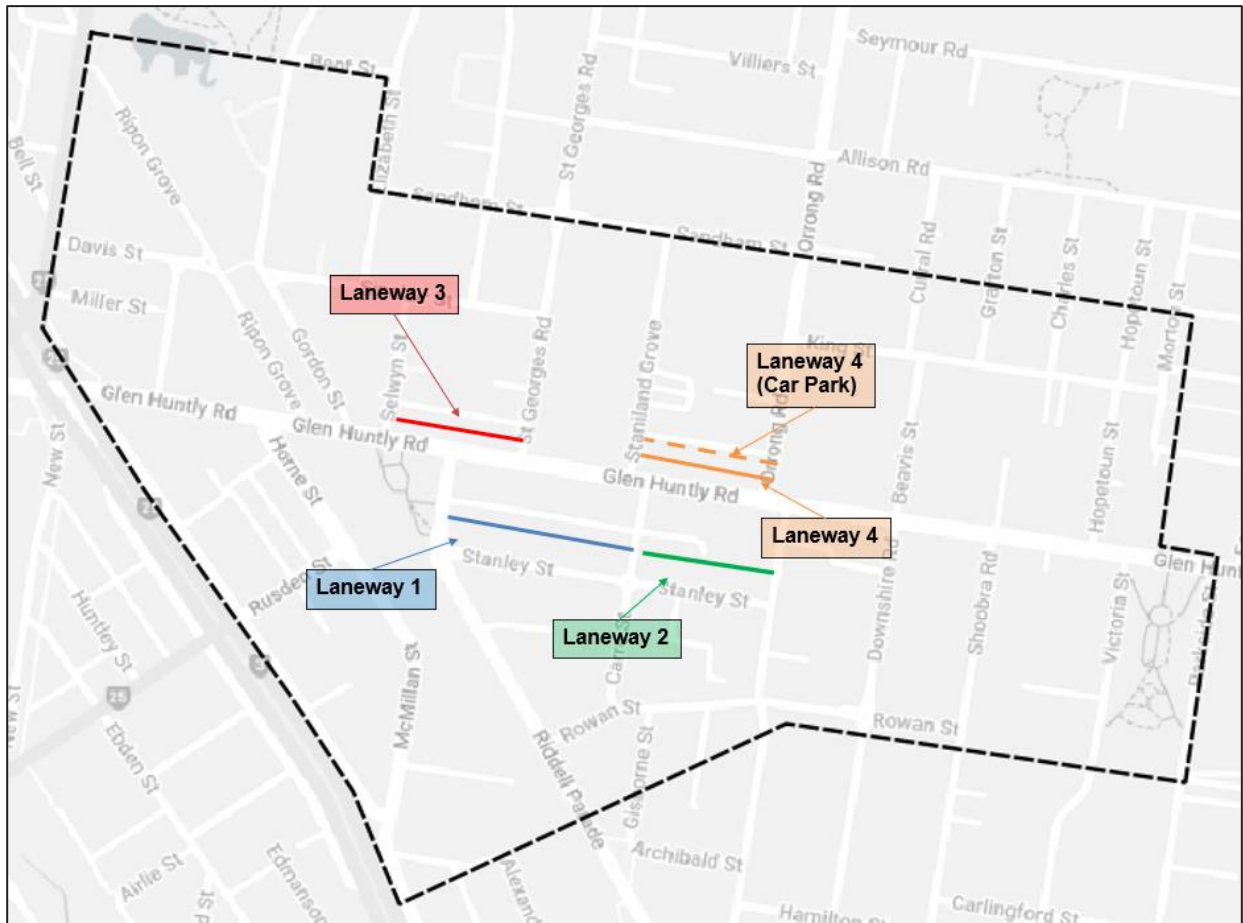


Table 4.9: Laneway Survey Volumes (Weekday, 7am - 7pm)

Laneway ID	Approx. Width (m)	Access Point	Total Vehicles (7am - 7pm)	% Heavy Vehicles	No. of Pedestrians (7am - 7pm)	No. of Cyclists (7am - 7pm)
Laneway 1	3.2 metres	Eastern	96	1%	214	6
		Western	99	6%	150	5
Laneway 2	3.2 metres	Eastern	149	1%	512	6
		Western	917	<1%	345	4
Laneway 3	3.2 metres	Eastern	22	<1%	97	1
		Western	25	<1%	274	2
Laneway 4 (Laneway)	2.5 - 3.2 metres	Eastern	0	<1%	873	2
		Western	22	5%	745	5
Laneway 4 (Car Park Aisle)	4 - 5.5 metres	Eastern	988	1%	272	6
		Western	1,211	1%	351	8

The data identified that all laneways were heavily utilised by pedestrians relative to the usage by vehicles, and that all laneways could be considered to be shared areas given the narrow widths and the requirement for vehicles and pedestrians to utilise the same space.

It is noted that high-pedestrian volumes in Laneways 1 and 2 are likely a result of access to and from the off-street car parks, as the most efficient and direct route towards Glenhuntly Road, as illustrated in Figure 4.30.

Figure 4.30: Stanley Street Car Parking Pedestrian Access Routes along Laneways



Laneway 4, which includes a laneway and adjoining car park which runs between Staniland Grove and Orrong Road experienced relatively high volumes of traffic and pedestrian movements. Based on our observations of the volume of car parking and types of laneway property access, it could be reasonable to assume that the car park is being used as a connection for through traffic, avoiding Glenhuntly Road.

As it relates to the environmental and theoretical capacity of laneways, there are several definitions for the appropriate quantity of vehicles using a laneway or 'shared zones'. The Glen Eira Planning Scheme identifies an indicative maximum daily traffic volume of 300 vehicles for Access Laneways 5.5 metres wide.

Additionally, the Department of Transport guidelines specify that shared zones are suitable in locations which carry less than 200 vehicles per hour in peak periods, or less than 1,000 vehicles between 7am and 7pm. The maximum design speed for a laneway and shared zone using the above guidance, is 10km/h and 20km/h respectively.

Separate to the laneways discussed in detail above, there are a number of other laneways which exist in the study area which provide rear property access. A number of these laneways are further constrained with a single width (e.g. less than 5.5 metres wide) and terminating or with 90 degree bends. In these instances, the actual capacity will be less where there is the potential of vehicles getting blocked if entering and exiting in opposing directions.

In this regard, Australian Standard AS2890.1 (Off-Street Parking) states that as a guide, 30 or more movements in a peak hour (in and out combined) requires the ability for two vehicles to pass on a driveway. For constrained laneways (e.g. laneways which act as non-continuing driveways, less than 5.5 metres wide), 30 vehicle movements could be considered as the capacity.

Both types of laneways, including through and terminating can be managed through a number of mechanisms including but not limited to:

- Widening (usually progressively through development);
- Creating new through connections with new developments;
- Traffic management such as localised traffic control systems in new developments; and
- Altering the traffic flow, such as making one-way.

Issues and Opportunities: Laneways

Having consideration of the above data and information, background review and on-site observations, the issues and potential opportunities for key laneways within the Elsternwick Transport Study area are outlined in Table 4.10 below.

Table 4.10: Laneway Issues and Potential Improvements

Item	Description of Issue	Potential Improvement or Intervention
LN1	Obstructions and vehicles propping in laneways blocking access.	Investigate opportunities to better manage existing waste and loading activities in laneways.
LN2	Conflict between pedestrian access and rear service / vehicle access to properties which have frontages to Glenhuntly Road.	Provision of alternate safe and efficient pedestrian routes to be considered, where required.
LN3	The relatively high use of laneways for pedestrian access may limit the ability to provide further property accesses (and thus increasing traffic volumes)	Investigate opportunities to implement traffic management in laneways, including widening if possible. Consideration should be also given to provision of separated or supporting pedestrian facilities where volumes of pedestrians and vehicles are high.

4.8 Road Safety

To understand the existing road safety characteristics for the transport study area, including trends in casualty crashes along the Glenhuntly Road corridor, the most recent 5 year period of DOT Crashstats data was reviewed (2016-2021). The data was analysed and separated into vulnerable (pedestrian, cycling) and non-vulnerable (vehicle only) crashes, as well as by severity, with the results presented in Figure 4.31.

Figure 4.31: 5 Year Casualty Crash Data for Transport Study Area (by user and severity)



The above analysis indicates that the majority of crashes, including almost all fatal and serious injury crashes (FSI) occurred along Glenhuntly Road.

The most predominant casualty crash type within the study area involved pedestrians, typically at intersections, both signalised and unsignalised.

A number of cyclist crashes were also observed in the data, which were distributed along Glenhuntly Road.

The two areas of particular interest in the available data include Glenhuntly Road between the Railway Station and Orrong Road (including signalised intersection), and the intersection of Glenhuntly Road and Nepean Highway.

Two fatal injury crashes were recorded in the past 5 years of available data, including:

- at the intersection of Glenhuntly Road and Selwyn Street, involving a heavy vehicle resulting in death of a pedestrian; and
- a head on collision between two cars at the intersection of Orrong Road and Glenhuntly Road.

Issues and Opportunities: Road Safety

Having consideration of the above data and information, background review and on-site observations, the issues and potential opportunities for safety within the Elsternwick Transport Study area are outlined in Table 4.11.

Table 4.11: Issues and Potential Improvements for Road Safety

Item	Description of Issue	Potential Improvement or Intervention
S1	High number of pedestrian crashes along Glenhuntly Road	Prioritise pedestrian safety improvements and enhancing walkability within the Activity Centre.
S2	High number of cyclist crashes along Glenhuntly Road	Investigate the detailed causes of each crash, to understand the specific issues which may include dooring, turning movements, tram tracks etc.
S3	Relatively high number of crashes occurring at the intersection of Glenhuntly Road with Orrong Road and Nepean Highway	Work with DOT to identify potential road safety interventions to improve the safety of all modes.
S4	Pedestrian and cyclist safety within local streets	Implement 40km/h area speed limits across the entire transport study area including investigating appropriate road traffic calming devices.

4.9 Car Parking Characteristics

Available Parking Options

A variety of on street and off-street parking opportunities exist with the Elsternwick Activity Centre, including both Council owned / managed and private but publicly accessible off-street car parks.

Surveys undertaken by Glen Eira City Council in 2017 for Major Activity Centres in Glen Eira indicated that there were approximately 1,247 off-street car parking spaces within the survey study area.

The location of off-street parking within the transport study area, including ownership and supply, is shown in Figure 4.32 and Table 4.12.

Figure 4.32: Publicly Available Off-Street Car Parks

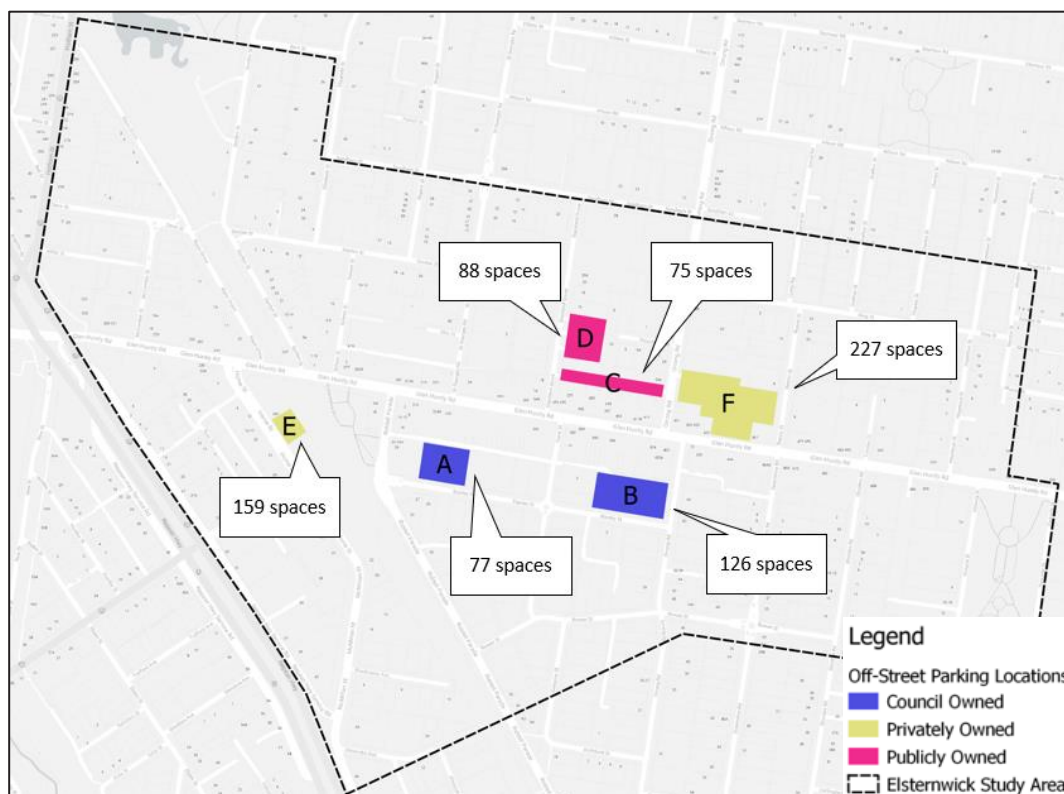


Table 4.12: Off-Street Car Parking Characteristics

Car Park	Description	Management	At Grade / Multilevel	Supply	Typical Restrictions
A	Stanley Street – West	Council	At Grade	77 spaces (2 DDA)	P, 4P, Loading, DDA
B	Stanley Street – East	Council	At Grade	126 spaces (3 DDA)	4P, 2P, DDA
C	Staniland Grove – Orrong Road	Council	At Grade	75 (2 DDA)	2P, DDA
D	Elsternwick Library	Council	At Grade	88 (1 DDA)	P, 2P, DDA
E	Elsternwick Station	DOT / Victrack	Multi-Level	159 spaces (4 DDA)	P, 3P, DDA
F	Elsternwick Coles	Private	Multi-Level	227 (DDA unknown)	2P

Source: Glen Eira City Council

The existing car parking supply and management characteristics for on-street car parking within the study area is summarised in Table 4.13. The respective zone numbers, including the location of on-street car parking spaces for people with disabilities is shown in Figure 4.33.

Table 4.13: On-Street Parking Characteristics

Zone	Total Supply	Allocated Zones ¹	Parking for people with disabilities	Very Short Term (30 mins or less)	Short Term (e.g. 1P, 2P)	Medium and Long Term (4P, Unrestricted)
1	235	6	0	0	111	118
2	205	12	1	1	125	66
3	257	13	3	1	142	98
4	343	14	4	8	170	147
5	130	2	0	2	91	35
6	265	9	1	2	129	124
7	168	7	1	3	90	67
Total	1603	63	10	17	858	655

¹ Allocated Zones refers to parking spaces with loading zones, mail zones signage etc.

Figure 4.33: Zones and Location of DDA On-Street spaces



Parking Management and Restrictions – Discussion

A range of on-street parking restrictions are in place throughout the Activity Centre which range between short term stay (15 minute) and unrestricted. Typical parking along Glenhuntly Road is short-term parking of 1 hour duration, with some quarter hour or less parking. Other zone restrictions, such as loading, bus, mail zones are less common and distributed based on their need to support a particular activity at a particular location.

Streets in the immediate vicinity of Glenhuntly Road and the Elsternwick Activity Centre are signed with a mixture of long and short term parking, with the majority of spaces allocated 2 hour parking. Permit zones are also in place throughout the residential areas surrounding the core commercial area of the Elsternwick Activity Centre.

Unrestricted car parking is located farthest away from Glenhuntly Road within the Activity Centre, as well as in the vicinity of the Railway Station in Gordon Street. Additionally, Riddell Street accommodates 4P restricted parking before transitioning to unrestricted all-day parking in the proximity of Rowan Street.

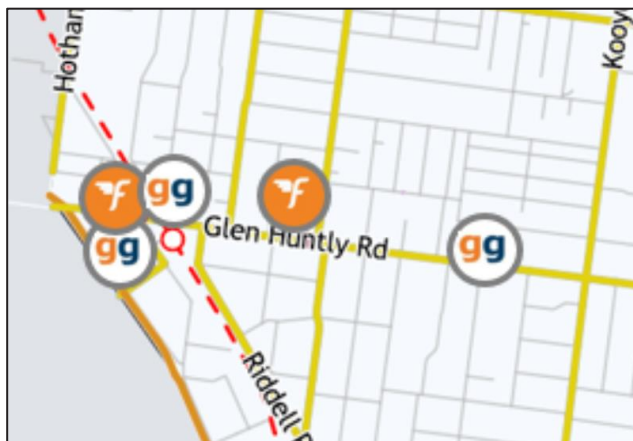
Off-Street typically accommodates short and medium term parking ranging from 1 hour to 4 hours, with the exception of the Elsternwick Station and Elsternwick Library car parks which provide all day parking for staff, commuters and visitors.

A number of DDA compliant parking spaces for people with disabilities are provided within the Activity Centre and are typically located within the public off-street car parks, away from Glenhuntly Road. DDA car parking is also provided at limited locations in on-street locations, typically in streets intersecting Glenhuntly Road.

Car Share Spaces

As of the time of this study, there were two car share providers within the Elsternwick Activity Centre with a total of five car share vehicles available. The vehicles are generally located within the vicinity of Elsternwick Train Station and reside within close proximity to Glenhuntly Road. The location of the available car share vehicles is shown in Figure 4.34.

Figure 4.34: Available Car Share Vehicle Locations



Source: Glen Eira City Council

Parking Demand Characteristics

To gain a high-level understanding of existing car parking demand characteristics, a comparison was undertaken of available data sources, including survey data provided by Glen Eira Council from a range of sources, and the car parking analysis undertaken for Elsternwick in 2017 by Glen Eira Council. The data sets include a mixture of on and off-street parking surveys across both a typical weekday and weekend.

As it relates to changes between the 2017 and respective 2019-2021 survey dates, there is minimal change in the results to maximum parking occupancy rates in surveyed off-street car parks.

Results showed that parking occupancy rates change dramatically over the course of the day, with peak occupancy occurring during the lunch period (10:00am – 2:00pm) for both the weekday and weekend.

Off-street parking on the western end of Stanley Street (Car Park A) experienced the highest demands, with maximum occupancies from the available survey dates ranging between 92% and 95%. Further east in Stanley Street (Car Park B), maximum occupancies from the available survey dates ranged between 67% and 81%, which was lower than Stanley Street west (Car Park A).

Off-street parking to the north of Glenhuntly Road (Car Park C and D) experienced relatively lower maximum occupancy rates ranging between 76% and 79% in the peak. Elsternwick Library (Car Park D) parking recorded occupancies over 90% during the peak periods.

On-street parking had generally high occupancy rates along Glenhuntly Road and nearby side streets, with occupancy ranging between 78% - 100% in the peak periods, depending on the street section / location. The data indicates that parking occupancy rates decrease in streets further away from Glenhuntly Road.

Unrestricted parking experienced higher occupancy rates on weekday peaks (100% occupied) which correlated to commuters using Elsternwick Station and nearby public transport. During the weekend peak, the maximum occupancy rates for unrestricted parking was lower (42% occupied).

Summary

The availability of car parking both on and off street within the Elsternwick Activity Precinct varies across the time of day, time of week, and location. Trends observed across multiple survey data sets are generally consistent, with peak on-street and off-street occupancy periods during the weekday and weekend lunch period.

Car parking is typically managed in accordance with the Glen Eira Parking Policy, with restrictions on Glenhuntly Road encouraging turnover (1P) and Council managed off-street parking ranging from 2P to 4P, including some all-day parking.

Issues and Opportunities: Car Parking

Having consideration of the above data and information, background review and on-site observations, the issues and potential opportunities for parking within the Elsternwick Transport Study area are outlined in Table 4.14.

Table 4.14: Issues and Potential Improvements for Car Parking

Item	Description of Issue	Potential Improvement or Intervention
CP1	Orrong Road south of Glenhuntly Road is generally quite steep and an unsuitable location for parking for people with disabilities.	Locate DDA car parking close to Glenhuntly Road on connecting side streets, with a focus on the areas north of Glenhuntly Road.
CP2	Most parking for disabilities is located in off-street areas with limited on-street located close to Glenhuntly Road.	Introduce DDA compliant parking within sides off Glenhuntly Road within the first available space
CP3	Traffic congestion along Glenhuntly Road may be contributed to by inadequate turnover of on-street parking resulting in vehicles circulating for car parking.	Vehicle sensors and dynamic signage used for on and off-street parking within the area. Prioritise further very short-term parking spaces (e.g. 15-30 minutes) along Glenhuntly Road, to enhance turnover of a high demand resource
CP4	Electric vehicles are an emerging transport trend and infrastructure will facilitate its uptake	Introduce public charging stations and speciality parking spaces available for electric vehicle use
CP5	Limited car share opportunities are provided across the study area, with the majority of car share vehicles located on the western end of Glenhuntly Road	Investigate further opportunities to increase car share uptake and provision, including in new developments
CP6	Previously completed car parking occupancy surveys indicate that there are generally high demands for off-street parking within the study area, varying from location to location and by restriction.	Several car parks had peak occupancies in the order of 70-90% which indicates a potential opportunity to repurpose some car parking or shift demands from on-street to off-street. Any changes will need to be subject to detailed car parking occupancy surveys including consideration of any future demands and also policy considerations regarding mode shift towards sustainable transport.

5 Future Land Uses:

5.1 Key Assumptions

The following key assumptions were developed with input from Council in order to effectively calculate the future trip generation characteristics of the transport study area. Please note that this list represents the key considerations, and further discussion of the assumptions made to complete the study are presented throughout the following sections of this report.

Future Mode Splits

The Glen Eira Integrated Transport Strategy (ITS) identifies a vision for 50% of all trips within the municipality by non-car modes. In calculating the future additional trips generated by new land uses within the area, an assumption was made of 50% of all trips made by car and sustainable transport respectively. Although expected with the implementation of the ITS, no adjustments were made to the mode share of existing trips in order to provide a conservative assessment of the traffic impacts.

Built Form and Access

The scale and access arrangements for proposed built forms within Elsternwick is taken from the *Elsternwick Built Form Framework* (BFF) prepared by Lat37. The BFF identifies where vehicular and pedestrian access for new developments will be taken from, including where relevant from rear of property laneways. The BFF also identifies the future characteristics of key streets and laneways in terms of their role in provide active frontages and pedestrian priority.

Population Growth, Density and Location

Details of the location, size and type of future expected dwellings by the year 2036, were provided by Council and taken from the SGS Economics *Housing Capacity and Demand Analysis* report. The level of detail provided included a block-by-block assessment of the net increase in dwellings, as well as population density assumptions.

Retail and Commercial Land Uses

Details and assumptions of the future uplift in retail and commercial floor areas, including rezoning of land to Commercial Zoning, were provided by Council, including utilising the SGS Economics *Employment Land Needs Assessment* report. The total uplifts in retail and commercial floor areas were evenly distributed across the Built Form Framework area as advised by Council.

Car Parking Management

Car parking for future developments will be assessed in accordance with the Glen Eira Planning Scheme.

For the purposes of this assessment and report, Column B rates are currently applicable for the majority of expected future land uses, given the position of the study area in context of the Principal Public Transport Network (PPTN).

Furthermore, public parking will be managed in accordance with the Glen Eira Parking Policy.

5.2 Elsternwick Built Form Framework

Overview

The Elsternwick Built Form Framework sets out the location of active frontage and preferred access for streets within the Built Form Framework study area. These streets and their designations are key considerations of this transport study and assessment.

Design Principles

The Built Form Framework outlines a number of key transport, parking and access objectives and principles which are relevant to this study, which are summarised below:

WALKABILITY AND ACCESSIBILITY

Ensuring walkability and accessibility for all is key to sustaining a connected, active and healthy community and to ensure its economic and environmental sustainability.

Active Frontages:

- It is recommended that active frontages are provided to all public open spaces and streets.
- Where active frontages are not able to be achieved at ground level, such as in service lanes, they should be incorporated at the first and second levels at a minimum to provide passive surveillance.

Main Entrance:

- It is recommended that the primary pedestrian entrance, to both residential and commercial buildings is provided on the main street available to the property, in order of street hierarchy.

Limited Crossovers:

- It is recommended that crossovers are consolidated if possible, and that these are separated as much as possible.
- Vehicles must be able to see pedestrians as they approach the property boundary when exiting the site.
- No new crossovers should be created on Glenhuntly Road with these properties relying on laneways and rear access where possible.

ENVIRONMENTALLY SUSTAINABLE DESIGN

The relative density and mix of uses in the Elsternwick MAC allow for the efficient delivery of services, energy savings and viable sustainable transport options.

Sustainable Transport:

- Developments should encourage people to make sustainable mode choices and provide infrastructure such as:
 - bicycle parking in line with or exceeding Better Apartment Design Standards,
 - electric vehicle power stations within car parks; and
 - ensure safe and pleasant walking and cycling egress and access.
- Car share initiatives should be encouraged to reduce vehicle ownership and free up valuable space.

FUNCTIONALITY AND LEGIBILITY

All new built form must enhance its context's coherent and imageable pattern and respond to activities and existing hierarchies.

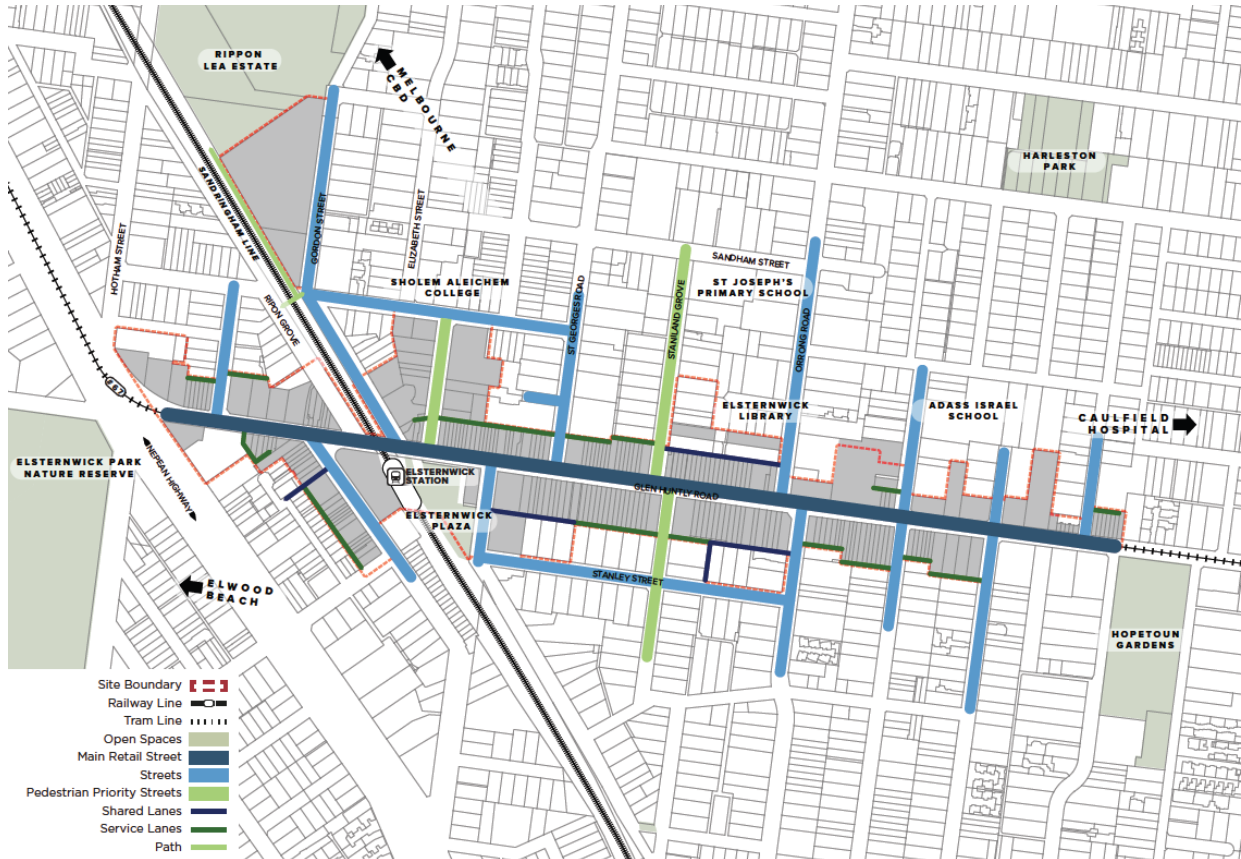
Vehicle Access / Egress:

- Its design and location must minimise crossovers and impact to traffic.
- It must be placed in a logical location, in accordance with the street hierarchy.
- It is recommended that vehicles access / egress is provided via service lanes and secondary streets and that no vehicles access is allowed on the primary activation corridor along Glenhuntly Road.
- This will allow for pedestrian safety and activated frontages.

Street Network Hierarchy

The proposed street network hierarchy from the Elsternwick Built Form Framework is replicated in Figure 5.1, with respective definitions shown in Table 5.1.

Figure 5.1: Elsternwick Built Form Framework – Street Network Hierarchy



Source: Elsternwick Built Form Framework, Lat37

Table 5.1: Street Network Hierarchy Definitions

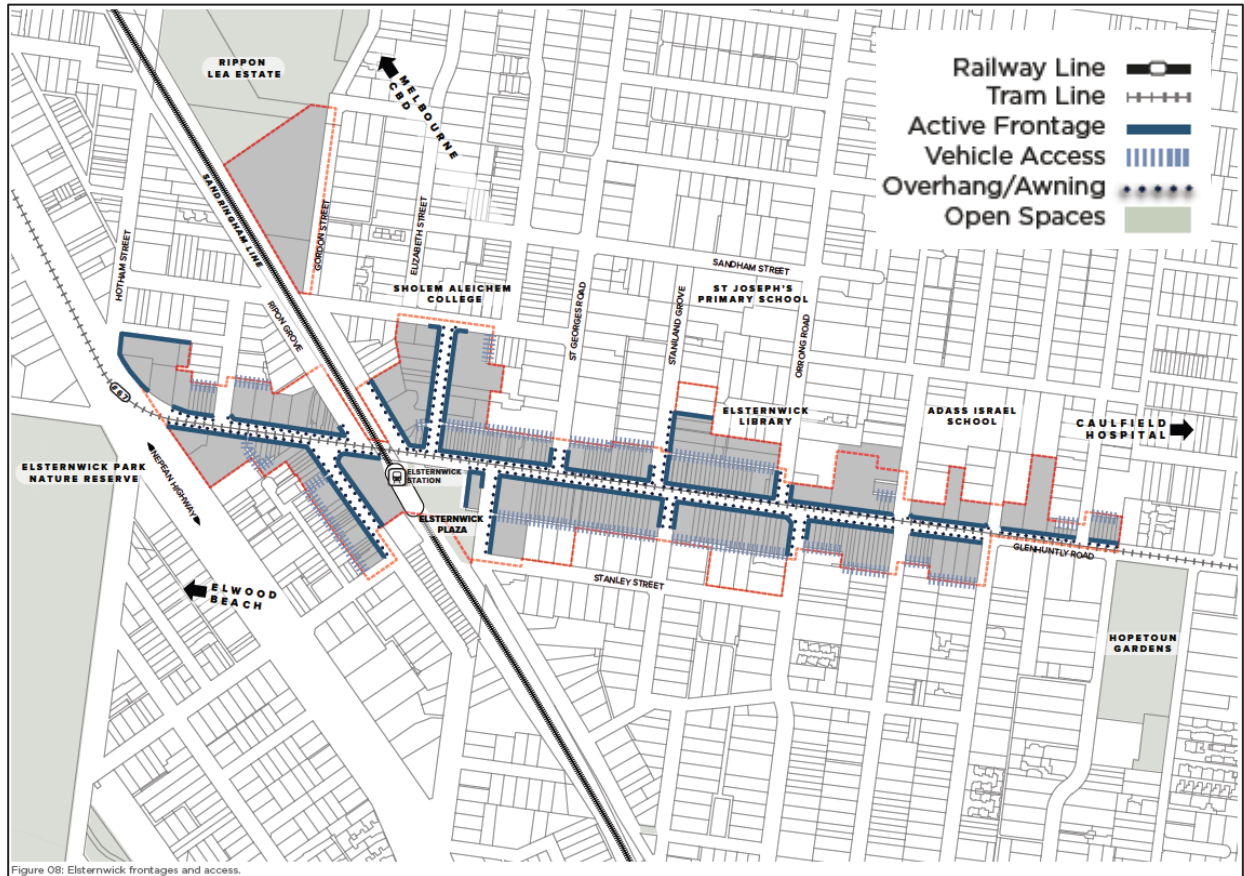
Street Network Hierarchy Classification	Relevant Definition
Main Retail Street	Active frontages at the ground level, balconies and windows at the upper levels to provide opportunities for passive surveillance and prohibit new vehicle crossovers over the pedestrian priority footpath.
Pedestrian Priority Streets	Open spaces and pedestrian priority streets should require active frontages at the ground level.
Shared Lanes	Shared lanes should encourage active frontages and vehicle access.
Service Lanes	Service lanes should encourage vehicle access.

Source: Elsternwick Built Form Framework, Lat37

Active Frontages and Access

Further to the above street hierarchy layout, the Built Form Framework identifies the location of active frontages and vehicular access, based on the principles and guidelines provided. The location of active frontages and access as replicated from *Figure 08 of the Built Form Framework* is shown in Figure 5.2.

Figure 5.2: Elsternwick Frontages and Access



Source: *Elsternwick Built Form Framework, Lat37*

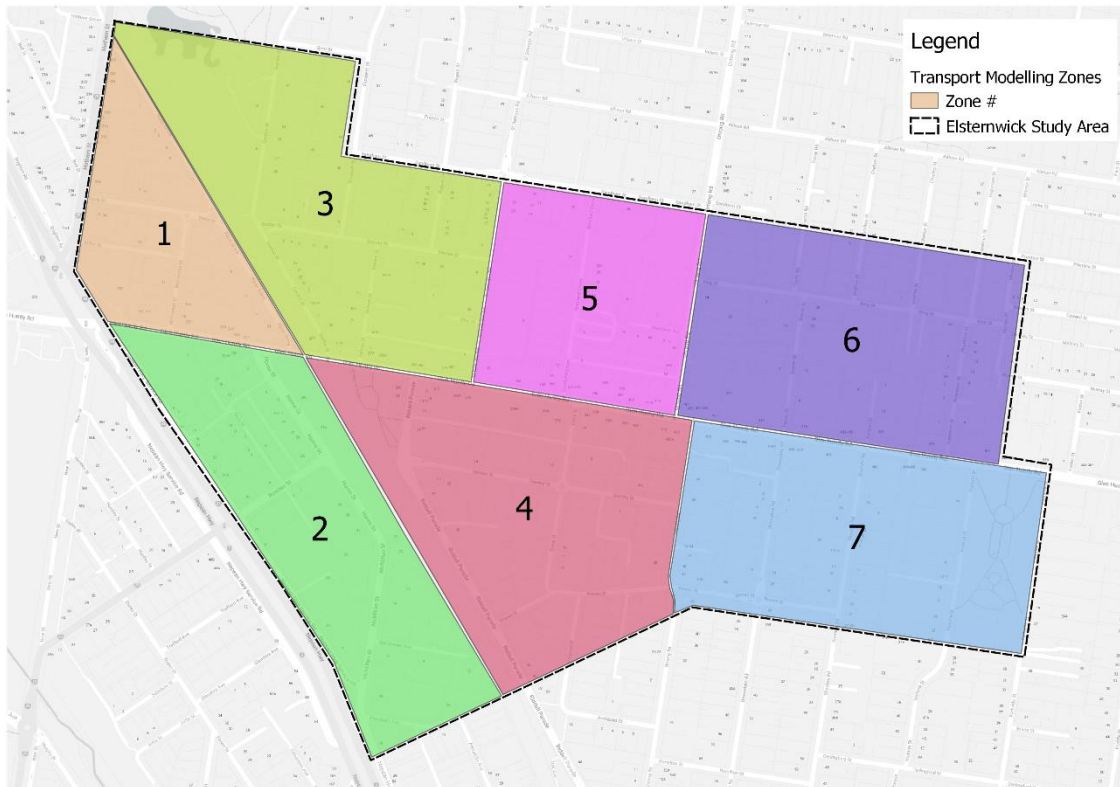
The above figure indicates that the majority of new development in the Built Form Framework area will have vehicular access from rear laneways, with active frontages, and hence the main pedestrian accesses, to either Glenhuntly Road or abutting streets.

5.3 Transport Study Zones

To calculate the expected additional trips generated by 2036, including by transport mode, the study area was broken up into seven transport zones as shown below. The high-level structure of these zones was established based on the key road network and allows distribution of trips at an appropriate level for this type of assessment.

The breakdown of transport zones for this assessment are illustrated in Figure 5.3.

Figure 5.3: Transport Assessment Zones



5.4 Residential Dwellings

The number of future dwellings used in this assessment were provided by Council for the year 2036. A summary of total future and net additional for each of the seven transport zones is shown in Table 5.2.

Table 5.2: Total and Net Additional Dwellings in Elsternwick by 2036

Transport Zone	Total Dwellings (2036)	Net Additional Future Dwellings (2036)
1	621	+425
2	666	+330
3	906	+705
4	310	+206
5	304	+141
6	461	+73
7	364	+193
Totals	3,632	+2,072

Source: Glen Eira City Council / SGS Economics

5.5 Commercial and Retail Floor Space

The amount of additional retail and commercial floor space used in this assessment was also provided by Council for the year 2036. The floor areas were apportioned evenly across the existing commercial and mixed-use zoned areas, including future potential rezoned sites.

Table 5.3: Additional Retail and Commercial Floor Space

Transport Zone / Sub Precinct	Net Increase in Retail Floor Space (2036)	Net Increase in Commercial Floor Space (2036)
1	+2,347	+1,191
2	+2,104	+1,068
3	+1,636	+830
4	+4,138	+2,100
5	+1,705	+865
6	+1,254	+636
7	+216	+110
Totals	+13,400	+6,800

Source: Glen Eira City Council / SGS Economics

6 Future Trip Generation:

6.1 Methodology

The following methodology presented in Figure 6.1 was used in the derivation of suggested modal generation rates for this study.

Figure 6.1: Trip Generation Derivation Methodology

Mode Share Data Analysis

6.2 Mode Splits

The mode split of future trips to and within the area were guided by the vision of the Glen Eira Integrated Transport Strategy, which is to strive for 50% of trips by non-car modes by 2031. The analysis is supported by a range of ABS (Journey to Work) and VISTA data, including benchmarking similar nearby activity centres with mode splits closer to the ITS vision.

The mode splits adopted for this assessment, including comparison to existing conditions are outlined in Figure 6.2.

Figure 6.2: Existing and Future Mode Splits – Elsternwick

6.3 Trip Generation Rates

Residential Trip Generation Rates

A review and analysis of VISTA data indicated that people undertake 2.9 trips per person per day on average in Elsternwick. Forecasts provided by Council citing profile.id analysis (which using ABS data) indicates that there will be on average 2.3 people per household within Elsternwick by 2036.

The combination of these factors results in a daily residential trip generation rate of 6.7 trips per household (all modes) for the suburb of Elsternwick by 2036.

The daily rate of 6.7 trips per household was applied to the target mode share split of 50:50 private vehicle trips and sustainable transport trips, with the results shown in Table 6.1.

Table 6.1: Proposed Residential Trip Generation Rates, Additional Dwellings (2036)

Mode	Rate (household trips per day) ¹
Private Vehicle	3.4
Sustainable Transport	3.4
Total	6.7

¹ Includes rounding to the nearest decimal place

The above rates were validated against a variety of empirical data sources for high-density residential developments, including recent approved development applications in Elsternwick.

These trip generation rates ranged from 1.2 – 4.2 private vehicle trips per dwelling, placing the proposed rates for this study (3.4 private vehicle trips per dwelling) within the higher end of this range, and therefore considered appropriate.

For the purposes of this assessment, to establish the additional peak hour movements for future residential land uses, a typical peak to daily ratio of 10% has been adopted.

Retail Trip Generation

To assess the likely traffic generation of the retail Activity Centre, reference is made to the NSW Roads and Traffic Authority (RTA) Guide to Traffic Generating Developments document. It is assumed that Elsternwick shopping precinct acts as a shopping centre, with users concentrated around the Glenhuntly Road precinct and the subsequent retail services. As such, a case study for a shopping centre has been used.

The Employment Land Needs Assessment for Bentleigh, Carnegie, and Elsternwick Major Activity Centres was produced by SGS Economics and Planning in February 2022. The report outlines the existing retail and commercial floorspace located within the Elsternwick Major Activity Centre. For Retail and Retail Services land uses, a total of 59,500sqm of useable floor space exists. As such, the traffic generation rates for the comparably sized surveyed shopping centre have been used for this assessment.

For shopping centres of 30,000 – 40,000sqm in floor space, the NSW RTA Guide suggests a daily trip generation rate of 50 trips per 100sqm and 4.6 trips per 100sqm during the evening commuter peak hour.

In regard to the AM commuter peak, the NSW RTA Guide does not suggest a trip rate, similarly limited case study data is available for the AM peak period. For the purposes of this assessment, it has been assumed that the AM peak trip rate will be 10% of the PM peak trip rate (i.e., 0.46 trips per 100 sqm) to account with staff and servicing activities.

The proposed Activity Centre trip generation rates assume the above outlined trip generation rates and the mode splits previously outlined in Figure 6.2. The resulting traffic generation rates for the Activity Centre use are outlined in Table 6.2.

Table 6.2: Proposed Retail Trip Generation Rates, Additional Floor Space (2036)

Mode	Rate (trips per 100sqm)		
	Daily	AM Peak Hour	PM Peak Hour
Private Vehicle	50	0.46	4.6
Sustainable Transport	50	0.46	4.6
Total	100	0.92	9.2

Commercial Trip Generation

Empirical data collected by Ratio suggests that office developments in inner city and middle urban locations typically generate in the order of 2 vehicle trips per parking space per day, and 0.5 movements per space during the AM and PM commuter peak hours.

It should be noted, a review of Clause 52.06 of the Glen Eira Planning Scheme sets a Column B minimum car parking rate of 3 car parking spaces per 100sqm of net floor area. Assuming one trip inbound and one outbound per car space per day, a total of 6 private vehicle trips would occur per day. It is noted that these rates may be considered conservative when compared to recent developments within the area.

Further, an average office floor area density of 10 people per 100sqm would generate a total of 20 trips per day per 100 sqm, resulting in the remaining 14 trips occurring as sustainable transport trips.

Based on the above assumptions, the resulting traffic generation rates for the office type uses are outlined in Table 6.3.

Table 6.3: Proposed Commercial Trip Generation Rates, Additional Floor Space (2036)

Mode	Rate (trips per 100sqm)		
	Daily	AM Peak Hour	PM Peak Hour
Private Vehicle (Car)	6	1.5	1.5
Sustainable Transport (Non-Car)	14	3.5	3.5
Total	20	5	5

6.4 Internal Trip Reduction Factors

To account for residential trips generated within the Elsternwick Activity Centre to the office and activity centre / retail land uses, internal trip reduction factors have been derived for the non-residential uses within the precinct. These factors will be applied to the non-residential trips calculated for the Precinct to avoid double-counting of trips.

The internal trip reduction factors were derived by firstly interrogating 2018 VISTA data for Inner Melbourne and assuming that trips less than 800 metres (based on a 10-minute walking distance and the overall dimensions of the Precinct) would be fully contained within the Elsternwick Activity Centre.

The 2018 VISTA data was interrogated to determine the proportion of internal verses external trips to activity centres and places of work. The analysis of the VISTA data is summarised in Table 6.4.

Table 6.4: VISTA 2018, Glen Eira – Trips Under 800 metres

Mode	Trips <800m	Total Trips	% Trips <800m
<i>Journey to Work (Office / Commercial)</i>			
Private Vehicle	13	760	2%
Sustainable Transport	39	580	7%
<i>Activity Centres (Retail)</i>			
Private Vehicle	54	661	8%
Sustainable Transport	121	271	45%

The above internal trip reduction factors are applied to the total trips identified in Table 6.6 and Table 6.7 in the transport modelling assessment presented at Section 7 of this report.

6.5 Trip Generation Summary

The number of trips generated by the additional number of dwellings and increased retail and commercial floor area within the Study Area (as detailed in Section 5) are outlined in Tables 6.5 to 6.7 respectively.

Table 6.5: Additional Residential Trip Generation (2036)

Mode	Future Trip Generation Rate (per household / day)	Additional Dwellings	Additional Daily Trips	Additional Peak Hour Trips
Private Vehicle	3.7	+2,072 dwellings	7,667 / day	767 / peak hour
Sustainable Transport	3.7		7,667 / day	767 / peak hour
<i>Total Trips</i>	7.4		15,334 / day	1,533 / peak hour

Table 6.6: Additional Retail Trip Generation (2036)

Mode	Future Trip Generation Rate (per 100 sqm / day)	Additional Retail Floor Space	Internal Trip Reduction Factor	Additional Daily Trips
Private Vehicle	50	+13,400 sqm	8%	6,164 / day
Sustainable Transport	50		45%	3,685 / day
<i>Total Trips</i>	100		-	9,849 / day

Table 6.7: Additional Commercial Trip Generation (2036)

Mode	Future Trip Generation Rate (per 100 sqm / day)	Additional Retail Floor Space	Internal Trip Reduction Factor	Additional Daily Trips
Private Vehicle	6	+6,800 sqm	2%	400 / day
Sustainable Transport	14		7%	885 / day
<i>Total Trips</i>	20		-	1,285 / day

7 Traffic Impacts:

7.1 Overview

The following section outlines the traffic impacts associated with the Built Form Framework. The traffic generation rates associated with future land uses were added to the existing estimated traffic volumes and distributed using a detailed spreadsheet-based traffic model developed by Ratio.

Other assessments undertaken including intersection capacity assessment using SIDRA Intersection software as well as an assessment of the capacity and potential impacts on laneways.

The purpose of these assessments is to understand:

- what capacity exists within the road network to accommodate additional development generated traffic volumes from the Built Form Framework;
- what capacity exists within the road network to support future potential road network changes;
- what changes may be required to the existing classification of road network including cross sectional changes; and
- the supporting infrastructure and / or interventions required to facilitate the expected level of development by the year 2036.

7.2 Summary of Modelling Assumptions

The assumptions adopted for this assessment and the spreadsheet modelling exercise are outlined below in Table 7.1.

Table 7.1: Summary of Spreadsheet Model Assumptions

Assumption	Description
Trip Generation	Daily and peak hour traffic generation by land use, as outlined in Section 6.
Internal Trip Reduction Factors	A % reduction applied to daily and peak hour traffic generation based on the likely proportion of neighbourhood-based trips (<800 metres), as outlined in Section 6.
Distribution of Trip Directions	The daily % distribution of trip directions generated by the study area to outside the study area, e.g. north, east, south, west.

7.3 Trip Distributions

Based on the location of Elsternwick within the broader Melbourne context and surrounding key land uses including education and other activity centres, the following distribution of trip directions has been established and is presented in Table 7.2.

Table 7.2: Distribution of Trip Directions

Direction	Percentage Distribution (Total Daily) ¹
North	34%
East	27%
South	16%
West	22%

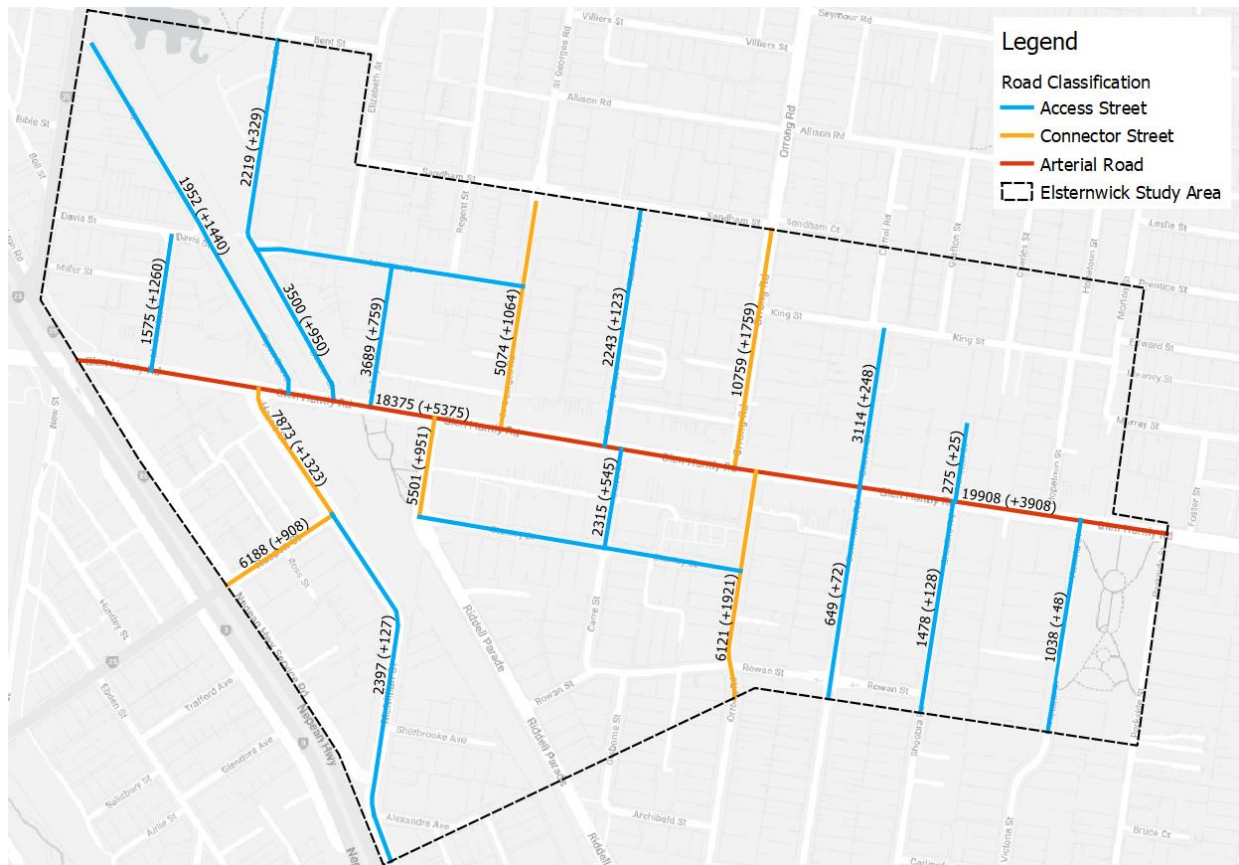
¹ Rounded to the nearest percentage

7.4 Future Mid-Block Traffic Volumes

Incorporating the above assumptions including trip generation rates established for private vehicles in Section 6, a spreadsheet model was developed to distribute the additional vehicle trips onto the surrounding road network and added onto the existing estimated traffic volumes.

The estimated future daily vehicle trips on key roads within the study area, including their difference from estimated existing volumes is presented in Figure 7.1.

Figure 7.1: Key Road Future Daily Volumes and Differences (2036)



Based on the spreadsheet modelling and analysis results presented above, a number of key impacts and findings were identified as it relates to the existing road Planning Scheme definitions. It is again reiterated that these definitions are not representative of a roads traffic carrying capacity, but rather have consideration of a range of amenity, geometrical and environmental factors.

The findings and subsequent description of potential changes or future considerations are presented in Table 7.3.

Table 7.3: Potential Road Hierarchy Changes

Road Name	Existing Classification	Estimated Future Daily Traffic Volumes (+ Difference from Existing)	Description of Potential Changes
Horne Street (Glenhuntly Road to Rusden Street)	Connector Street (3,000 – 7,000 vpd)	7,873 vpd (+1,323 vpd)	This section of road is already a median separated, two-lane road, with a bus interchange and pedestrian priority treatments. Considerations should be given to intersection treatment types at Glenhuntly Road to ensure the efficient and safe movement of vehicles, in particular buses.
Gordon Street	Access Street (1,000 – 3,000 vpd)	3,500 vpd (+950 vpd)	Gordon Street is a local street with unimpeded two-way traffic flow, without separation. The increase in traffic volumes above the threshold for a local access street may warrant a change in hierarchy for Gordon Street to a Connector Street (3,000 – 7,000 vpd). A minimum trafficable width of 6.0 metres should be maintained (i.e. 3.0 metre wide lane in each direction) to support expected vehicular movements.
Selwyn Street	Access Street (1,000 – 3,000 vpd)	3,689 vpd (+759 vpd)	Selwyn Street is a local access street with a number of existing and future high activity developments. A minimum trafficable width of 6.0 metres should be maintained (i.e. 3.0 metre wide lane in each direction) to support expected vehicular movements.
Beavis Street	Access Street (1,000 – 3,000 vpd)	3,114 vpd (+248 vpd)	Beavis Street is a local access street with a number of existing and future high traffic generating developments. A minimum trafficable width of 6.0 metres should be maintained (i.e. 3.0 metre wide lane in each direction) to support expected vehicular movements.

7.5 Key Intersection Capacities

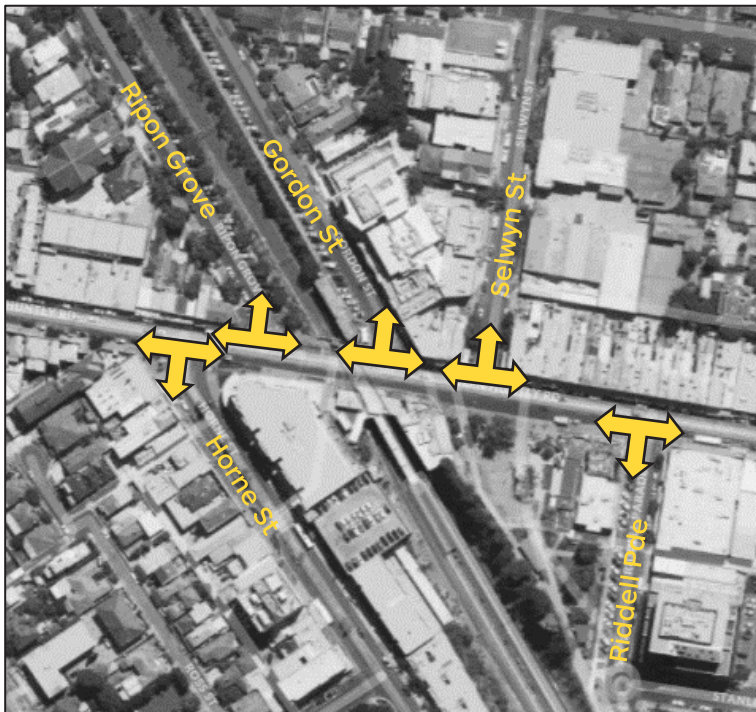
Overview

Based on the above findings and discussions, the existing and future operation of unsignalised intersections along Glenhuntly Road between Horne Street and Riddell Parade (inclusive of intersections between) were analysed using intersection modelling software, SIDRA Intersection 9.0. Intersections were placed in a network arrangement, given their proximity to each other, including signalised pedestrian operated crossings on Glenhuntly Road.

SIDRA Intersection is a lane-based micro-analytical network modelling software which aids in the determination of capacity and road performance. In this instance, the software has been used to assess the overall impacts for key intersections within the Transport Study Area. It is noted that SIDRA Intersection does have limitations when it comes to replicating the dynamic nature of drivers which has been discussed further within this section.

The network modelling study area analysed in SIDRA is presented in Figure 7.2.

Figure 7.2: Network Modelling Study Area



Assumptions and Parameters

The key parameters used to determine the operational capacity of an intersection are queue length, average delay and degree of saturation (or volume to capacity ratio). The operational rating associated with the degree of saturation is summarised in Table 7.4.

Table 7.4: Ratings of Degree of Saturation

Degree of Saturation (DOS)	Rating
Up to 0.6	Excellent
0.61 – 0.70	Very Good
0.71 – 0.80	Good
0.81 – 0.90	Fair
0.91 – 1.00	Poor
Greater than 1.00	Very Poor

Although operating conditions with a degree of saturation around DOS 1.0 are undesirable, it is acknowledged that this level of congestion is typical of many inner urban activity centre intersections during the AM and PM peak hours.

To reflect the dynamic nature of individual drivers and their ability to make spur of the moment decisions, changes to critical gap acceptance² and follow-up³ headway have been applied. Where appropriate, SIDRA default values were updated to reflect those outlined within the *AustRoads Guide to Road Design Part 4: Unsignalised and Signalised Intersection*. The values adopted from this document provide a better representation of vehicle behaviour within peak times and congested networks.

Moreover, courtesy gaps are the result of drivers pausing to allow others to join the stream of traffic flow and often occur during peak times and within busy networks. They act as a form of a keep clear zone and are reliant on individual drivers to accommodate one another within the network. To account for this driver behaviour, critical gap and headway times were further reduced in an effort to replicate 'real life' behaviour.

Results: Existing Conditions

The results of the following SIDRA assessment have been presented with the Degree of Saturation (DOS) results for the five (5) networked sites presented in the following sections.

The results for each intersection under estimated existing (2022) conditions are presented in Table 7.5.

Table 7.5: SIDRA Results – Existing Conditions

Intersection	Approach	AM Peak (DOS)	PM Peak (DOS)
Glenhuntly Road / Horne Street	South	0.72	0.71
	East	0.25	0.27
	West	0.4	0.42
Glenhuntly Road / Ripon Grove	East	0.22	0.24
	North	0.14	0.08
	West	0.25	0.24
Glenhuntly Road / Gordon Street	East	0.35	0.31
	North	0.65	0.76
	West	0.25	0.24
Glenhuntly Road / Selwyn Street	East	0.3	0.26
	North	0.6	0.5
	West	0.38	0.36
Glenhuntly Road / Riddell Parade	South	0.24	0.12
	East	0.35	0.05
	West	0.53	0.42

² Critical Gap Acceptance time is the minimum time between successive vehicles in the major traffic stream that is acceptable for a vehicle in the minor traffic stream to enter. I.e. the space required between vehicles on Glen Huntly Road for a car on a minor side road to turn into Glenhuntly Road.

³ Follow-up headway is the time between successive vehicles from a minor road entering a gap on a major traffic stream. I.e. the time between two vehicles from a minor road turning onto Glenhuntly Road.

The above analysis of estimated existing volumes indicates that the networked intersections are operating satisfactorily. Further review of queuing and delays identified that Horne Street and Gordon Street intersections are beginning to show signs of deterioration in both the AM and PM peak periods, with delays of between 40-45 seconds occurring for right turning vehicles onto Glenhuntly Road.

Results: Future Conditions (2036)

The future additional vehicle trips generated as a result of the Built Form Framework, including land use and trip generation assumptions were added to estimated existing traffic volumes and analysed using SIDRA Intersection. The results of the analysis are presented in Table 7.6 as follows.

Note: Intersections which are exceeding their theoretical capacity are highlighted in orange, for that particular approach.

Table 7.6: SIDRA Results - Future Conditions (2036)

Intersection	Approach	AM Peak (DOS ¹)	PM Peak (DOS ¹)
Glenhuntly Road / Horne Street	South	1.28	1.89
	East	0.29	0.34
	West	0.51	0.63
Glenhuntly Road / Ripon Grove	East	0.25	0.30
	North	0.72	0.62
	West	0.31	0.32
Glenhuntly Road / Gordon Street	East	0.27	0.30
	North	1.48	1.85
	West	0.30	0.30
Glenhuntly Road / Selwyn Street	East	0.39	0.36
	North	1.30	1.42
	West	0.45	0.49
Glenhuntly Road / Riddell Parade	South	0.34	0.47
	East	0.42	0.48
	West	0.67	0.72

¹ DOS = Degree of Saturation

The analysis indicates that current intersection layouts (e.g. T-intersection with give-way or stop control) at Horne Street, Gordon Street and Selwyn Street will experience significant levels of delay and queuing (in both AM and PM peaks) on the minor road approaches.

Glenhuntly Road performs satisfactorily under future conditions without any significant queuing or delay experienced in the westbound direction.

As outlined earlier in this section, SIDRA software is limited in replicating and predicting the dynamic nature of driver behaviours, especially for unsignalised intersections where courtesy gaps and painted 'keep clear' restrictions are in place. As such, results presented within Table 7.6 may overestimate the level of delay and queueing associated within the minor approaches to Glenhuntly Road.

Discussion – Traffic Capacity

Increases in traffic volumes as a result of Built Form Framework development generated traffic, are expected to result in excessive queuing and delays on the minor road approaches to a number of unsignalised T-intersection including Horne Street, Gordan Street and Selwyn Street intersections with Glenhuntly Road.

The increase in traffic distributing from minor side roads to the north and south present challenges to delay and queuing, resulting in Degree of Saturation above 1.0 for multiple minor roads within the network. The analysis however identified that Glenhuntly Road would still operate within its theoretical capacity with a degree of saturation below 1.0 at all locations.

In this regard, the concentration of dwellings and increased retail and office floor space surrounding the Elsternwick Railway Station presents a challenge to the western end of Glenhuntly Road within the study area.

It is noted that the model prioritises the use of Glenhuntly Road as a preferred access point to the surrounding arterial road network, including Nepean Highway as a major north-south arterial connection. In this regard, additional traffic volumes may use local streets to travel north to Glen Eira Road to avoid right-turns onto Glenhuntly Road. Similarly, vehicles may travel through the local road network towards North Road to the south of the Transport Study area which presents a reasonable alternative for drivers travelling to the East.

As it relates to mode share assumptions, it is acknowledged that the target mode share splits of 50% private vehicle and 50% sustainable transport modes is proposed for the entirety of Glen Eira, and not just new developments. This means that improvements to sustainable transport infrastructure, in particular those aligning with the Integrated Transport Strategy will result in a reduction in existing private vehicle trips, noting the existing share of private vehicle trips is 66% for Elsternwick.

Congestion which is expected to occur in the network based on the modelling will also act as a relevant consideration for individual users' route selection and mode choice where more efficient alternatives ways of travelling / commuting are available.

A further reduction in trips will also be possible through other policy considerations including reducing the minimum parking provisions for new developments, and improved public and active transport infrastructure. Further discussion is provided on these relevant considerations and recommendations in the following sections.

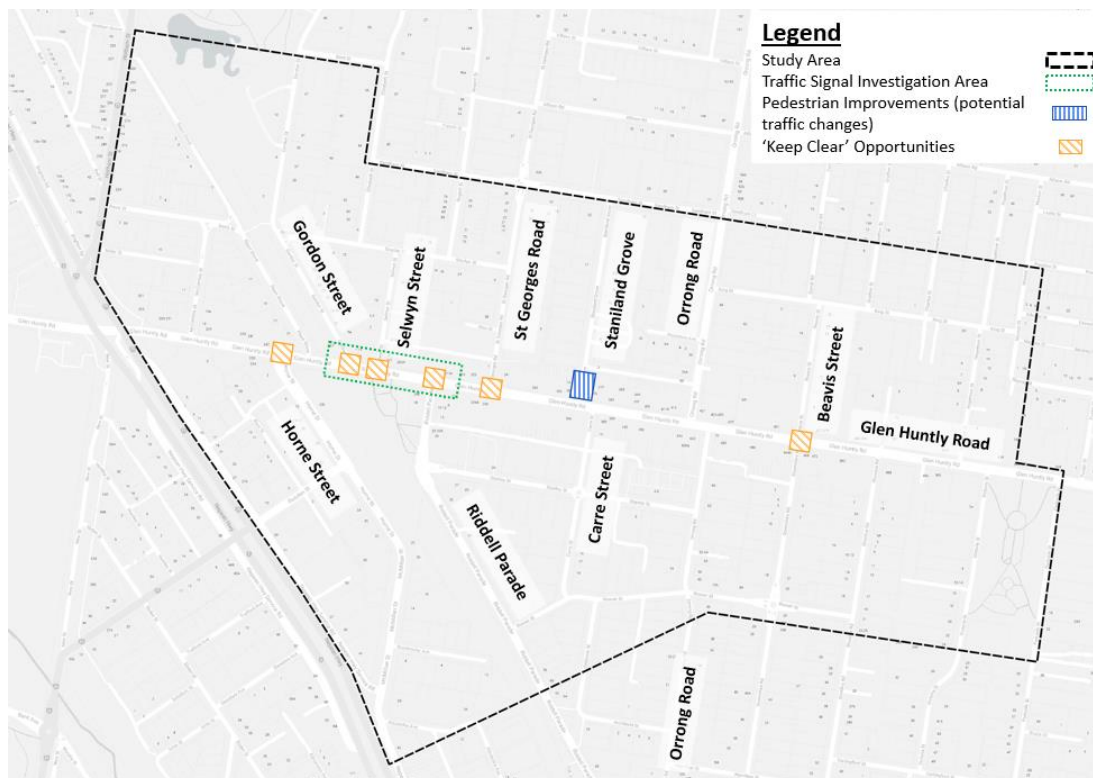
Notwithstanding the above, interventions will likely be required to ensure the existing intersections and surrounding network can sufficiently accommodate the traffic produced under the Built Form Framework conditions. All mitigating works including their likely triggers, types and responsibilities will be subject to further detailed analysis with consideration of potential public transport and public realm improvements, in particular surrounding the Elsternwick Railway Station.

Possible intervention works and recommendations are outlined in Table 7.7 and Figure 7.3.

Table 7.7: Traffic Impact - Mitigations and Interventions

Mitigation / Intervention	Description
Increased Mode Shift, in particular surrounding the Elsternwick Railway Station	Further encouragement of mode shift from private vehicles to sustainable transport modes may reduce the dependence on car use and hence help to keep increases in traffic volumes to a minimum.
Local Area Traffic Management Plan	Traffic calming and other measures should be introduced to reduce instances or impacts of rat-running in local streets. This should be done proactively on an area wide basis as opposed to a piecemeal / reactive approach to local community complaints post development.
Keep Clear at key intersections with streets with 'Connector Roads' definition traffic volumes	<p>Keep clear zones provided at minor road intersection with Glenhuntly Road to enforce appropriate gaps. This will allow vehicles to exit Glenhuntly Road thus improving opportunities for minor road traffic to enter Glenhuntly Road.</p> <p>Key intersections where this would be of most benefit are towards the west of the study area along Glenhuntly Road, including Gordon Street, Selwyn Street and Riddell Parade.</p>
Potential Partial / Full Road Closures	<p>The reallocation of road space on minor roads, including partial or full road closures, would reduce vehicular connection and improve pedestrian safety / amenity between Glenhuntly Road and uses / areas of activity to the rear.</p> <p>A potential location for a partial or full road closure would be further away (to the east) from the Railway Station where traffic related impacts / increased traffic generation as a result of the Built Form Framework are less.</p> <p>A potential candidate intersection for a road closure could be Staniland Grove and Glenhuntly Road, which would provide an important pedestrian connection between car parking and the future library redevelopment.</p> <p>Several options could be considered including a partial road closure trialled through parklets / outdoor dining or other tactical urbanism type treatments developed in collaboration with nearby traders and the local community.</p> <p>Further detailed traffic engineering investigations would need to occur before any changes to the road network or street cross sections from a traffic capacity and safety perspective.</p>
Intersection Signalisation	<p>The implementation of traffic signals at key intersections on Glenhuntly Road could be implemented to improve access, capacity and overall safety. A key area of consideration based on the analysis of Built Form Framework traffic impacts would be around the Railway Station along Glenhuntly Road, including Selwyn Street Gordon Street and Riddell Parade.</p> <p>Due to the close spacing of intersections, it may only be possible to signalise one intersection, or provide a staggered arrangement similar to Orrong Road. Traffic signals could incorporate existing signalised pedestrian crossing at the Railway Station entrance.</p> <p>Traffic signals may provide additional benefit in creating additional gaps for adjacent unsignalised minor intersections. The design and operation of signals should be linked to other nearby intersections with Nepean Highway and Orrong Road in order to minimise the impacts on Glenhuntly Road, including the tram route.</p>

Figure 7.3: Potential Location of Intersection and Road Network Interventions



7.6 Laneways

Overview

The Built Form Framework for Elsternwick identifies the location of vehicular access to the majority of new developments from laneways at the rear of properties fronting Glenhuntly Road. As outlined in Section 4.7, the environmental and theoretical capacity of laneways vary based on its function and spatial constraints.

A review of existing laneways, including surveys at key locations identified that most laneways are currently utilised by a range of vehicles and pedestrians, including heavy vehicles. All laneways are operating within their upper limits for maximum daily traffic volumes per the Glen Eira Planning Scheme, which states up to 300 vehicles per day, however noting this definition is given to laneways 5.5 metres wide.

Traffic Generation in Laneways

Based on the existing conditions and also proposed access considerations outlined in the Built Form Framework, laneways within the study area are anticipated to experience an increase in traffic volumes. Consideration must be also given to the reduction in traffic volumes where existing uses are replaced, as well as any interim conditions where there is a mix of new and existing developments utilising laneways for access and servicing.

New land uses will generate traffic onto laneways based on their estimated traffic generation rates, which are presented within Section 6 of this report. The level of traffic generated onto a laneway is linked to the type of use and also car parking supply. In this regard, car parking provisions in new developments will play a pivotal role in the capacity of laneways.

For the purposes of this section of the report, the following peak hourly generation rates are presented in Table 7.8.

Table 7.8: Indicative Laneway Access Traffic Generation

Use	AM Peak Hour	PM Peak Hour
Residential	0.34 vehicles per dwelling / hour (with car parking)	
Retail	0.46 vehicles per 100 sqm / hour	4.6 vehicles per 100 sqm / hour
Commercial	1.5 vehicles per 100 sqm / hour	

Traffic Impacts and Capacity within Laneways

A high-level capacity analysis has been undertaken based on the traffic generation rates presented in Table 7.8. The analysis demonstrates the estimated maximum number of dwellings which could be reasonably provided with access from a laneway based on width. The analysis considers the presence of pedestrian access therefore effectively creating 'shared zones'. The assessment is presented in Table 7.9.

Table 7.9: Indicative Residential Car Parking Capacity

Laneway Width	Planning Scheme	Other Guidance	Estimated Residential Car Parking Capacity ¹
<5.5 metres (minimum 3.0 metres)	N/A	30 vehicles per hour (AS2890.1)	Approx. 90 dwellings (with car parking)
>5.5 metres	300 vehicles per day	1,000 vehicles per day (VicRoads, Shared Zones)	Approx. 90 to 300 dwellings (with car parking)

¹ Provided as an example only, and does not include existing dwelling or other uses, such as retail / commercial, and associated service vehicles.

It is highlighted that the number of dwellings relates to those with allocated car parking spaces, such as in the case a dwelling had no car parking, it would not generate any vehicular movements.

Further, the presence of other land uses will potentially generate higher volumes of traffic during the peak hours, notably retail in the PM peak and commercial in both the AM and PM peak hours.

Based on the observations that most laneways within the study area are less than 5.5 metres wide, this limits the capacity to in the order of 300 vehicles per day, as outlined above.

Laneway Access and Traffic Management Considerations

The following sets out a list of considerations and strategies which are relevant to the provisions of access and traffic management in the laneways within the study area to support the Built Form Framework.

Laneway Widths

- Laneways less than 5.5 metres wide can accommodate up to approx. 300 vehicles per day, equating to approx. 90 dwellings with car parking. This number of dwellings would reduce based on any other traffic generating access.
- Where laneways are expected to exceed 300 vehicles per day at any point / location, consideration should be given to widening to provide for increased capacity. An alternative solution may include changing operation to one-way flow, with all traffic travelling in one direction.
- In shorter laneways with only a single access point to the nearest street, other measures considered may include signaling systems and passing areas at the boundary (provided within the development).

Access Points

- Access to public off-street car parking should be provided from named street frontages (minor roads, not Glenhuntly Road).

- Where identified in the Built Form Framework, vehicular access to private off-street car parking will be via laneways.

Pedestrian Safety and Access

- Where separate pedestrian paths cannot be provided in rear laneways, appropriate shared zone signage and / or line marking should be considered.
- The speed in laneways should be restricted to 10-20km/h and this may be done with traffic calming, ensuring a smooth and continuous path is provided for DDA access.
- Property access points to laneways must provide adequate pedestrian sight triangles to ensure visibility and safety of pedestrians.
- The requirements for pedestrian sight lines should be further enhanced at the intersection with adjacent streets, with high pedestrian volumes crossing near the threshold. Pedestrian priorities at intersections should be clear.
- Any upgraded or new laneways should be smooth and continuous to ensure DDA accessibility as well as comfort for cyclists.

Existing Constraints

- Existing issues in laneways restricting capacity, such as bins and loading vehicles should be managed through existing Local Laws and other relevant policies.

Development Applications

- Development applications must have consideration to the current capacity of the laneway and future potential constraints, such as adjacent potential development yields.

The following Figure 7.4 outlines the future laneway network including recommendations for potential connectivity improvements, and preferred locations for off-street car parking access. The laneways definitions are informed by the future transport function as well as the nature of abutting future land uses outlined in the Built Form Framework. Figure 1.1

Figure 7.4: Laneway Recommendations



7.7 Summary of Findings and Recommendations

Summary of Findings

The analysis of the traffic impacts associated with the Built Form Framework indicates that a number of roads within the study area will exceed their existing definitions for indicative maximum traffic volumes as set out in the Glen Eira Planning Scheme.

A similar assessment indicated that all roads would operate within their theoretical mid-block capacities per the AustRoads definitions. The key exception being Glenhuntly Road, which acts with an arterial road function, and also accommodates a relatively high-turnover of car parking and a tram route. In this regard, Glenhuntly Road is approaching its mid-block theoretical capacity based on the AustRoads definitions.

To further confirm the impacts of the Built Form Framework on Glenhuntly Road including key intersections with adjacent local and connector streets, a SIDRA network modelling exercise was undertaken. The purpose of the exercise was two-fold, to confirm the capacity of Glenhuntly Road to cater for additional traffic volumes, as well as impacts to queuing and delays on minor road approaches.

The results of the SIDRA network modelling exercise indicated that key intersections were operating under 'Excellent', 'Very Good' or 'Good' conditions based on existing conditions.

The addition of traffic volumes associated with the Built Form Framework and land-use modelling data provided by Council indicated that a number of intersections will exceed their Degree of Saturation in the future.

Recommendations

A summary of recommendations including the issue or objective addressed is presented in Table 7.10.

Table 7.10: Traffic Impact Recommendations Summary

Recommendation	Description of Recommendation or Mitigation	Issue / Objective Addressed
TI.A	A number of roads will exceed their Planning Scheme definitions for indicative maximum traffic volumes. At these locations where future traffic volumes require, mid-block vehicular capacity should be maintained to discourage use of other local streets.	Catering for future traffic volumes generated by the Built Form Framework on the local road network.
TI.B	A number of key intersections surrounding the railway station will reach their theoretical capacity based on the expected level of future traffic volumes. Consideration should be given to interventions such as 'Keep Clear' linemarking to enforce gaps on Glenhuntly Road, and intersection signalisation, to improve overall capacity.	Catering for future traffic volumes generated by the Built Form Framework on the local road network.
TI.C	Reduce the number of trips made by car on the road network by both existing and future residents / land uses. This will be done by improving sustainable transport access and efficiency, including the use of lower or zero car parking provisions in new developments as a mechanism to reduce car ownership and hence the number of additional vehicle trips on the network. A key focus should be near the Railway Station where there is a high level of servicing by public and active transport.	Minimising the amount of traffic generated by the Built Form Framework.

Recommendation	Description of Recommendation or Mitigation	Issue / Objective Addressed
TI.D	<p>Future access to dwellings from rear laneways will increase the amount of traffic volumes. Laneways have limited capacity due to spatial constraints and are also used in some instances as key pedestrian access routes.</p> <p>Where widening of laneways are not possible to increase capacity, it is recommended to implement traffic management interventions, including better management and enforcement of existing uses.</p> <p>Other inventions may include reducing car parking requirements or providing access to car share vehicles to reduce the reliance on vehicle ownership.</p>	<p>Maximising the opportunities to provide vehicular access away from adjacent streets.</p> <p>Improving pedestrian safety and overall amenity within laneways.</p>

8 Sustainable Transport:

8.1 Overview

The following section outlines the sustainable transport considerations and recommendations for the Elsternwick Structure Plan. Specifically, this section identifies what walking and cycling infrastructure and treatments could be implemented to achieve the goals of the Glen Eira Integrated Transport Strategy, as well as achieving other overarching objectives from within the Built Form Framework.

8.2 Sustainable Transport Trip Generation

To gain a general understanding of the future additional increases in walking and cycling trips which may be experienced within the study area, the trip generation rates for sustainable transport were further broken down by sustainable transport mode, including trips by future residents to public transport.

As outlined within Section 6.2, the mode split of future Sustainable Transport Trips to and within the area was guided by the vision of the Glen Eira Integrated Transport Strategy, which is to strive for 50% of trips by non-car modes by 2031.

In this regard, the following assumptions regarding future mode share for additional sustainable transport trips, as a proportion of the additional 50% of trips, is outlined below:

- 82% by public transport, including rail, tram and bus
 - 50% of trips will involve a walking trip to and from the public transport stop;
 - 10% of trips will involve a cycling trip to and from the public transport stop;
 - 40% of trips will not involve walking or cycling;
- 10% by walking (excluding trips to public transport); and
- 8% by bicycle (excluding trips to public transport).

Based on the expected trip generation rates set out in Section 6 of this report, the future increase in land uses as per the SGS Economics *Housing Capacity and Demand Analysis*, and *Employment Land Needs Assessment* could be expected to generate the following approximate numbers of additional sustainable trips by 2036:

- Walking = +6,400 trips / day
- Cycling = + 2,050 trips / day
- Public transport (all modes) = +10,300 trips / day

These trips are only relevant to trips associated with additional / new land uses, and not any mode shift which may be experienced from existing land uses.

8.3 Pedestrians

Overview

The walkability of the study area in the future will be constrained largely by the existing street network within Elsternwick and the study area. In this regard, the study area is already served relatively well with a network of pathways on both sides of most streets.

They key areas of focus include Glenhuntly Road, including walking both along and crossing the street. Both Glenhuntly Road and the Sandringham Railway Line are major barriers to pedestrian movements.

Other key considerations including the movement to and from off-street car parks, which currently utilise a network of streets and shared laneways. The presence of vehicles, including waste and service trucks in laneways represents a safety issue for pedestrians.

As identified in the previous sections, a mode shift towards sustainable transport modes for both existing and future users within Elsternwick will be key to supporting the land use vision outlined in the Built Form Framework.

Pedestrian Network

Glenhuntly Road, a Great Walking and Shopping Street as defined within the Glen Eira Integrated Transport Strategy, is a road or Street that aims to enable the movements of people for the purpose of walking, shopping and experiencing activity centres and public places.

Based on the future land uses as outlined in the Built Form Framework, a network of supporting key pedestrian routes has been identified including relevant supporting infrastructure, illustrated in Figure 8.1.

Figure 8.1: Recommended Future Pedestrian Network

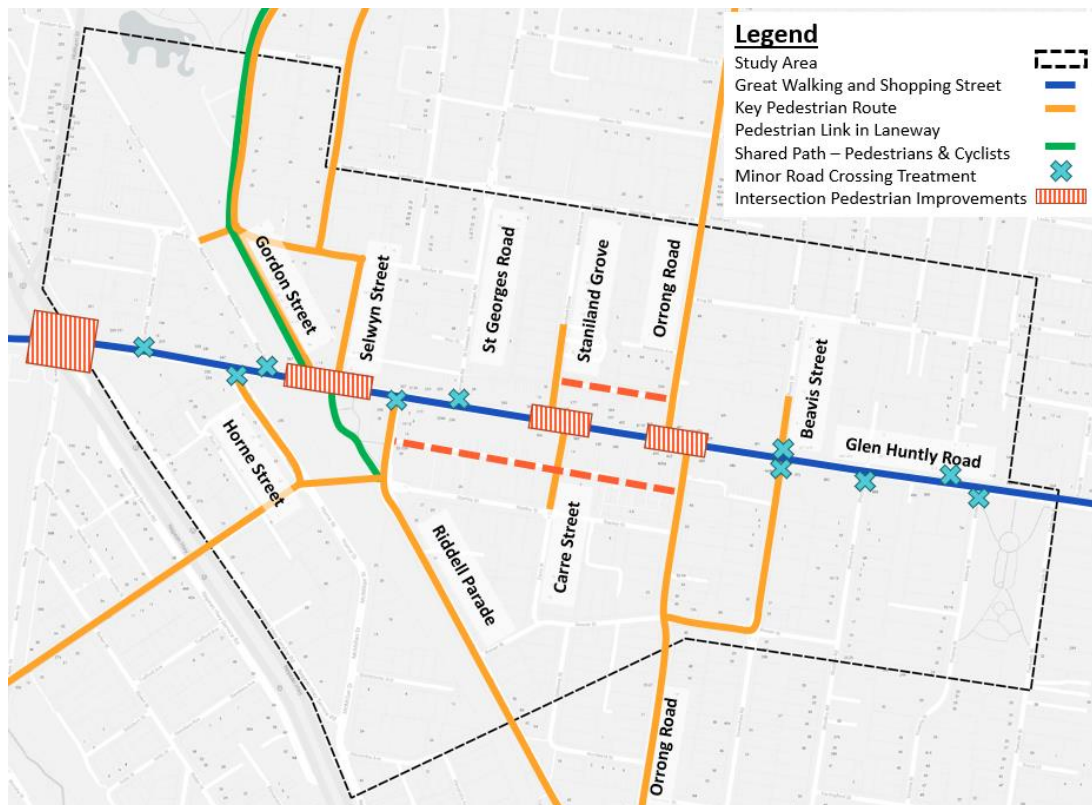


Figure 8.1 shows the key pedestrian routes across the study area which east-west connection provided by the central walking and shopping corridor along Glenhuntly Road. These key routes aim to connect key destinations and activity hubs throughout the Elsternwick Activity Centre including schools, shopping precincts, public transport, open space / reserves and future employment precincts.

Better managed and improved crossings points along Glenhuntly Road act to connect the northern and southern portions of the study area and improve the safety of vulnerable road users. These improvements may range from simple phasing and cycle time changes at locations such as Nepean Highway and Orrong Road, to the introduction of threshold and scramble crossings.

In addition, crossing treatment improvements at the intersections of Glenhuntly Road and minor roads will aid in improving the main east-west walking and shopping link, and improve the safety of pedestrians throughout the study area.

The recommendations have been detailed within Table 8.1 with relevant examples provided.

Table 8.1: Pedestrian Network - Mitigations and Interventions

Recommendation	Mitigation / Intervention	Description	Example
P.A	Great Walking and Shopping Corridor	The key east-west link through the study area should provide wide, flat footpaths with appropriate pedestrian amenities such as seating, rubbish bins, signage, and lighting.	Generally, per existing northern side of Glenhuntly Road between Selwyn Street and Beavis Street. (Figure 8.2)
P.B	Key Pedestrian Route	To encourage pedestrian use, key pedestrian routes should include wide flat footpaths with ample signage to aid active travel users through the transport network. Where possible, appropriate pedestrian amenities should be included such as seating and lighting.	Riddell Parade and Gordon Street.
P.C	Minor Road Crossing Treatment	<p>All kerbing should be designed and implemented as per DDA standards, with tactile surfacing provided where necessary. Pedestrian refuge points should be included where road widths are deemed too wide for pedestrians of all types to cross in a single session.</p> <p>Where possible, additional treatments such as kerb-outstands, raised wombat crossings and threshold treatments should be utilised to prioritise vulnerable user groups.</p>	<p>Horne Street intersection with Glenhuntly Road.</p> <p>Camden Street intersection with Carlisle Street, Balaclava</p> <p>Sydney Road intersection with Barkly Street, Brunswick (Figure 8.3)</p>
P.D	Intersection Pedestrian Improvements	<p>Improvement to existing signalised pedestrian crossings to improve both pedestrian safety and priority.</p> <p>The introduction of wider pedestrian crossings will aid in encouraging pedestrians to cross at designated signalised points and help reduce the potential for conflict between pedestrians and road users.</p> <p>Treatments could include scramble crossings, tactical urbanism, and threshold treatments, subject to further detailed investigation of warrants and traffic impacts.</p>	<p>Anderson Street, Yarraville</p> <p>South Yarra Station Crossing, Toorak Road (Figure 8.4)</p>
P.E	Repurposing On-Street Parking	<p>Large portions of the Glenhuntly Road Great Walking and Shopping corridor are occupied by on-street dining to accommodate high patronage numbers and to take advantage of the lively atmosphere.</p> <p>This on-street dining currently reduces the width of available pedestrian footpaths, resulting in high congestion areas and footpaths which are no longer DDA compliant.</p> <p>It is recommended to identify opportunities for on-street parking to be reallocated to other uses such as dining, trading, or streetscaping to alleviate pressures on the existing footpath infrastructure. Proposed changes will be subject to current parking surveys and the needs of adjacent businesses.</p>	Multiple locations across the Elsternwick Activity Centre along Glenhuntly Road.

Recommendation	Mitigation Intervention /	Description	Example
P.F	Widened Laneways	<p>Section 7.6 of this report outlines the requirements for laneways and laneway access for both vehicles and vulnerable users.</p> <p>Laneways within the Elsternwick Activity Centre act as access points to nearby off-street parking, retail and car parking. Opportunities should be sought to widen and design laneways to accommodate all user types. Where appropriate, it is recommended laneways are widened to separate vehicular traffic and vulnerable users.</p>	Royal Place, Richmond (Figure 8.5)

The following figures provide examples of the above proposed mitigations and interventions.

Figure 8.2: Northern side of Glenhuntly Road



Figure 8.4: South Yarra Station, Toorak Road



Figure 8.3: Raised Pedestrian Threshold Treatment



Figure 8.5: Shared Laneway



8.4 Cycling

It is expected that the majority of cycling trips which are generated from future land uses will be distributed to and from the Melbourne CBD, which is approximately 7-8km to the north, or a 20-30 minutes ride. The remainder of trips will either be internal to the study area to employment and education, to public transport (railway station), as well as recreational trips. In this regard, there are a range of potential routes from the Built Form Framework area to these areas.

The following Figure 8.6 highlights the recommended on and off-road cycling infrastructure to support the level of cycling activity anticipated to be generated by the Built Form Framework.

Figure 8.6: Recommended Future Cycling Network



Figure 8.6 shows the connection of the Strategic Cycling Corridor East-West along Glenhuntly Road with additional connections provided north-south. In addition to existing on-road cycling facilities, routes along Selwyn Street and Riddell Parade are introduced to provide connections between schools, open space, and existing cycling networks.

Cycling connections along Horne Street and Rusden Street will provide access to Elsternwick Park in the west and Elster Canal Path through to Elwood and the Bay Trail.

A proposed crossing treatment is shown at the intersection of Glenhuntly Road and Selwyn Street to help facilitate cycling movements from the Ross River Rail Trail, north toward Ripponlea Gardens and Glen Eira Road.

The provision of a safe and efficient cycling network will also encourage mode shift in existing residents and visitors.

The recommendations have been detailed within Table 8.2 with relevant examples provided.

Table 8.2: Cycling Network - Mitigations and Interventions

Recommendation	Mitigation / Intervention	Description	Example
C.A	Key Cycling Routes	<p>Providing additional cycling infrastructure and closing missing links along key cycling routes (including those identified along DoT Strategic Cycling Corridors or the Principal Bicycle Network) will facilitate the development of a robust and connected cycling network within the Elsternwick Activity Centre</p> <p>Existing On-Road cycling lanes have been provided along Orrong Road and Rusden Street. Additional on-road cycling lanes are proposed along Riddell Parade and Elizabeth Street.</p> <p>Introduction of on-road treatments as part of the Ross Town Rail trail will encourage active travel trips between Elsternwick Station and the wider Elsternwick network to the south.</p> <p>Treatments may include line marked lanes, full separated lanes, green paint treatment, head start / storage boxes at signalised intersections, and sharrows treatments on local roads.</p>	Kooyong Road, Nepean Highway (Figure 8.7)
C.B	Shared Path	<p>Introduction of a shared path along Gordon Street will facilitate connections between Elsternwick Train Station and the strategic development site on Gordon Street.</p> <p>Separation provided as part of the shared path will also work to improve cyclist safety and remove conflict between cycling and vehicles on-road.</p>	Elster Canal Path (Figure 8.8)
C.C	Crossing Treatment	<p>Dedicated cycling crossing points connecting Selwyn Street and Off-Road Shared paths through Elsternwick Station Reserve will improve the safety of cyclists. It will also help reduce the conflict between cyclists and on-road vehicles.</p> <p>Dedicated crossings points should be surfaced appropriately to avoid conflict between tram tracks and active travel users.</p>	Winton Road intersection with Pitt Street, Ashburton (Figure 8.9)
C.D	Bicycle Parking	<p>Additional bicycle parking can be provided within the Elsternwick Activity Centre and at key attractors such as public transport hubs, schools and open spaces.</p>	Glenhuntly Road, opposite Staniland Grove (Figure 8.10)

The following figures provide examples of the above proposed mitigations and interventions.

Figure 8.7: On-Road Cycling Lane

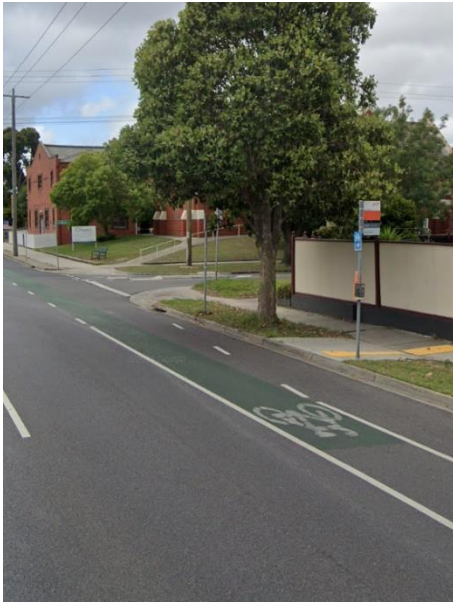


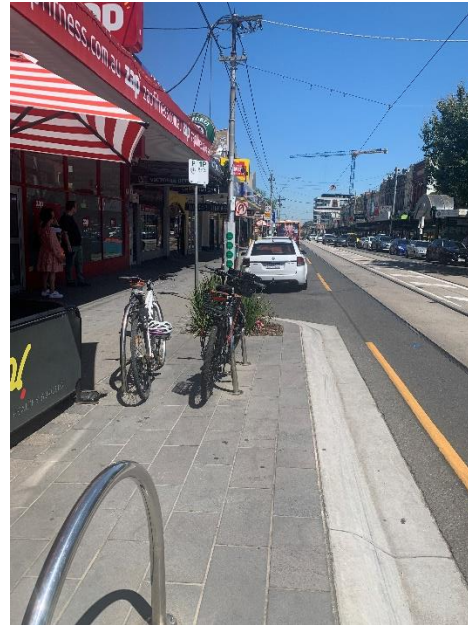
Figure 8.8: Shared Path



Figure 8.9: Signalised Cycling Crossings



Figure 8.10: Bicycle Parking



8.5 Public Transport

The Elsternwick Activity Centre is currently serviced by an extensive public transport network, providing immediate access to Train, Tram and Bus services.

As outlined within Section 4.5 of this report, current public transport services are provided frequently with all areas of the Built Form Framework area falling within a reasonable walking distance of public transport services.

Having regard to the issues presented throughout this report, increase in public transport trips, and mode shift aspirations, a number of recommendations have been developed which are presented in Table 8.3.

Table 8.3: Public Transport Network Recommendations

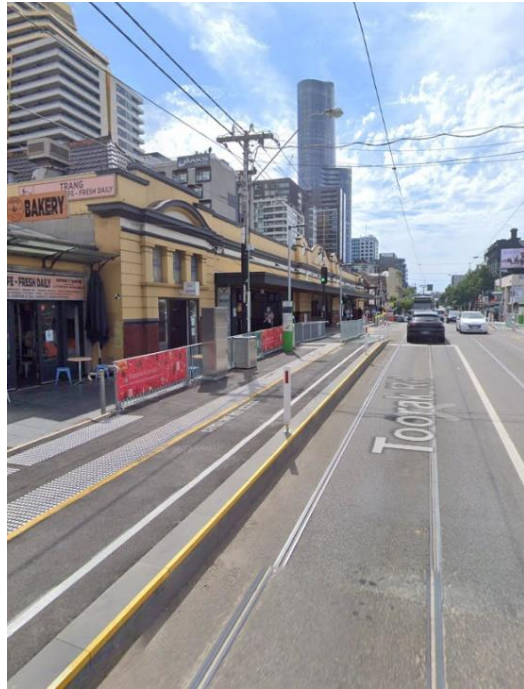
Recommendation	Mitigation Intervention /	Description
PT.A	Public Transport Priority	<p>Tram and Bus services along Glenhuntly Road are currently subject to congestion due to travelling in a shared lane with motor vehicles and on street parking. As private vehicle traffic increases so will delays to tram and bus services.</p> <p>Improvements to public transport priority may be achieved through the improvement to overall capacity along Glen Huntly Road. This may include improvements to existing traffic signal operations (along the corridor but including intersections at Orrong Road and Nepean Highway), and separation of traffic to public modes transport at key locations to provide priority.</p>
PT.B	DDA Compliance	<p>Current bus and tram stops throughout the site are accessed via kerbside boarding, with many tram stops separated by trafficable lanes.</p> <p>It is understood that the Department of Transport is currently investigating and implementing both DDA compliant tram stops and trams across the entire Victorian network. It is recommended that Council develop a DDA Advocacy Plan to establish where DDA compliant stops should be designed, located and priority of delivery.</p>
PT.C	Elsternwick Station Connection	<p>Current patronage for the Elsternwick Railway Station tram stops are reasonably higher than other connections throughout the network.</p> <p>These patronage volumes are expected to increase as a result of the Built Form Framework. To accommodate these high volumes, an accessible tram stop at Elsternwick Station could improve accessibility, safety and capacity. This will also aid to separate vehicular traffic and vulnerable users.</p>
PT.D	Bus Locations Stop	<p>Horne Street currently acts as a bus terminus for local bus services within the Elsternwick Activity Centre. However, the 625 bus currently terminates at the corner of Riddell Parade and Glenhuntly Road. It is recommended that terminating bus stops be located on minor roads, such as Riddell Parade, or within the Horne Street bus zones to consolidate movements between trip modes and remove conflicts between bus patronage and existing road users along Glenhuntly Road.</p> <p>In addition, with buses sitting idle with engines running, both noise and sound pollution to patronage along Glenhuntly Road is detrimental to the wellbeing and performance of the Elsternwick Activity Centre.</p>

The following figures provide examples of the above proposed mitigations and interventions.

Figure 8.11: DDA Complaint Kerbside Tram Stop



Figure 8.12: Accessible Tram Stop with Train Station Connection



Accessible Tram Stops

The Disability Discrimination Act 1992 (DDA) requires that all tram stops within Victoria are fully compliant with the Disability Standards for Accessible Public Transport 2002 (DSAPT), by the 31st of December 2022. In addition, all active trams currently in use along the Victoria tram network, and any future tram proposed for use, must be DSAPT compliant by 31st December 2032.

As part of network wide upgrades to meet the above requirements, it is recommended that Council work with the State Government and DOT for the upgrade of tram stops to meet DDA compliance.

Figure 8.13 details the locations of all non-accessible public transport stops within the Transport Study Area. It should be noted that tram stops near the corners of Staniland Grove, and Carre Street are located near footpath extensions and hence already provide a higher level of safety and accessibility with the removal of the through traffic lane.

Figure 8.13: Accessible Stop Upgrade Locations and Potential Bus Stop Relocation



The above Figure 8.13 also details the suggested relocation of Bus route 625 terminus from Glenhuntly Road to the existing Bus hub along Horne Street.

9 Car Parking:

9.1 Overview

The preceding sections of the report have identified that based on an application of future mode share targets (50% of trips by car per the Glen Eira ITS) to new land uses in Elsternwick, there will be increases in traffic above the Planning Scheme definition for several local roads, plus an approximately 10% increase in vehicle trips along Glenhuntly Road.

A further analysis of key intersections near the Railway Station also indicated that minor road approaches to Glenhuntly Road would likely exceed their capacity from a degree of saturation perspective. An assessment of impact of development generated traffic on laneways identified that there is relatively limited capacity to accommodate future residential access off laneways without significant widening and / or traffic management interventions. Further, a shift towards increased levels of zero parking dwellings would subsequently increase the capacity of adjacent land to accommodate dwellings.

The analysis contained throughout this report, including as highlighted above, has assumed application of statutory car parking requirements in line with Column B of Table 1 in Clause 52.06 of the Glen Eira Planning Scheme.

Car parking interventions, which are further detailed in the following section, to reduce the impacts of development generated traffic on the road network while supporting the mode shift vision for Glen Eira, include:

- Management of on-street car parking along key movement corridors;
- Car parking requirements for new developments;
- Car share and other sustainable transport initiatives; and
- Utilising car parking as a travel demand management tool at an Activity Centre wide level.

9.2 Statutory Requirements for Car Parking in New Developments

Currently for new residential developments, a minimum of one car parking space is required for each residential dwelling with one or two bedrooms, and two spaces in dwellings with three or more bedrooms within the study area. In this regard, the majority of the study area falls either within the Principal Public Transport Network (PPTN) of Schedule 2 of the Parking Overlay (Clause 45-09). Both the PPTN and Parking Overlay apply to the whole area covered by the Elsternwick Built Form Framework.

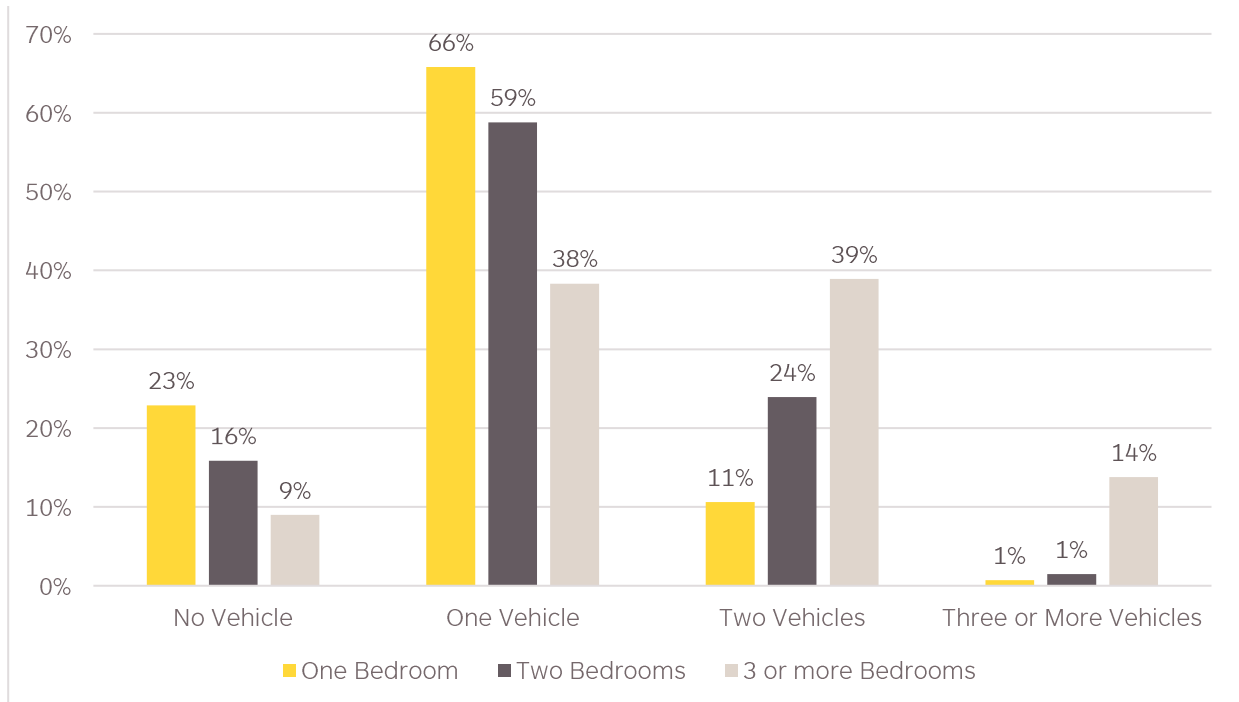
For new dwellings and other typical Activity Centre type uses, for example Commercial (Office), Retail, and Food and Drink, Column B rates also apply. The exception to this is Student Housing, for which the requirement is 0.5 spaces per each bed available.

9.3 Estimated Car Parking Requirements for New Residential Developments

New Residential Dwellings

Analysis of the number of vehicles owned by residential apartment dwellings, sorted by number of bedrooms was undertaken using ABS Vehicle Ownership data, and presented below in Figure 9.1.

Figure 9.1: Vehicle Ownership for Apartments (Number of Bedrooms), Elsternwick



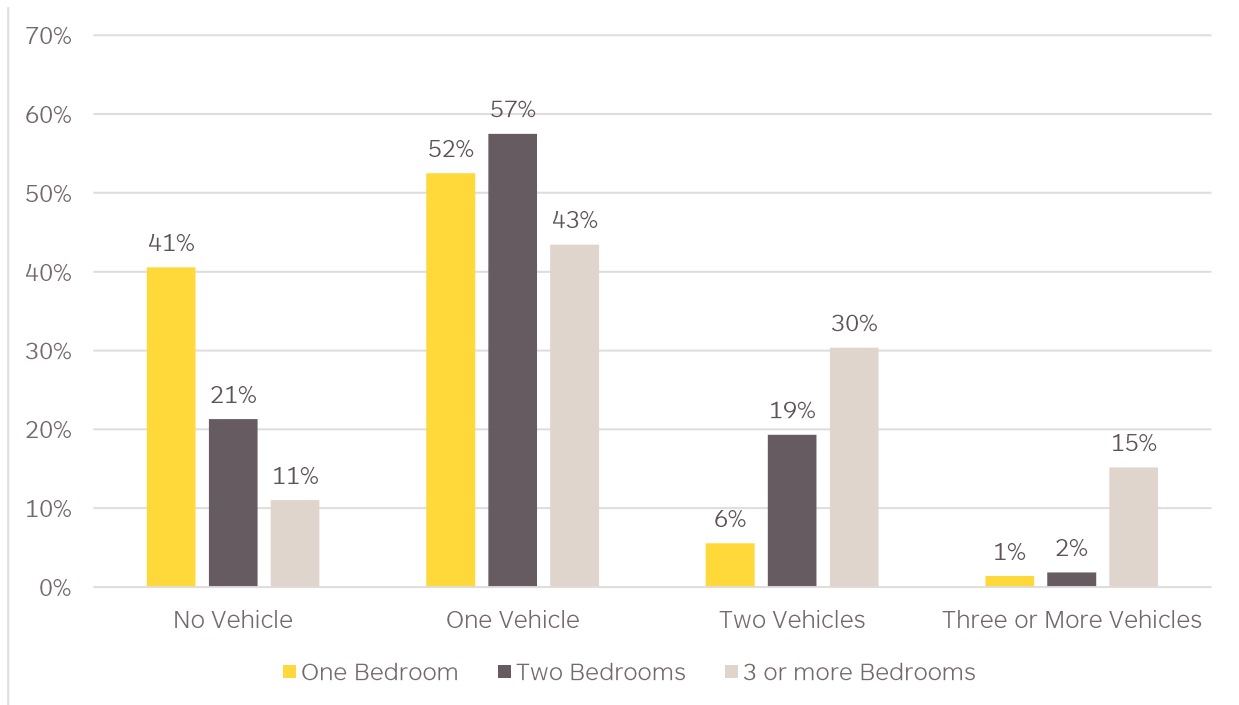
As expected, based on the above analysis of ABS vehicle ownership data, there is a trend towards smaller dwellings owning less number of vehicles. The data indicates that for one bedroom dwellings, 23% do not own a vehicle, while 66% of dwellings own one vehicle. For two bedroom dwellings, the proportion of dwellings that do not own a vehicle decreases to 16%, while 59% own one vehicle only.

Case Study: Windsor (City of Stonnington)

A review of nearby Windsor in the City of Stonnington indicated that mode share in this suburb (using ABS Journey to Work data) was closer to the Glen Eira ITS than in Elsternwick, with 45% of all trips by non-car modes. A similar review of ABS Vehicle Ownership data identified that there was a higher rate of dwellings without car parking than in Elsternwick. Windsor was chosen as it has similar characteristics in terms of transport and housing options, albeit slightly closer to the Melbourne CBD.

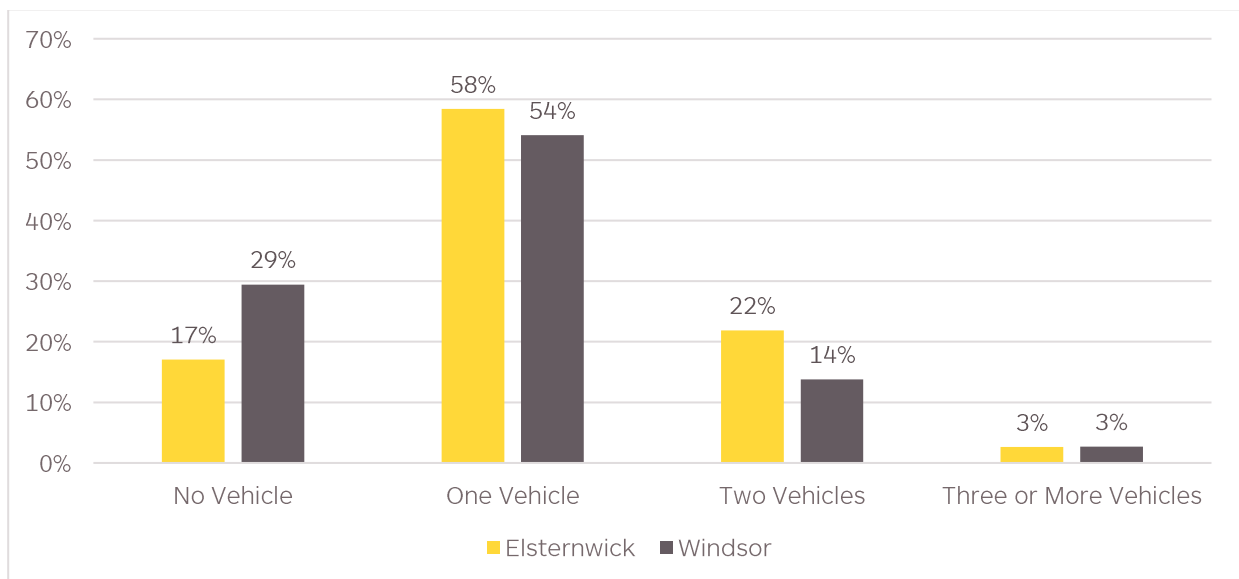
The same analysis as shown in Figure 9.1, has been undertaken for Windsor, which is shown in Figure 9.2.

Figure 9.2: Vehicle Ownership for Apartments (Number of Bedrooms), Windsor



A comparison of vehicle ownership characteristics in apartment type dwellings for Windsor and Elsternwick is shown in Figure 9.3.

Figure 9.3: Elsternwick vs Windsor, Comparison of Vehicle Ownership in Apartments



The above analysis indicates that a significantly higher proportion of dwellings in Windsor do not own a vehicle. It is noted that no car parking overlay applies to Windsor and that car parking is provided in accordance with Column B of Table 1 in Clause 52.06, based on its position within the PPTN.

Estimated Car Parking Requirements for New Residential Developments

On this basis, coupled with improvements to active and public transport as identified throughout this report, there is an opportunity to provide for zero car parking dwellings within new developments to reduce the overall traffic impacts with the Built Form Framework and assumptions outlined in this report.

As a reasonable amount, to achieve these benefits, car parking could be provided at the following rates provided as ranges for current vehicle ownership characteristics for:

- dwellings in Elsternwick (e.g. status-quo); and
- higher rates of zero parking developments based on the case study example in Windsor.

The respective percentages, including equivalent per dwelling rates, provided as a guide based on the preceding analysis, are shown in Table 9.1.

Table 9.1: Suggested Levels of Zero Parking Dwellings

Number of Bedrooms (Apartments)	Elsternwick (Status Quo)		Windsor (Case Study)	
	% dwellings zero parking	Rate	% dwellings zero parking	Rate
1 bedroom dwelling	23%	0.77 spaces / dwelling	41%	0.59 spaces / dwelling
2 bedroom dwellings	16%	0.84 spaces / dwelling	21%	0.79 spaces / dwelling
3 + bedroom dwellings	9%	1.82 spaces / dwelling	11%	1.78 spaces / dwelling

Visitor Car Parking for Residential Developments

As it relates to visitor car parking, the current provisions do not require any visitor car parking on-site, and instead typically time restricted car parking will be utilised within the broader Activity Centre, which will be retained.

Empirical data collected and used for residential development in activity centres indicates that visitor car parking demands are typically higher outside daytime hours, when more people are expected to be at home, such as at night or on the weekend. This data indicates peak visitor demands of 0.1 spaces / dwelling during evenings and weekends, and 0.06 / dwelling spaces during weekday daytime.

The location of high-quality public transport services and an already constrained road network within vicinity of the Activity Centre will likely result in lower rates of visitor car parking demands than those outlined above.

The impacts of estimated visitor car parking demands, including appropriate restrictions to ensure turnover in line with the Parking Policy could be further investigated as part of a Precinct Parking Plan or similar parking study.

9.4 Car Parking in Other Developments

Future new retail and commercial developments are likely to service existing users and the future residents of the Activity Centre. In this regard, future car parking demands will be linked to existing trips, but also from additional demands generated from new or standalone trips.

Car parking associated with new retail and commercial developments is currently provided in line with Column B of Table 1 in Clause 52.06, which states for key land uses being considered in the structure plan:

- Retail (Shop)– 3.5 spaces per 100 sqm (LFA); and
- Commercial (Office) – 3 spaces per 100 sqm (NFA).

The estimated car parking demands associated with new developments will vary substantially based on the exact use of the land. Further, the proportion of employee generated demands versus visitor demands will vary based on the use.

For future retail and commercial land use developments, the reduction of car parking requirements against the statutory rates will require a Car Parking Demand Assessment. In these instances, noting the location of future land uses in context of public transport availability and the likelihood of multi purpose trips the appropriateness of lower than statutory rates may be appropriate.

While this will be subject to review and decision by Council on an application-by-application basis, consideration should also be given to the appropriateness of providing for visitor /customer demands off-site, including in on-street or public off-street parking areas.

The provision of a detailed precinct parking plan may identify the need to provide additional car parking provisions at an Activity Centre level. In this instance, it may be appropriate to investigate the suitability of cash-in-lieu provisions via a Parking Overlay.

9.5 Parking Management Approach

Glen Eira Parking Policy

The Glen Eira Parking Policy (2020) sets out the preferred approach to managing car parking within Elsternwick, including on-street and off-street locations, and within adjacent residential neighbourhood areas.

The preparation of a detailed Precinct Parking Plan will include, amongst other items, a review of existing restrictions against the objectives and user hierarchies outlined in the Parking Policy.

In this regard, undertaking a Precinct Parking Plan would be an appropriate mechanism to implement the Parking Policy for the Structure Plan area, and should occur and be implemented as soon as practicable to ensure future development applications are considered based on the current parking restrictions aligning with the policy.

Improving the Management of Public Car Parking

To improve the overall walkability of the Activity Centre, in particular reinforcing Glenhuntly Road as a 'Great Walking and Shopping Street' per the ITS, there is an opportunity to improve the way that car parking is managed in these locations. On-street car parking plays a pivotal role in supporting the economic viability of activity centres, in particular for loading and parking for people with disabilities amongst other purposes.

At the same time however, on-street parking creates congestion, with people searching for the highest value car parking to suit their needs, as close to their final destination as possible. Glenhuntly Road for example plays a number of important functions, including adjacent commercial and retail land uses, a key walking link, a destination and place in its own right, as well as a major tram route and vehicle thoroughfare. The presence of on-street parking both supports and hinders these functions.

Car parking in activity centres is also evolving through the use of enhanced technology as well as car parking being repurposed for other uses. Based on the Built Form Framework objectives, current trends and understanding of existing parking characteristics, the following could be implemented in Elsternwick:

- **Repurposing existing car parking on Glenhuntly Road** for a range of reasons including but not limited to:
 - outdoor dining / street trading;
 - landscaping / WSUD treatments;
 - providing for better pedestrian sight lines;
 - providing for improved tram stop facilities; and
 - more bicycle parking in convenient locations.

- **Electronic wayfinding signage**, directly motorists to closest available parking, in off-street locations.
- **Potential to implement paid parking**, subject to an activity centre wide, municipal wide or multiple municipality-based approach to pricing mechanisms;
- **Implementation of additional car share scheme spaces** to encourage uptake and reduce reliance on private vehicle use or ownership (existing and future residents);
- **Provision of public electric vehicle charging spaces**; and
- **Implementation of parking overstay detection systems**, to improve compliance and hence turnover.

Implementation of the above would be subject to understanding the needs based on detailed parking occupancy and duration of stay analysis, including consideration of land uses adjacent to the Built Form Framework area.

9.6 Commuter Car Parking

It is understood from Council that a long-term commuter multi-deck car parking is being considered at the site of the Stanley Street West Car Park. The car park would be provided for the benefit of railway commuters.

On the basis that the majority of the Built Form Framework is within 800 metres of the Railway Station, it is unlikely that any future residents would utilise commuter car parking. The location will require a 200 metre walk from the closest part of the car park, not including travelling from upper levels if car parking is located off the ground level. As such, there is not expected to be any benefit for residents from within the Built Form Framework area to drive to the station compared to walking, cycling or connecting via a tram.

In this regard, the commuter car park would be largely for the benefit of existing residents living outside of the walkable 800 metre catchment, where Elsternwick is the closest railway station.

Based on empirical and anecdotal evidence of similar commuter car parks around Melbourne, vehicle trips are likely to be generated prior to the commuter peak, with car parking being fully occupied relatively early in the morning, with subsequent outbound trips occurring during late afternoon.

The full impacts of any proposed commuter car park including mitigating works should be considered at a site-specific level.

9.7 Appropriateness of a Precinct Parking Plan and Car Parking Overlay

The practice note provided by DELWP for Parking Overlays (Practice note 57), outlines the objectives and processes for developing and implementing a Parking Overlay. The practice note states that before implementing a Parking Overlay, it is necessary to prepare a Parking Precinct Plan. A Parking Precinct Plan would identify car parking needs and issues for, in this case, Elsternwick, and set objectives and development strategies to manage parking at an activity centre wide basis.

The preceding report and analysis identify the traffic impacts associated with increased development, where car parking is provided at existing statutory rates, being Column B of Table 1 in Clause 52.06. The report identifies that providing car parking at lower rates, including increased rates of zero parking dwellings, will increase the mode share of active transport based trips, reduce the overall number of new development generated car trips onto the local road network, and increase the capacity for laneways to cater for development access.

The factors identified above, combined with the Built Form Framework vision for Elsternwick provide a number of clear objectives which could be investigated further with a Parking Precinct Plan. In addition, the existing management of car parking, including detailed car parking occupancy and duration surveys would be appropriate to identify any existing issues and opportunities.

The preparation of a car parking precinct plan would be suitable to use as a way to test various public realm initiatives, including repurposing of on-street car parking for other economic or placemaking purposes such as outdoor dining and WSUD / street greening initiatives.

9.8 Summary of Recommendations

A summary of car parking recommendations including the issue or objective addressed is presented in Table 9.2.

Table 9.2: Car Parking Recommendations

Recommendation	Description	Issue / Objective Addressed
CP.A	Implement car parking technologies to better manage the existing use of a finite resource, including electronic wayfinding signage, parking overstay detection devices etc.	More efficient trips to car parking for people driving to Elsternwick. Encourage turnover of car parking spaces
CP.B	Implement the Glen Eira Parking Policy approach to managing on-street and off-street parking through restrictions.	Encourage a potential mode shift away from private vehicle for existing users, while improving the efficiency of a high-demand finite resource.
CP.C	Increased provision of parking spaces for people with disabilities closer to Glenhuntly Road.	Most parking spaces for people with disabilities are currently located in public off-street car parks, which are in instances too far from key destinations along Glenhuntly Road.
CP.D	Consider the implementation of car share in new developments (for larger developments) and / or increase the number of public car share spaces.	Reduce reliance on private vehicle ownership in new developments.
CP.E	Consider the implementation of publicly available electric vehicle charging stations.	Encourage the uptake of electric vehicles for visitors to Elsternwick.
CP.F	The provision of zero car parking dwellings in line or above current trends in new residential dwellings.	Reducing the traffic related capacity impacts from the Built Form Framework.
CP.G	<p>Prepare a Precinct Parking Plan for Elsternwick, the parking precinct plan should consider, at a minimum:</p> <ul style="list-style-type: none"> - Detailed car parking occupancy and duration surveys; - Implement the Glen Eira Parking Policy; - The car parking issues and needs from both a Council and community perspective; - Identify opportunities to repurpose existing on-street car parking for other purposes such as outdoor dining or public realm initiatives; - Identify opportunities to alter car parking restrictions to better suit the needs of users including residential visitors, business and visitors; and - Establishing appropriate mechanisms including Parking Overlay to implement the actions. 	Reducing the traffic related capacity impacts from the Built Form Framework.

10 Conclusion:

Based on the preceding report and analysis, a number of key findings and conclusions have been made. In addition, recommendations have been made on the transport infrastructure and other interventions required to support the Elsternwick Built Form Framework.

The following Table 10.1 sets out the location of key recommendations within the report.

Table 10.1: Location of Key Findings and Recommendations

Description	Location in this report
Detailed review of existing conditions, including issues and potential opportunities, outlined by mode including: walking, cycling, public transport, road network, laneways, road safety and parking.	Section 4: Existing Transport Conditions
Summary of anticipated trips generated by the Built Form Framework	Section 6.5: Trip Generation Summary
Future mid-block traffic volumes based on the Built Form Framework assumptions, established using a detailed spreadsheet model.	Section 7.4: Future Mid-Block Traffic Volumes
Description of potential changes to the road hierarchy	Section 7.4: Future Mid-Block Traffic Volumes
Analysis of existing and expected future intersection capacities at key intersections	Section 7.5: Key Intersection Capacities
Potential road network and intersection mitigations to support Built Form Framework generated vehicular trips	Section 7.5: Key Intersection Capacities
Recommendations for providing future vehicular access to laneways	Section 7.6: Laneways
Summary of traffic impact findings and potential interventions and recommendations.	Section 7.7: Summary of Findings and Recommendations
Future pedestrian network and required infrastructure to support mode shift and the Built Form Framework	Section 8.3: Pedestrians
Future cycling network and required infrastructure to support mode shift and the Built Form Framework	Section 8.4: Cycling
Recommendations to improve public transport usage and accessibility	Section 8.5: Public Transport
Summary of car parking recommendations, including car parking management, provisions for new developments and parking precinct plan.	Section 9.8: Summary of Recommendations (Car Parking)