CROSS ROAD – ANZAC HIGHWAY TO SOUTH EASTERN FREEWAY

Corridor Study Report

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Contents

Glossary

Term	Description
26m B-Double vehicles	A B-double is defined in the Heavy Vehicle National Law (HVNL) as a combination consisting of a prime mover towing two semitrailers, with the first semitrailer being attached directly to the prime mover by a fifth wheel coupling and the second semitrailer being mounted on the rear of the first semitrailer by a fifth wheel coupling on the first semitrailer.
A Functional Hierarchy for South Australia's Land Transport Network	The Department's *A Functional Hierarchy for South Australia's Land Transport Network* has been developed to describe a functional hierarchy that identifies which corridors are important for different modes of transport.
AddInsight	*AddInsight* is a traffic monitoring and incident detection system that was developed by the Department of Transport and Infrastructure. Based on a network of WIFI and Bluetooth receivers *AddInsight* provides real-time data for the road network.
Adelaide's Outer Ring Route	Adelaide's Outer Ring Route includes six corridors that distribute traffic and provide reliable cross-city travel for both business and the movement of freight without the need to pass through the central city. These roads are Grand Junction Road, Hampstead Road, Portrush Road, Cross Road and South Road (including sections of the North-South Corridor).
Commercial/retail land use	Land used for business and/or profit generating activities.
Corridor Study	A corridor study as defined by Australian Transport Assessment and Planning is a cooperative long-term plan identifying the transport problems within a corridor and the potential initiatives and priorities to address those problems.
CV	Commercial Vehicle (heavy vehicles defined as being those vehicles that are included in Classes 3 to 12 inclusive of the Austroads vehicle classification system).
Education land use	Land occupied by public or private buildings associated with education (i.e., schools, universities, or other government facilities).
GIS data	Geographic Information Systems (GIS) that creates, manages, analyses, and maps all types of data.
High Activity Pedestrian Area	As defined within The Department's *A Functional Hierarchy for South Australia's Land Transport Network* as locations where significant pedestrian activity exists or is planned and where the aim is to provide safe and convenient connections at key locations along an arterial route for connections and access to destinations of high pedestrian activity.
Journey to work	Australian Bureau of Statistics application of Census data to understand the characteristics of the journey (commute) to work in Australia.
LIDAR	Light Detection And Ranging (LIDAR) is a remote sensing technology. A laser light is used to produce measurements of the earth's surface and create 2D/3D points for use in a GIS database.
Low-density residential land use	Development primarily characterised by single detached dwellings or buildings with a small number of units.
Major Cycling Route	As defined within The Department's *A Functional Hierarchy for South Australia's Land Transport Network,* Major Cycling Routes in the metropolitan area are arterial roads where bicycle transportation is encouraged. They provide direct, continuous links to the Adelaide CBD, regional centres, district centres and major employment areas, as well as access to key cycle trip generators (e.g., strip and local shopping, educational institutions, and places of cultural and social activity).
MASTEM 3.1 (Land Use Scenario G)	The Metropolitan Adelaide Strategic Transport Evaluation Model (MASTEM) is a comprehensive multi-modal urban travel demand model suite, which is used to prepare forecasts of travel demand for selected future years (i.e. 2021, 2026, 2031 and 2036) founded on the State Government's demographic and land use policies and plans.
National Heritage	Natural, historic and Indigenous places of outstanding significance to the nation.
National Key Freight Route	The national key freight routes have been identified with the collaboration of commonwealth, state and territory governments and industry to develop a more comprehensive understanding of Australia's freight system and to assist governments and industry to better understand, and plan for, critical freight flows.
National Land Transport Network	The National Land Transport Network (the Network) is a network of nationally important road and rail infrastructure links and their intermodal connections. The Network is determined by the Commonwealth's Minister in the National Land Transport Network Determination 2020 under the National Land Transport Act 2014.
Operating at capacity	As defined in Austroads Guide to Traffic Management, capacity of a road segment, as determined for design purposes, is the maximum sustainable hourly rate at which

Term	Description
	persons or vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under the prevailing roadway, environmental, traffic and control conditions.
Over Size, Over Mass vehicles (OSOM)	Oversize and/or overmass (OSOM) vehicles and loads that are travelling on South Australian roads under an exemption (permit or notice) issued under the Heavy Vehicle National Law (HVNL) or the Road Traffic Act (RTA).
Place activation	Place classification based on degree of activation applies to areas with differing street-based activity such as areas with retail and commercial frontages and public uses.
Performance based standards (PBS)	Performance based standards (PBS) vehicle routes are classified into four national network levels (1 to 4). These network levels include a Class A and Class B category for the vehicle lengths and cover general mass limits, concessional mass limits and higher mass limits.
Population density	Number of individuals divided by the size of the area.
Select link analysis	Shows the routes taken between AddInsight WIFI/Bluetooth sites.
Standard Frequency Corridor (Go Zone)	As defined within The Department's *A Functional Hierarchy for South Australia's Land Transport Network* Standard Frequency Corridor (Go Zone) are Standard frequency on-road public transport corridors providing access to district centres and cross-suburban connections.
State Heritage	Places of heritage value in South Australia, including State Heritage Areas, Places and related Objects of State significance. The South Australian Heritage Register is maintained by the South Australian Heritage Council under the Heritage Places Act 1993.
Strava Heatmap	A data visualisation technique that shows aggregated public activities recorded using the Strava Application.
Swiftly	Swiftly is a transit data platform application utilised by South Australian Public Transport Authority (SAPTA) to assess data and inform management of the Metropolitan Adelaide bus network.
TfNSW Road Network Plans	Transport for New South Wales Road Network Corridor Planning is a program to provide a consistent approach to the management of State-operated road in NSW. The program aims to address current and future transport needs and challenges with key road users in mind.
U-rails	Installed at bicycle parking locations and consisting of a steel loop with two points of contact to the ground which provides the ability for a bicycle to be secured to the rail. Typically used for short term bicycle parking.
Urban design professionals	Professionals specialising in Landscape Architecture, Urban Design, Wayfinding and Urban Strategy.
Wayfinding	Information systems such as signage and linemarking that assist with navigation and understanding of the physical environment.

1 Executive Summary

1.1 Introduction

The Department for Infrastructure and Transport (the Department) is currently preparing Corridor Studies for key State-controlled roads within Adelaide. The corridor studies provide a plan for corridor improvement with consideration of all modes of transport that use the corridor and the urban realm, to inform future investment prioritisation decisions up to year 2036 (a fifteen-year horizon).

This corridor study comprises Cross Road (road number designation 'A3') between the South Eastern Freeway and Anzac Highway, which traverses the following Local Government Areas:

- City of Unley (northern side of Cross Road)
- City of Mitcham (southern side of Cross Road)
- City of Marion (west of South Road)
- City of West Torrens (west of Glenelg Tram line).

The aim of developing a corridor study is to provide an evidence-based investment plan for a corridor, linked to an understanding of current performance, future function, and an agreed plan for that corridor.

1.2 Existing corridor

The *Cross Road Corridor Study* looks at the length of Cross Road from Anzac Highway to the start of the South Eastern Freeway (the corridor). The corridor facilitates the strategic movement between the South Eastern Freeway and the inner southern and western areas of the Adelaide Metropolitan area and provides an east-west link between South Road and Portrush Road, which are both part of the National Land Transport Network. It intersects with key north-south corridors such as Marion, Goodwood, Unley and Fullarton Roads. Cross Road also acts as a local access road and provides connectivity to community/leisure facilities and residential areas to its north and south.

The key characteristics of Cross Road are its:

- Classification as a National Key Freight Route
- Designation as the southern section of Adelaide's Outer Ring Route
- Designation as the following within the Department's *A Functional Hierarchy for South Australia's Land Transport Network:*
    - Major Traffic Route
    - Freight Route
    - Major Cycling Route (Metro)
    - Standard Frequency Public Transport Corridor (GoZone).

Approximately 70% of land use along the corridor is low-density residential, with nodes of commercial/retail activity in specific locations, typically at intersections with the major north-south roads such as Unley Road, Goodwood Road and Marion Road. There is also a relatively high percentage of education land use at the eastern end of the corridor (Segment 4), including the University of Adelaide Waite Campus and Urrbrae Agricultural High School. There are no National Heritage places along the corridor and there are five State Heritage places along the corridor.

Census data from 2016, shows the population of the study area (1km either side of road) was approximately 60,400 people, with a population density of 19 persons per hectare. Total employment was approximately 22,400. Overall, the dominant mode of transport to work for people within the study area is by private vehicle.

The Cross Road corridor length is 8.8km. The road carriageway has a cross-section ranging between 15 and 17 metres, comprising two traffic lanes in each direction, along with full or part time cycle lanes along some lengths. The speed limit is posted as 60 km/h along its full length, with no school zones or other speed limits present. There are very limited on-road parking provisions along its length, however, there are some all-day

parking spaces on Segment 4. There are 11 signal-controlled intersections, 4 pedestrian actuated crossings and 3 level crossings (the Glenelg Tram and Seaford and Belair rail lines).

A benchmarked performance analysis was undertaken to compare the Fatal and Serious injury (FSI) rate (crashes per km per year), casualty crash rate (number of crashes per km per year) and casualty crash rate per 100 million vehicle km travelled (MVKT) per year. The data shows that the corridor crash rates are above the South Australian road network average crash rate. The crash density and cluster map for the corridor is provided in **Figure 1**.

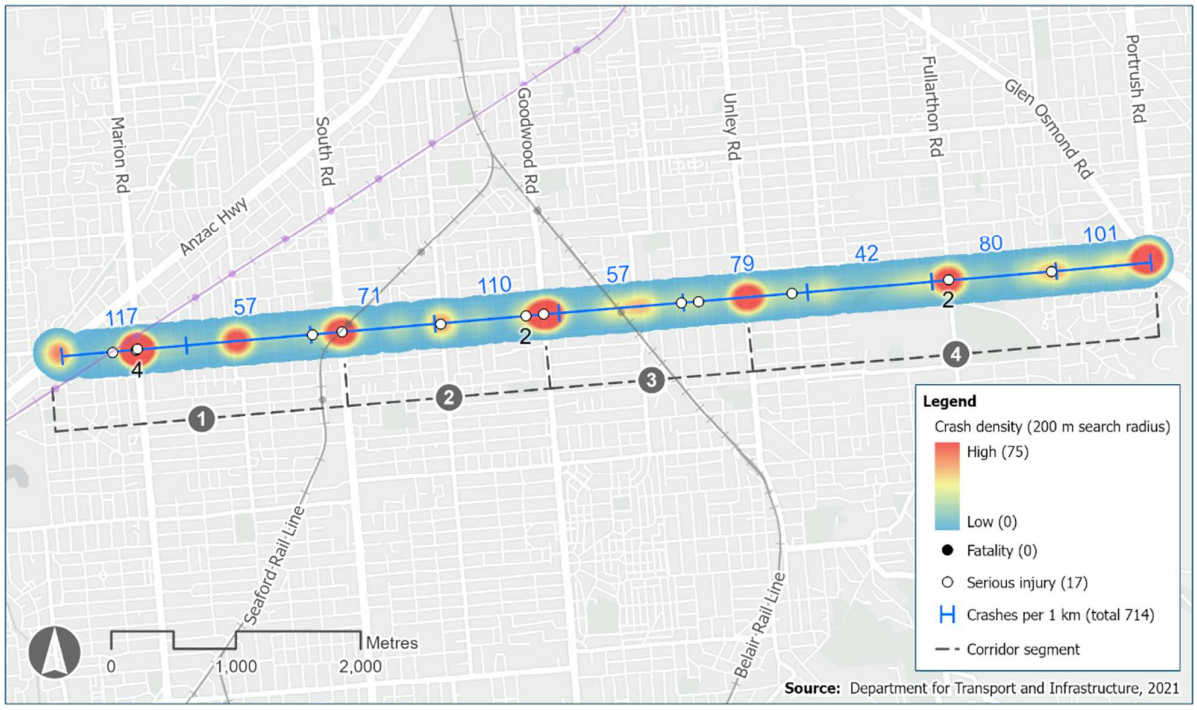

Figure 1: Crash density and cluster map

1.3 Movement and Place

For the purposes of the Movement and Place assessment, the corridor has been subdivided into four segments as shown in **Figure 2**. The extent of these segments has been carefully considered based on:

- Consistency of land use;
- Consistency of road cross section; and
- Logical data analysis groupings (e.g. traffic volumes).

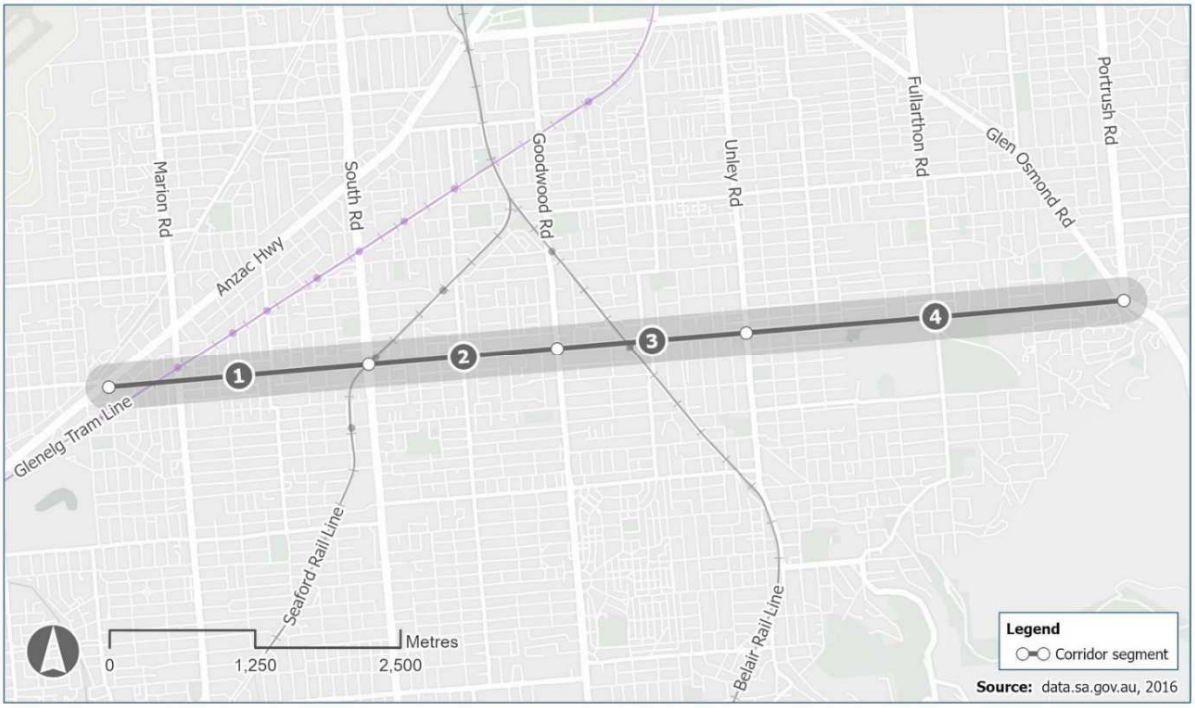

Figure 2: Study area and corridor/network segmentation

Any road network has multiple functions on which the community rely. These include:

- Connecting our communities through the **movement** of people and goods
- Supporting **places** and public spaces in our urban areas and regional centres
- Facilitating **economic** growth and prosperity
- Facilitating **social** activities such as events and celebrations.

The corridor study process has adopted a Movement and Place approach. This approach recognises that a street performs two, often competing functions – Movement and Place – and that network planning and street design should consider both. A classification matrix for 'P = Place' and 'M = Movement' was adopted, with number 1 representing the highest strategic importance (National), and number 5 representing local importance. Ultimately the classification of a road segment within a corridor is dependent of the significance of Movement needs and Place function along the corridor, and also the varying modal priorities.

Each segment of the Cross Road corridor has been given an M2 Movement classification, reflecting the strategic function and multi-modal use of the entire corridor length. The corridor has been classified as having a P4 to P5 Place classification, which recognises the corridor segments with neighbourhood or local significance. The current degree of activation along the corridor is relatively low, with few locations where stopping and staying along the roadside is attractive, or required.

Figure 3 shows the movement and place status of each segment and identifies the significant features at city-wide, district and local level.

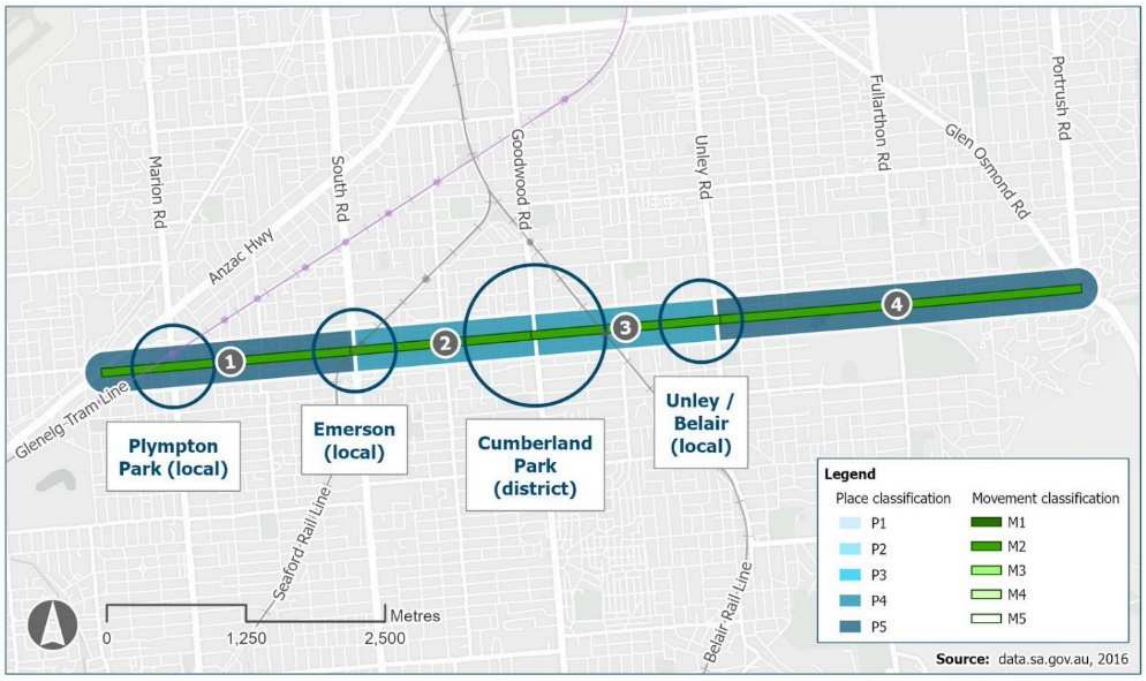

Figure 3: Movement and Place summary

1.4 Strategic vision

Based on the consolidated themes of Movement and Place, a strategic vision (which links to corridor objectives) has been developed and agreed for the Cross Road corridor:

> *The Cross Road corridor protects and enhances a key economic function and provides for safe and efficient movement of people and goods, whilst providing accessibility to residential, commercial, education and recreation precincts*

1.5 Current performance

The evidence base developed using a range of data and assessments, enables objective corridor planning that ultimately allows decision makers to prioritise investment, allocate road space and improve outcomes for all corridor users.

Existing performance of the corridor has been assessed using 12 specified performance indicators (6 movement and 6 place indicators) that are consistent across all the corridor plans currently being developed. A consistent methodology was developed to allow the calculation of a performance score for each of the indicators, per corridor segment. This assessment has highlighted the following for the existing performance of the corridor related to the specified indicators:

- Journey time reliability and speed efficiency during peak periods along most segments of the corridor is low, reflecting the delays experienced by all vehicles on the corridor
- Cycling and pedestrian movement along the corridor is not well catered for, in part due to an absence of bicycle lanes in Segment 4 of the corridor and the proximity of freight to bicycles
- The place scores of the corridor are generally low, reflecting the long-standing vehicle movement focus along the corridor.

1.6 Future context

Cross Road will continue to cater for local and regional traffic movements in line with its role as part of Adelaide's Outer Ring Route and the National Freight Route Network. Future forecast traffic data, extracted from MASTEM 3.1 (Land Use Scenario G), indicates in an unconstrained scenario there is reasonably high traffic growth on Cross Road to 2036. However, as the corridor is already operating near capacity, and aside from Fullarton Road there are no funded upgrades, actual growth in vehicles numbers is dependent on broader network and policy considerations.

Future network policy for Cross Road requires holistic consideration of Adelaide's Outer Ring Route and other key corridors such as Glen Osmond Road. The need for this is particularly important considering the completion of the North-South corridor, which is expected to change travel patterns across Greater Adelaide.

Cross Road will continue to form part of Adelaide's Outer Ring Route and the National Key Freight Route Network. As such, the future movement classification for Cross Road is not anticipated to change from M2.

No changes to existing Place classifications are expected in the future (from P4/P5), though there may be local opportunities to enhance the place function at specific sites.

1.7 Problem identification

In consideration of the current and future issues identification, the following problem statements were identified for the Cross Road corridor:

- Problem Statement 1: Accessibility – The corridor has various impediments that reduce accessibility for corridor users.
- Problem Statement 2: Safety – The corridor exposes its users to an environment where personal safety may be compromised.
- Problem Statement 3: Efficiency – The corridor does not meet user's operational efficiency expectations.
- Problem Statement 4: Social Impact – The corridor provides an environment that is inconsistent with all the social needs of adjacent communities.

1.8 Investment Plan

Following investigation of current context, current performance and future context, a separate *Investment Plan* (refer *Cross Road Investment Plan Report - IPP-AMJV-420-001-PL-KR-DO-0048)* was developed as part of Phase 4 of the Cross Road Corridor Study.

The *Investment Plan* provides a 'pipeline' of potential initiatives that, when implemented, would contribute to improved performance of the existing infrastructure along the corridor in line with the vision, objectives and desired outcomes between 2021 and 2036.

The *Investment Plan* has assessed the potential initiatives to identify the degree of contribution to resolving the corridor problems.

2 Introduction

2.1 Background

The Department for Infrastructure and Transport (the Department) is currently preparing corridor studies for key State-controlled roads within Adelaide.

The corridor studies provide a plan for corridor improvement with consideration of all modes of transport that use the corridor and the urban realm to inform future investment prioritisation decisions up to year 2036 (a fifteen-year horizon).

This corridor study comprises Cross Road (road number designation 'A3') between the South Eastern Freeway and Anzac Highway, which traverses the following Local Government Areas:

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- City of Mitcham (southern side of Cross Road)
- City of Marion (west of South Road)
- City of West Torrens (west of Glenelg Tram line).

The corridor provides a strategic connection between the South Eastern Freeway and the inner southern and western areas of the Adelaide Metropolitan area. It forms part of Adelaide's Outer Ring Road and is a designated National Key Freight Route.

Figure 4 provides locational context of the Cross Road corridor in the surrounding region.

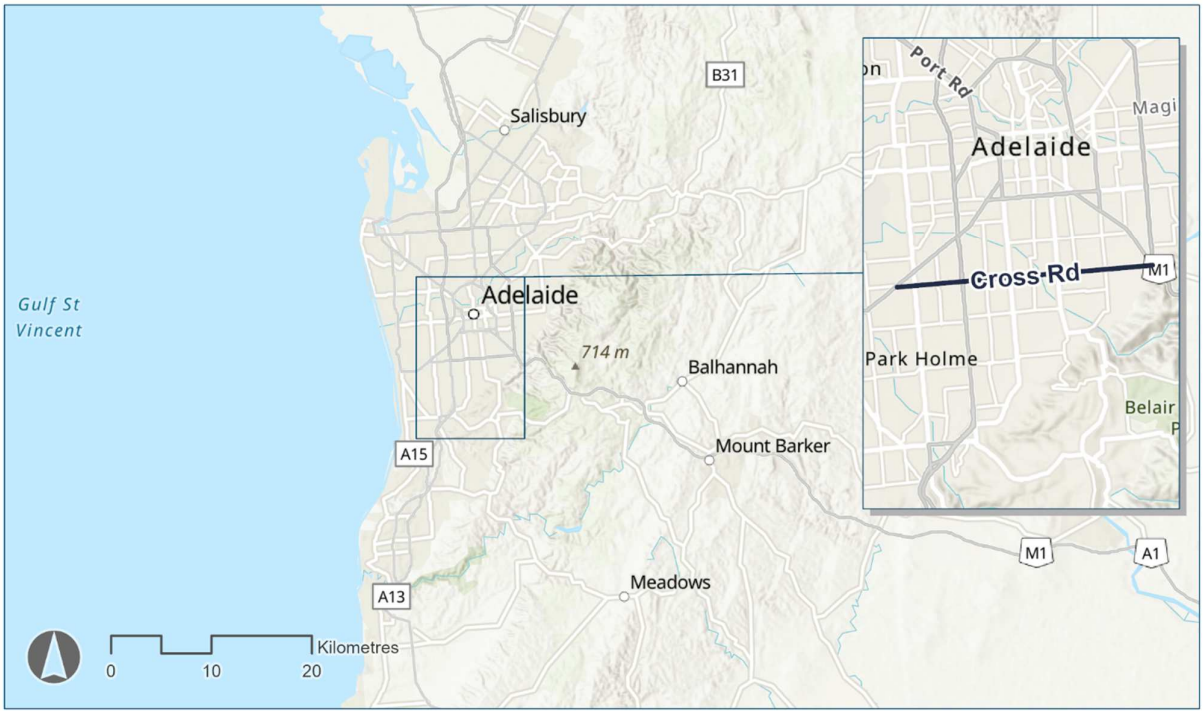


Figure 4: Cross Road corridor location

2.2 Scope

2.2.1 Overview of corridor study

A corridor study is intended to inform project prioritisation decisions, along with providing context for more detailed action planning, project design development and project implementation.

Figure 5 identifies the Corridor Study transport planning process which precedes project planning and design development stages based on the *Department's Transport Planning Master Specification.*

Figure 5: Corridor Study transport planning process

2.2.2 Aim and scope of the corridor study

The aim of developing a corridor study is to provide an evidence-based investment plan for a corridor linked to an understanding of current performance and an agreed future plan for that corridor. It has been developed as part of a series of six pilot corridor studies in South Australia. Studies have also been undertaken on Portrush Road, Brighton Road, Unley Road, Main North Road and Payneham Road corridors. The studies have been co-designed subject to the local and strategic contexts of each corridor and therefore will not be identical, but outputs will be comparable to consistently inform and prioritisation of investment decisions.

The overarching scope of work for the corridor studies includes:

- Definition of the existing corridor function and user requirements
- Definition of the strategic vision and objectives of the corridor
- Assessment of the existing performance, using defined movement and place indicators
- Identification of potential future changes required and determination of the associated implications
- Development of an investment plan for the short (0-5 years), medium (5-10 years) and long-term (10-15 years) for enhancing how the corridor operates
- Identify opportunities for further investigation in the short, medium and long-term as well as in the longer term, beyond 15 years.

The corridor study process has adopted a Movement and Place approach. This approach recognises that a street performs two, often competing functions – Movement and Place – and that network planning and street design should consider both. This is the first use of the Movement and Place principles by the Department for corridor studies in South Australia.

This study references information from policy and strategy documents available at the time of preparation. The assessment of road network performance was based on data obtained from AddInsight[1]. In addition, site observations, desktop analysis and targeted consultation with stakeholders have all been used to gain an understanding of the overall performance of the corridor.

[1] The AddInsight Travel Time Information System is an Intelligent Transport System (ITS), developed by the South Australian Government provides real-time road traffic data from Bluetooth and Wi-Fi technologies

2.2.3 Purpose of this report

The *Cross Road Corridor Study* has been undertaken in four phases as presented in **Figure 6** which is the IPP Corridor Studies Framework for these pilot studies.

This report summarises the key findings for Phases 1 to 3.

A separate *Cross Road Investment Plan Report – IPP-AMJV-420-001-PL-KR-DO-0048* has been developed as part of Phase 4.

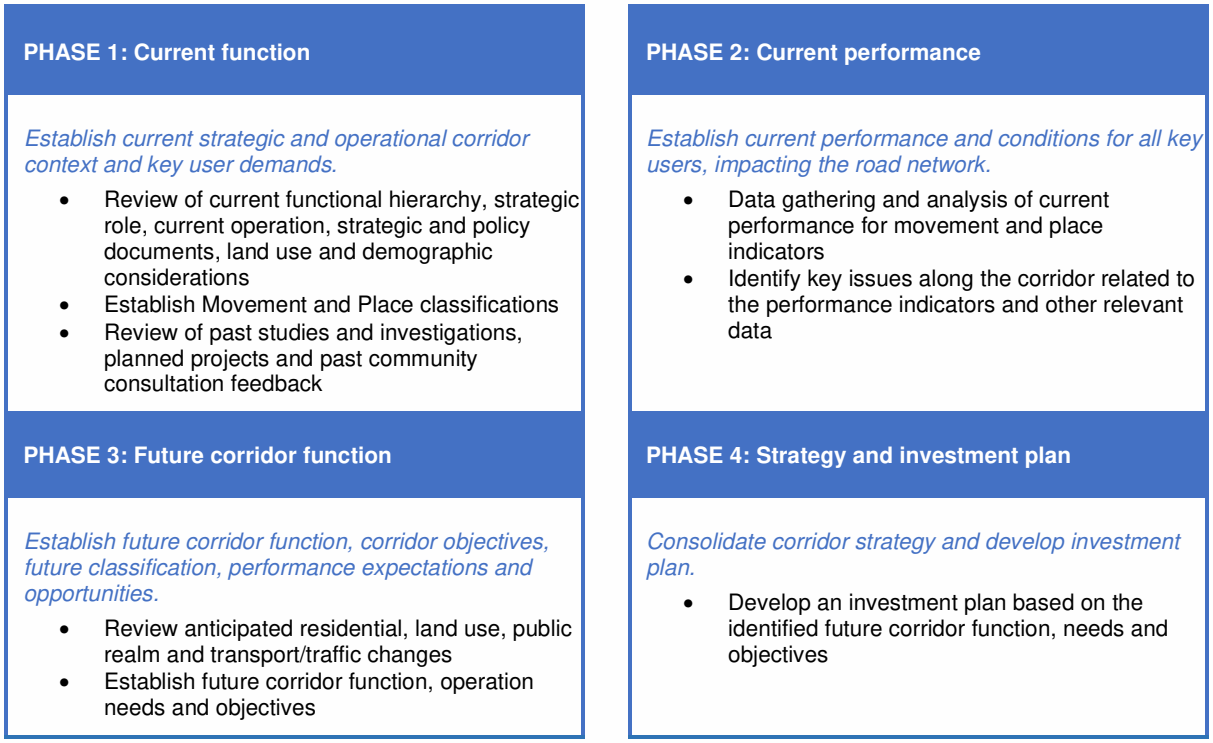


Figure 6: IPP Corridor Studies Framework

2.2.4 Stakeholder engagement

Engagement with key stakeholders is critical to the success of the delivery of this corridor study and the Department is committed to listening to and partnering with stakeholders to understand local issues relating to Movement and Place through the corridor.

Stakeholder and community engagement undertaken for the *Cross Road Corridor Study* is summarised later in this document. The engagement included workshops with internal Department stakeholders and Local Government, along with community engagement via an online tool (Social Pinpoint). Refer to the Stakeholder Engagement Report in **Appendix A – Stakeholder Engagement Report** for further detail.

Stakeholder engagement occurred during phases 1 and 2 for the following purposes:

- Phase 1 – to receive feedback on the current function of the Cross Road corridor and identify issues and opportunities.
- Phase 2 – to receive feedback on the current function, performance assessment and future condition of the corridor.

Community engagement occurred in a single phase for the following purpose:

- To gain an understanding of people's experience along this corridor, identifying issues and opportunities.

Feedback received as part of the engagement supplement the corridor performance issues obtained through data collection and analysis and assist in identifying the relative importance of resultant opportunities identified and investment decisions in the corridor where possible.

2.3 Study Area

2.3.1 Study area extents and network segmentation

The *Cross Road Corridor Study* comprises the section of Cross Road between Anzac Highway and the start of the South East Freeway. The corridor has a total length of approximately 8.8km under the care and control of the South Australian Government.

To facilitate the corridor assessment, the corridor has been subdivided into four segments as shown in **Figure 7** and detailed in **Table 1**. The extent of these segments has been carefully considered based on:

- Consistency of land use
- Consistency of road cross section; and
- Availability of differentiating data (e.g. traffic volumes).

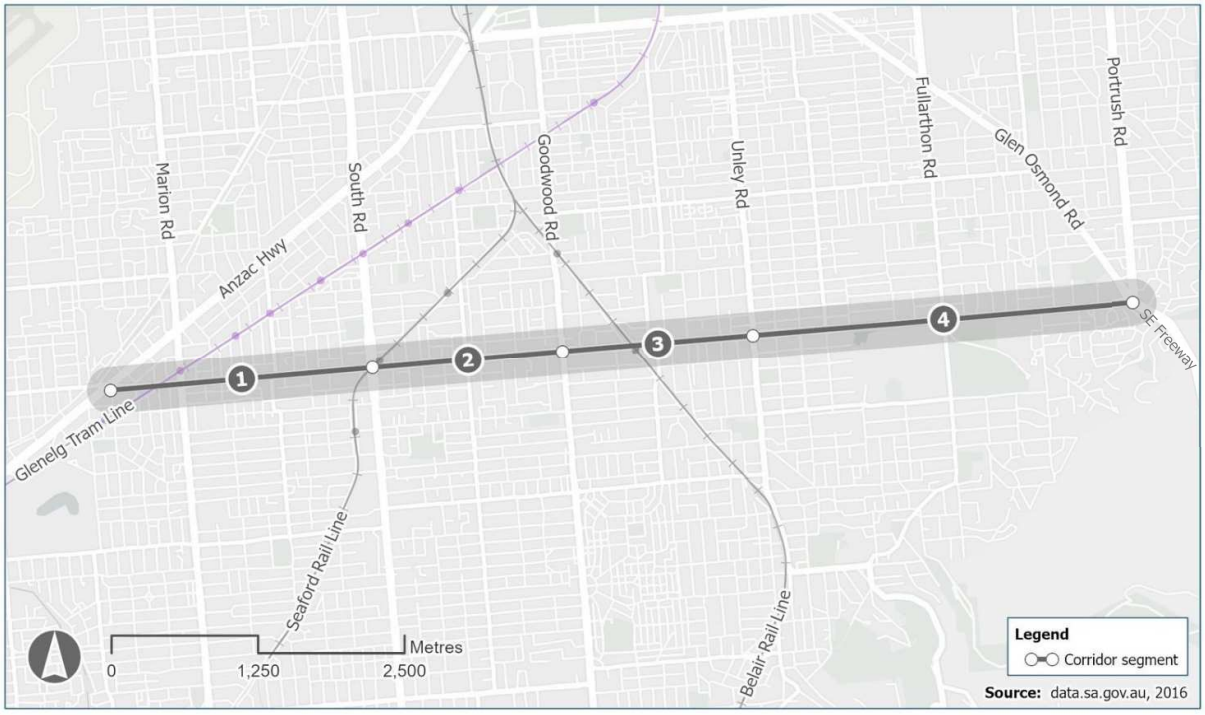


Figure 7: Study area and corridor/network segmentation

Table 1: Corridor segmentation

Segment		From	To	Length[2]	Speed Limit
1	Cross Road	Anzac Highway	South Road	2.3 km	60 km/h
2	Cross Road	South Road	Goodwood Road	1.6 km	60 km/h
3	Cross Road	Goodwood Road	Unley Road	1.7 km	60 km/h
4	Cross Road	Unley Road	South Eastern Freeway	3.2 km	60 km/h

[2] Based on Google Maps measurement tool

2.3.2 Area overview

The Cross Road corridor traverses the following Local Government Areas (LGA):

- City of West Torrens – Suburb of Plympton.
- City of Marion - suburbs of Glandore, Edwardstown, South Plympton and Plympton Park
- City of Unley – suburbs of Myrtle Bank, Highgate, Malvern, Unley Park, Kings Park and Clarence Park
- City of Mitcham - suburbs of Urrbrae, Netherby, Kingswood, Hawthorn, Westbourne Park, Cumberland Park and Clarence Gardens
- City of Burnside – suburb of Glen Osmond

Figure 8 shows the corridor segments in context of the LGA boundaries.

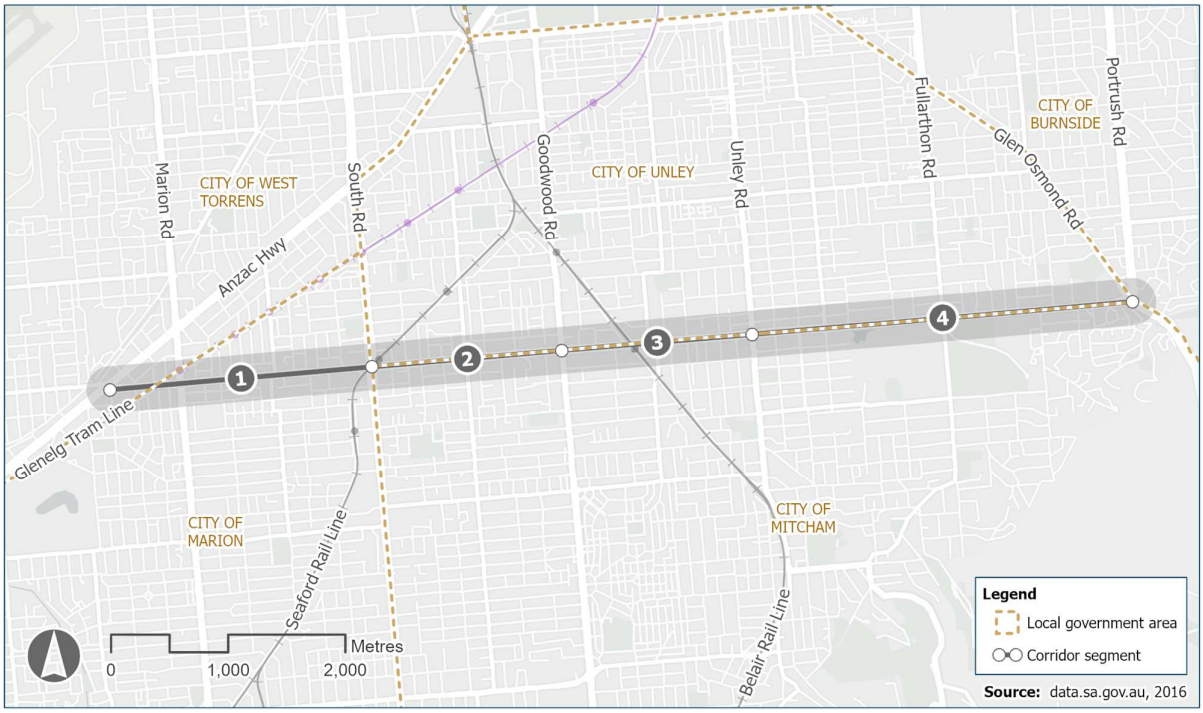


Figure 8: Cross Road in context of LGA Boundaries

2.3.3 Physical/natural environment features

The Cross Road corridor is typically characterised by low-density residential and light commercial development with the exception of the University of Adelaide Waite Campus, Urrbrae Agricultural High School and Urrbrae Wetlands in Segment 4.

The following key features also shape the role and experience of the corridor:

- Three rail crossings along the corridor (two heavy rail and one tram);
- Small public open spaces; and
- Mature, large London Plane trees are the dominant flora (vegetation) along both sides of Cross Road.

The elevation profile of the corridor provided in **Figure 9** and **Figure 10** shows the corridor gradually sloping from the foothills to the east towards to the coast in the west with an approximate height difference of 140m across the 8.8km section of road.

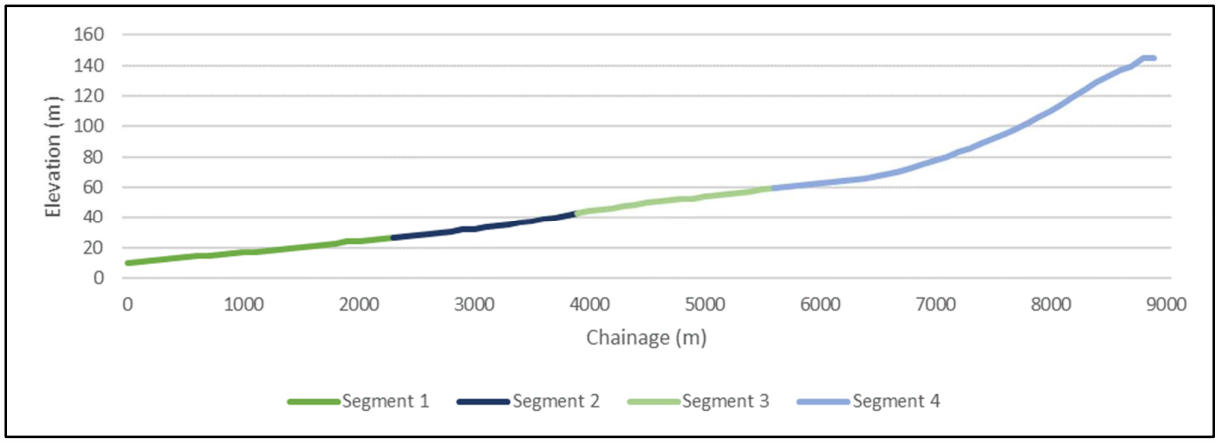


Figure 9: Elevation profile of Portrush Corridor from west to east

Figure 10: Local topography

2.4 Strategic planning context

Adelaide was recently listed as the third most liveable city in the world[3] and the South Australian Government has a vision for a more lively, connected and vibrant Greater Adelaide. In conjunction with this, the Government wants to grow the South Australian economy at an annual rate of 3%, bringing the State back in line with other parts of Australia that have out-performed and out-grown South Australia over the past 20 years[4].

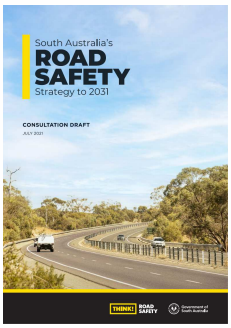
To ensure that Adelaide continues to maintain its status as one of the world's most liveable cities, there are several Australian, State and Local Government strategic policies and priorities that seek to drive this, while also striving to achieve the economic growth targets.

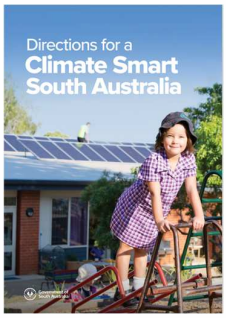
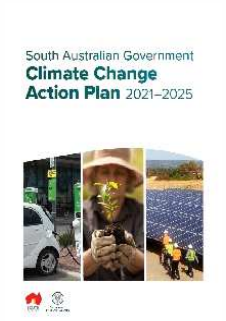
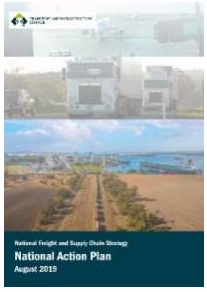
Table 2 identifies key strategic documents relevant to the preparation of this Corridor Study.

Table 2: Strategic planning context of Cross Road corridor

Strategy / Priority	Relevant objectives and priorities
SA State Government strategies and priorities	
SA Growth State	The *Growth Agenda* identifies infrastructure as one of the four key areas for economic growth. Additionally, *Growth State* identifies nine priority export-focussed sectors with strong growth prospects for South Australia including: • Tourism • International education • Defence industry • Food, wine and agribusiness • Hi-Tech • Health and medical industries • Energy and mining • Space industry • Creative industries
20-Year State Infrastructure Strategy (2020)	The Strategy identifies the key needs and challenges and provides priorities to guide government policy and investment in infrastructure to support economic growth. The Strategy includes the following priorities: • Priority 21: Improve public transport patronage to take a greater share of demand as Adelaide grows. • Priority 22: Make strategic investments to improve connectivity to, between and within key economic precincts. • Priority 23: Improve the safety of the road network. • Priority 26: Identify key economic corridors through Adelaide and the regions and plan interventions to create more efficient supply chains. • Priority 27: Improve the efficiency of freight through Adelaide.

[3] The Economist Intelligence Unit (2021), *The Global Liveability Index 2021*, viewed at https://www.eiu.com/topic/liveability
[4] Joyce Advisory (2019), *Review of the South Australian Government's International and Interstate Engagement Bodies and Functions*

Strategy / Priority	Relevant objectives and priorities
 **The 30-Year Plan for Greater Adelaide**	The Plan outlines three key objectives which are: • Maintain and Improve Liveability. • Increase Competitiveness. • Drive Sustainability and Resilience to Climate Change. There are several relevant objectives to transport projects including: • Accessibility. • A transit focused and connected city. • Healthy, safe and connected communities. • Economic growth and competitiveness. The 2017 update to the 30-Year Plan outlined three key targets relevant to transport, including: • Target 2 – More ways to get around • Target 3 – Getting active • Target 4 – Walkable neighbourhoods • Target 5 — A green liveable city.
 **A Functional Hierarchy for South Australia's Land Transport Network (2013)**	The Functional Hierarchy recognises the vital roles that different corridors play in South Australia's transport network. It identifies which transport corridors are important for different modes of transport and include: • Public transport corridors • Cycling routes • Pedestrian access areas • Major traffic routes • Freight routes • Peak hour routes • Tourist routes (regional) • Key outback routes (regional).
 **Draft South Australia's Road Safety Strategy to 2031 (2021)**	The State Government is developing an updated *Road Safety Strategy*. The vision of SA's Road Safety Strategy is to have zero fatalities on our roads by 2050. The ten-year targets are: • At least 50% reduction in lives lost; and • At least 30% reduction in serious injuries (per capita) on South Australian roads by 2031. Key focuses of the Road Safety strategy are: • Enforcing safe road user behaviour • Regional and remote areas and younger drivers in these areas • Workplace road safety • Aboriginal road safety • Working with Local government • Older road users • Improving safety for vulnerable road users

Strategy / Priority	Relevant objectives and priorities
 **South Australian Government's Directions for a Climate Smart South Australia**	The *Directions for a Climate Smart South Australia* policy statement sets the government's agenda for practical, on-ground action to address climate related impacts and will guide climate smart planning and action across government to drive low emissions jobs and growth, protect our environment, and support community resilience and wellbeing. It includes a number of policy actions/recommended solutions relevant to this corridor study including: **Reduce Net Emissions**: The State Government will lead an orderly and socially responsible transition to a low emissions economy. **Leading by example:** The State Government will embed climate risk and opportunity into Government decision making and investment and seek to achieve net zero emissions in government.
 **South Australian Government's Climate Change Action Plan**	The *Climate Change Action Plan* describes the South Australian government led objectives and actions to help to build a strong climate smart economy, further reduce greenhouse gas emissions, and support South Australia to adapt to a changing climate. It includes a number of actions relevant to this corridor study or recommend solutions including: • 4.5 – Align transport planning with net zero emissions outcomes • 4.6 – Drive increased patronage of public transport through delivery of services that are move efficient, integrated and customer-focused • 5.8 – Identify strategic opportunities for urban greening in metropolitan Adelaide • 5.12 – Assess and address climate change risk in government infrastructure decisions, risk assessment and audit processes • 7.1 – Ensure climate risk and opportunity are addressed across government policy and practice
Federal Government strategies	
 **National Freight and Supply Chain Strategy – National Action Plan (2019)**	The *National Freight and Supply Chain Strategy – National Action Plan* sets an agenda for coordinated action across all freight modes over the next 20 years. It sets key actions to be delivered by government to achieve strategic goals. The Action Plan outlines the following action areas: • Ensure that domestic supply chains are serviced by resilient and efficient key freight corridors. • Provide infrastructure to connect regions and remote areas to markets. • Target infrastructure investment programs to improve regional and remote freight access and safety.

Strategy / Priority	Relevant objectives and priorities

Infrastructure Australia's Infrastructure Priority List 2021

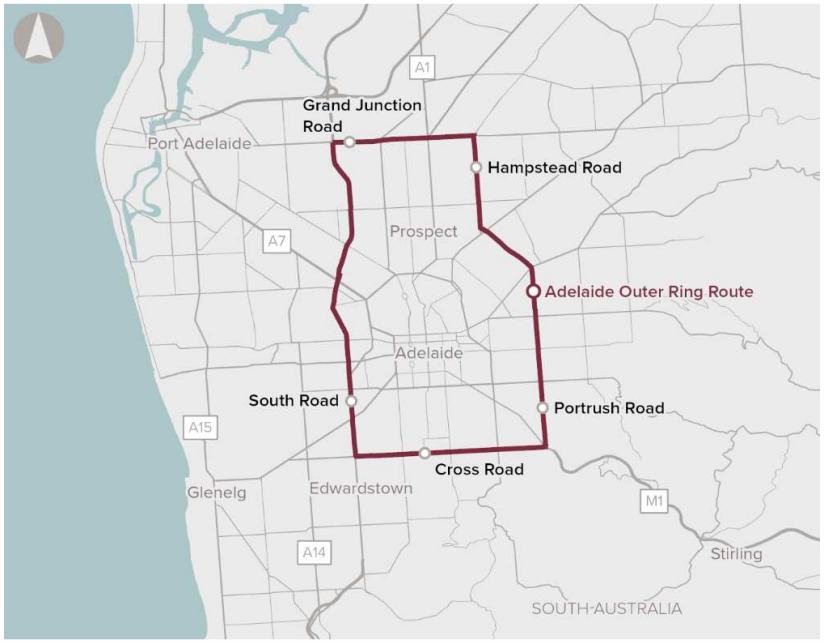
The *Infrastructure Priority List* provides a credible pipeline of nationally significant proposals for governments at all levels to choose from.

It provides evidenced-based advice to help decision makers identify Australia's spending priorities and deliver the infrastructure most needed by Australian communities.

'Adelaide's Outer Ring Route capacity' was released as a 'High Priority Initiative' on 26 February 2021.

Infrastructure Australia describe Adelaide's Outer Ring Route as '*six corridors that operate as the key freight route connecting the South Eastern Freeway, the Port of Adelaide, the Adelaide Airport, and intermodal terminals in northern Adelaide.*'

Cross Road is at the southern end of Adelaide's Outer Ring Route, connecting to South Road and Portrush Road.



Infrastructure Australia Problem Definition

The following is summarised from the Infrastructure Australia problem definition:

- *Segments of Adelaide's Outer Ring Route, which surrounds inner-Adelaide, are heavily congested in peak and non-peak periods. This results in inefficient and less productive freight movements, reduced performance of the public transport system, longer travel times, and decreased safety for commuters and pedestrians.*
- *In 2019, delays on the most congested sections of Adelaide's Outer Ring Route increased travel times by more than 25%.*
- *Cross-city traffic patterns, increasing land use densities and the location of schools create conflicts at several intersections along the route, and on arterial roads that feed into key locations, including the Adelaide CBD.*

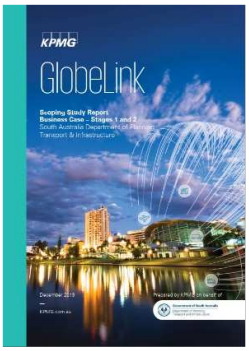
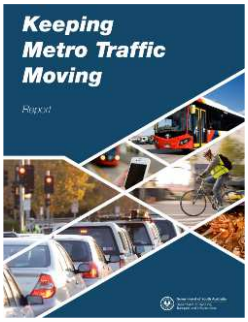
Infrastructure Australia Proposed Initiative

Potential options to address the initiative are identified by Infrastructure Australia as:

Strategy / Priority	Relevant objectives and priorities
	• Making better use of the existing infrastructure, such as with technology to improve traffic management • Improving or removing intersections • Bus network improvements • Targeted High Productivity Vehicle access improvement
Local Government strategies	
 **City of Unley Community Plan 2033**	The *City of Unley Community Plan 2033* provides a guide to orderly and efficient development, integrated transport and land-use planning, implementation of the Planning Strategy and targets for growth and affordable housing, infrastructure planning and review of the Development Plan and the strategic directions and priorities for amendments. The Plan identifies a vision of "Our City is recognised for its enviable lifestyle, environment, business strength and civic leadership." The Plan identifies four themes, Community Living, Environmental Stewardship, Economic Prosperity and Civic Leadership. Key objectives include: • 1.5 Our City is connected and accessible • 2.1 Unley's urban forest is maintained and improved • 3.2 Thriving main streets and other business activities operate across our City
 **City of Unley, Strategies and policy documents**	The City of Unley has a number of Strategies and policy documents including the Integrated Transport Strategy, Four Year Delivery Plan, Walking and Cycling Plan, Living City Open Space Strategy, Tree Strategy and Local Area Traffic Management Plans. Whilst the documents do not provide directly relevant objectives and goals, they do highlight the objectives and goals of the Council that will need to be referenced at a more fine grained level as the corridor study progresses.
 **Mitcham 2030**	*Mitcham 2030* is Council's aspirational plan for future generations to guide what Council does over the next 10 years. The Plan identifies a vision of "We are a welcoming and inclusive community that values its heritage and natural environment." The Plan identifies four goals, Accessible, Healthy & Connected Community; Sustainable City; Dynamic & Prosperous Places; and Excellence in Leadership. Key themes include: • Theme 1.1, We are a City that is connected to places through an integrated, efficient and people friendly transport network for motorists, cyclists and pedestrians • Theme 1.2, We build capacity for people to be active, healthy and connected, and provide inclusive and safe environments for all. • Theme 2.3, We protect and enhance the environment and its biodiversity across natural landscapes, waterways, open spaces and across our suburbs • Theme 3.1, We have a spatial vision that guides the development of integrated, attractive and vibrant precincts that support diverse land uses and housing choice • Theme 3.2, We are a City well recognised for our social and cultural diversity, creativity, arts, events, heritage, natural environment, education and medical facilities

Strategy / Priority	Relevant objectives and priorities
 **City of Mitcham, Strategies and policy documents**	The City of Mitcham has a number of Strategies and policy documents including the Spatial Vision for the City, Transport Asset Management Plan and Open Space Asset Management Plan. Whilst the documents do not provide directly relevant objectives and goals, they do highlight the objectives and goals of the Council that will need to be referenced at a more fine grained level as the corridor study progresses
 **City of Marion Strategic Plan 2019-2029**	The *City of Marion Strategic Plan 2019-2029* sets out the priorities which guide Council's decisions about new projects and service over the coming decade. The Plan identifies a community vision of "A community that is Liveable, Valuing Nature, Engaged, Prosperous, Innovative and Connected." The Plan identifies six themes, Liveable, Innovative, Valuing Nature, Prosperous, Engaged and Connected. Key strategies include: • We will make our services, facilities and open spaces more accessible • We will create a series of streetscaped avenues to improve the amenity of our neighbourhoods • We will celebrate our rich cultural diversity and heritage through artistic, cultural and community activities and vibrant destinations • We will seek to activate our city through quality streetscapes and place activation initiatives to deliver vibrant and prosperous business precincts • We will encourage, where economically feasible, the provision of the daily needs of residents within a short walk or bike ride
 **City of Marion, Strategies and policy documents**	The City of Marion has a number of Strategies and policy documents including the Community Vision, Transport Asset Management Plan and Disability Access and Inclusion Plan 2020-2024. Whilst the documents do not provide directly relevant objectives and goals, they do highlight the objectives and goals of the Council that will need to be referenced at a more fine-grained level as the corridor study progresses.

Strategy / Priority	Relevant objectives and priorities
 **City of West Torrens Community Plan 2030**	The *City of West Torrens Community Plan 2030* is an aspirational document that will guide Council action over the next five to 10 years. The Plan identifies a community vision of "Committed to being the best place to live, work and enjoy life" The Plan identifies five focus areas, Community life, Built Environment, Prosperity, Environment and Sustainability, and Organisational Strength. Key strategies include: • Recognition of our unique cultural identity and heritage • An attractive, safe and cohesive urban environment that supports better quality development assessment outcomes, diverse housing choice and compatible non-residential development • Neighbourhoods designed to promote safe, active travel and strengthen connections, amenity and accessibility • Place-making and public art which enhance the visitor experience at key destinations • Open spaces that foster the natural environment, support biodiversity and encourage people to spend time outdoors • Protect and expand the urban forest
 **City of West Torrens, Strategies and policy documents**	The City of West Torrens has a number of Strategies and policy documents including the Tree Strategy, Open Space and Public Place Plan, Road Asset Management Plan, Transport Strategy and the Disability Access and Inclusion Corporate Plan. Whilst the documents do not provide directly relevant objectives and goals, they do highlight the objectives and goals of the Council that will need to be referenced at a more fine-grained level as the corridor study progresses.
Other Strategies / Documents	

Strategy / Priority	Relevant objectives and priorities
 **GlobeLink Study Business Case (2019)**	An alternative connection between the South Eastern Freeway (M1) and North South Corridor was investigated within the *GlobeLink Scoping Study Report* Business Case prepared for the Department in 2019. As part of the Business Case, alternative road connections for freight to/from the South Eastern Freeway were investigated which included: • Alternative M1 route – 'Short South' • Alternative M1 route – 'Short North' • Cross Road Tunnel – M1 to North-South Corridor All options delivered poor economic assessment results with Recommendation #2 of the Scoping Study recommending *'targeted upgrades to key sections of the South Eastern Freeway, Portrush Road and Cross Road corridors that will address safety issues and deliver improved network efficiency'*.
 **Keep Metro Traffic Moving (2018)**	The *Keep Metro Traffic Moving* report is intended to guide road congestion investment in South Australia and focuses on maximising existing road assets through short to medium term actions. The Report identifies the most congested roads in Adelaide, of which Cross Road was ranked number five (5) with a 19.4% travel time delay. The Report seeks to deliver several objectives including: • Efficient and productive people and freight movement on roads. • Improved connectivity among vehicles, roads, pedestrians and cyclists. Cross Road is identified as part of Adelaide's Outer Ring Route which is defined as: • Defined as a link for people and goods, providing efficient reliable transport connections around the city and to interstate and international markets • Priority: Heavy vehicles, Cars, Cyclists, Buses • Vehicle Movements: 25,000 to 51,000 vehicles per day. • Peak Movements: 7:30am to 8:30am and 4:45pm to 5.45pm

3 Corridor Context

3.1 Population and demographics

A study catchment extending 1km either side of the road corridor was defined for the purpose of the population and demographics analysis[5]. This strikes a balance between catchment area likely to use the road, without extending too close to the inner ring route.

A 2km catchment extending either side of the corridor is provided within **Appendix B – 2km Study Area** for comparative purposes.

3.1.1 Population

In 2016, the study area contained approximately 60,400 people[6]. This equates to a population density of 19 persons per hectare.

Refer to **Figure 11** for a map of 2016 population density (residents per hectare). Density is relatively consistent along the corridor, representative of the low density residential and educational land uses.

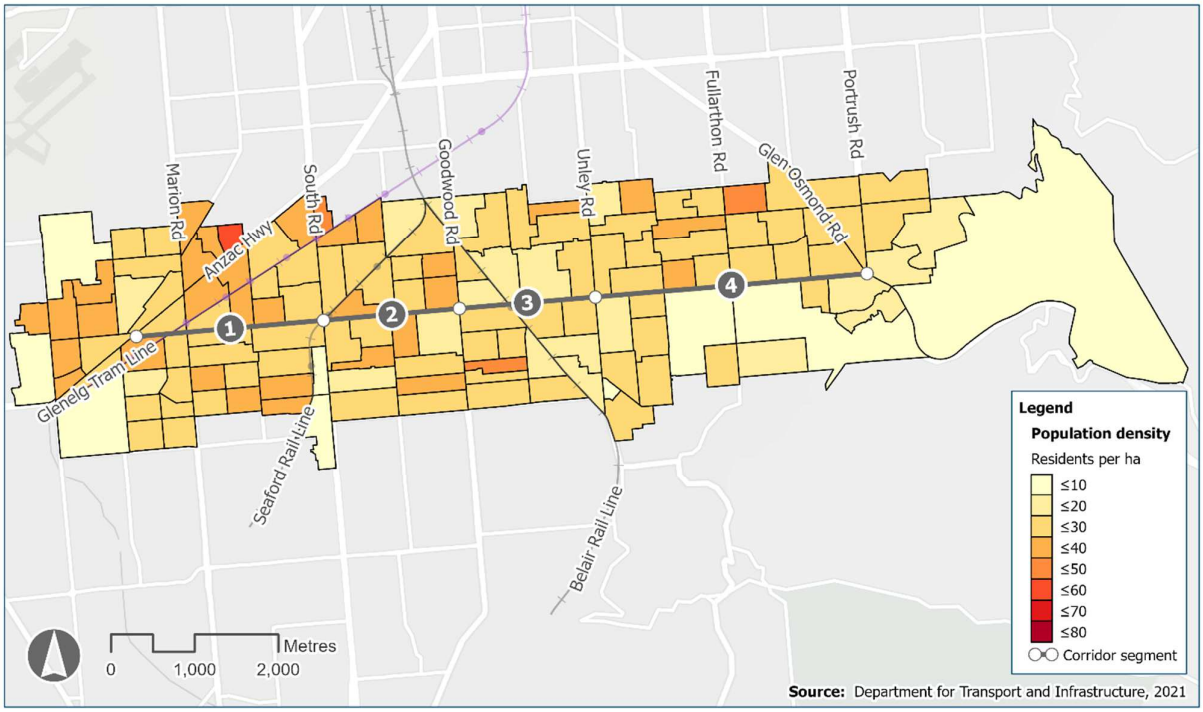


Figure 11: 2016 Population density

[5] Data used to calculate existing 2016 population and households within the defined study catchment is based on the Population Projections for South Australia and Regions Report (dated May 2019)

[6] Population within geographic Statistical Area 1 (SA1) that intersect with 1km study area (SA1s typically provide smallest unit for the release of ABS population and housing census data)

3.1.2 Employment

In 2016 total employment within the study area was approximately 22,400 jobs[7].

Refer to **Figure 12** for a map of 2016 employment density (jobs per hectare). Along the Corridor, higher employment areas are near key intersections of Unley Road, Goodwood Road, South Road and Marion Road. Outside of this, Mitcham Shopping Centre, commercial areas along South Road and the area to the south of Adelaide Airport have higher employment density.

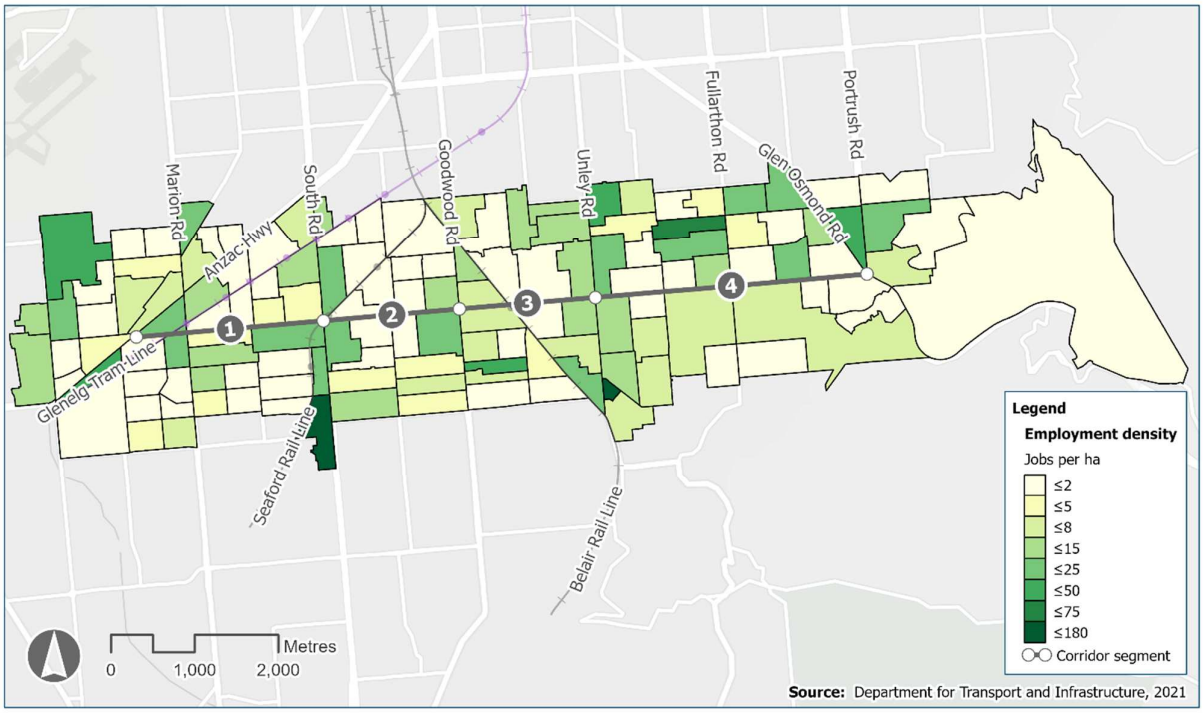


Figure 12: 2016 Employment density

3.1.3 Mode share

Journey to work (JTW) mode share for private vehicles, public transport and active transport is provided in **Figure 13**, **Figure 14** and **Figure 15** respectively.

Overall, the dominant mode for transport to work is private vehicle with most zones showing 70% or greater mode share. However, there is higher public transport use around the Glenelg tram line and Seaford railway line and the high frequency / priority bus corridor of Anzac Highway.

No specific trends are observable within the active travel mapping with only zones near Unley Road and the Airport (which are located well off the corridor) showing greater than 8% demand. This is despite the catchment of the Cross Road corridor being within a 20-minute cycle ride from the CBD.

[7] Employment within SA1 areas that intersect with 1km study area

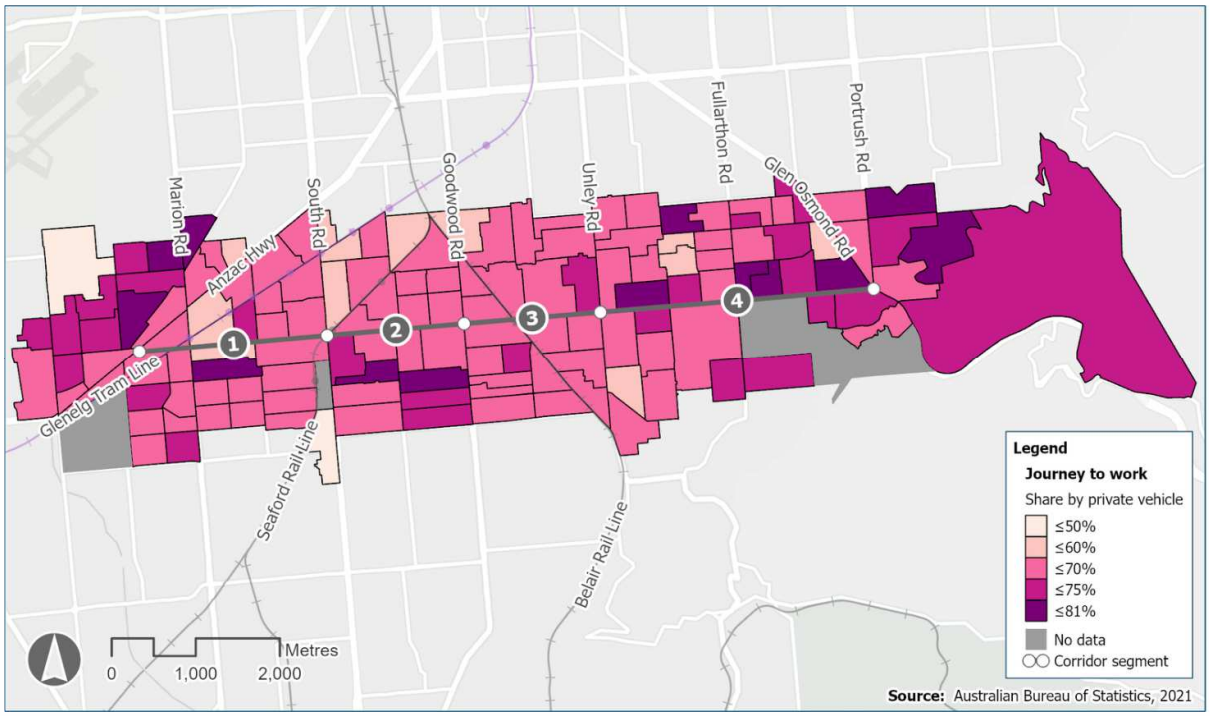


Figure 13: 2016 JTW Private Vehicles

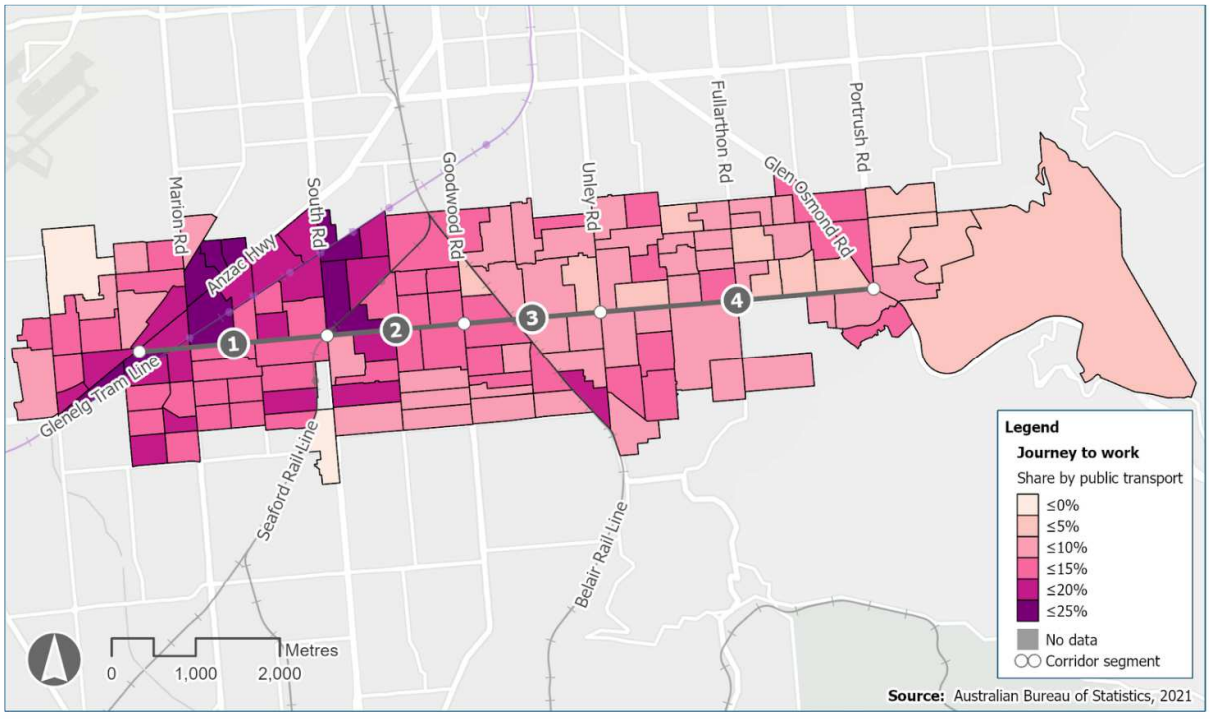


Figure 14: 2016 JTW Public Transport

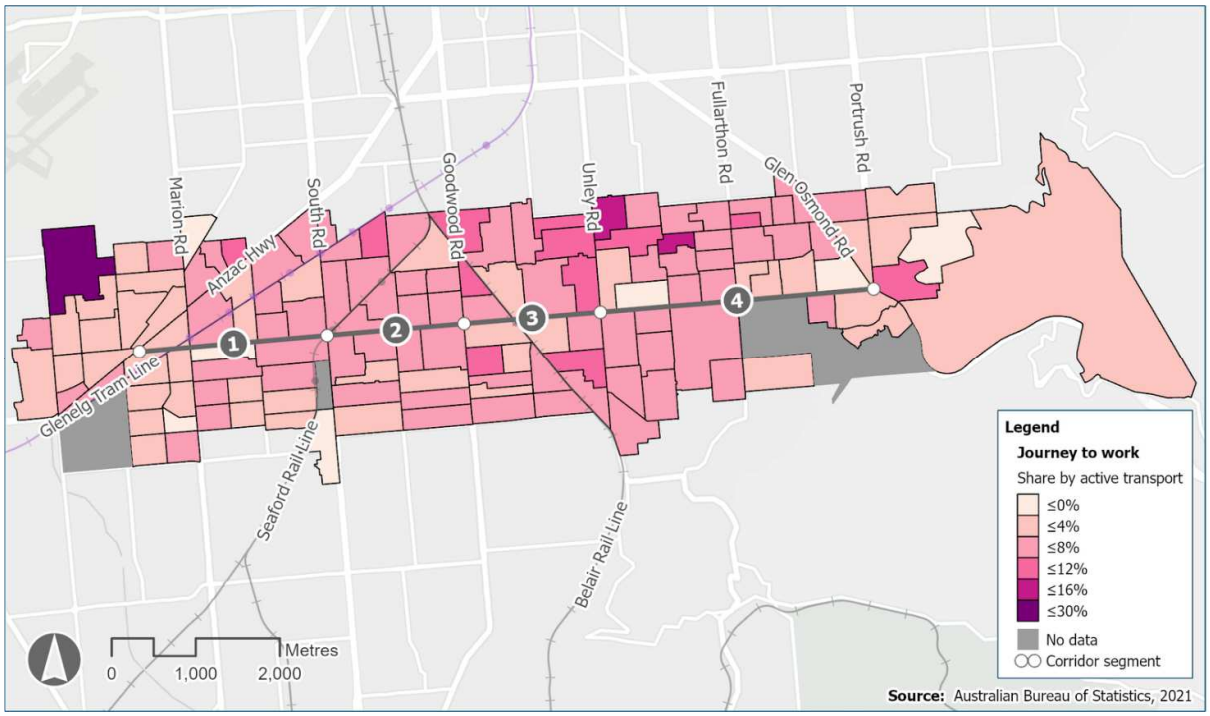


Figure 15: 2016 JTW Active Transport

3.1.4 Overall study area mode share

Figure 16 shows the modes people within the corridor catchment area use to travel to work[8] which indicates:

- Driving to work is by far the most common choice made by residents
- Bus and tram represent approximately 10% of mode choice
- Walking and cycling represent a combined 6% of mode choice
- Working at home represents 5% of the study area.

[8] ABS 2016 SA2 Data

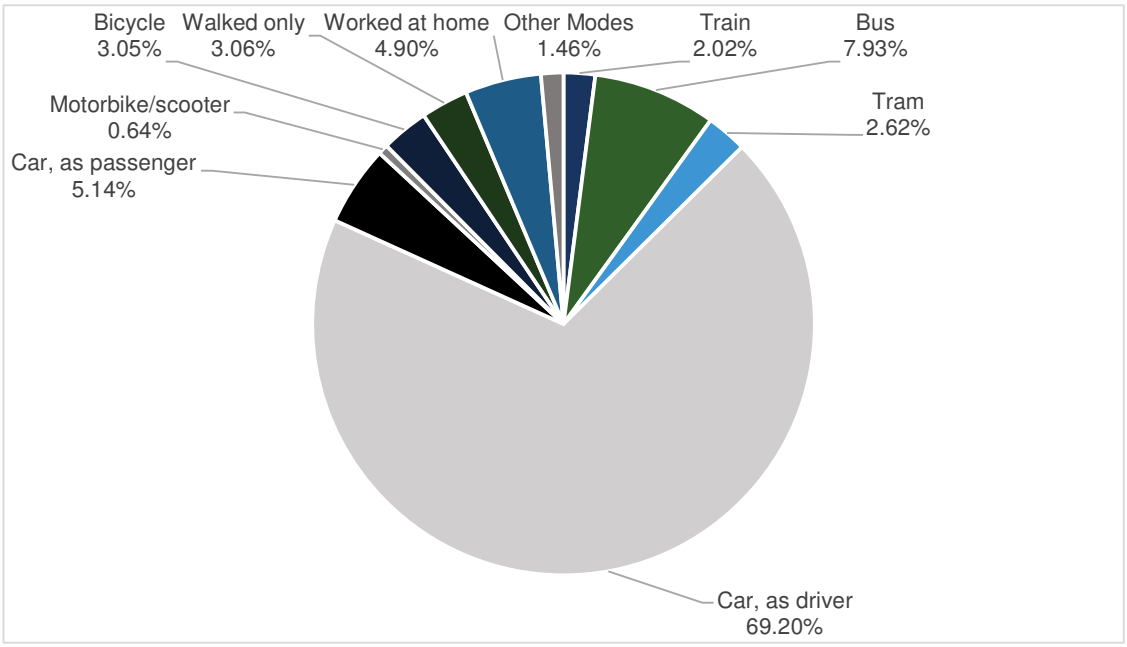
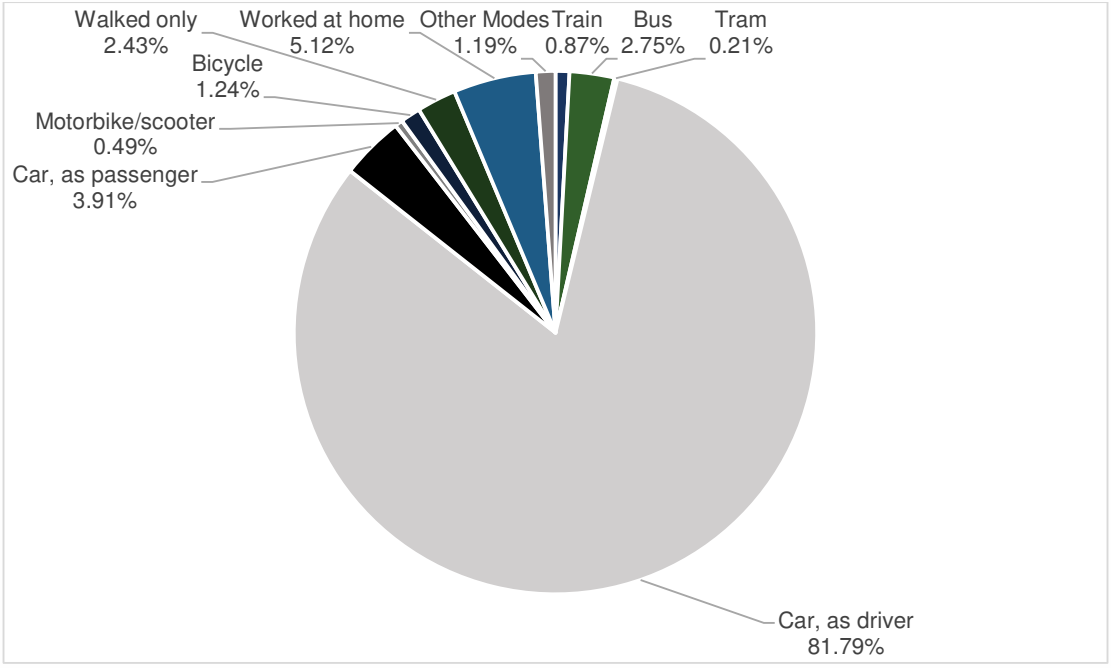


Figure 16: JTW mode share (place of usual residence)

Figure 17 shows the modes people working within the corridor catchment area use to travel to workplaces along the corridor[9] which indicates:

- Driving to work is by far the most common
- Walking and cycling represents 4%
- Bus represents 3%
- Working at home represents 5%.



[9] ABS 2016 SA2 Data

Figure 17: JTW mode share (place of work)

The above percentages are based on Australian Census data collected in 2016 and since that time it is possible that there has been an increase in those choosing to work from home. This will become evident in Census data collected in 2021.

3.2 Land use

3.2.1 Significant features

Land uses surrounding the corridor are summarised in **Table 3** which shows that the dominant land use along the corridor is low-density residential (70%) with nodes of commercial/retail activity in specific locations, typically at intersections with the major north-south roads (Unley Road, Goodwood Road and Marion Road). There is also a reasonably high percentage of education land uses (8.3%).

Table 3: Land use breakdown

Land Use	Land area (ha)	Percentage of study corridor
Agriculture	42.3	2.2%
Commercial	45.8	2.4%
Education	158.9	8.3%
Food Industry	0.9	0.0%
Non-Private Residential	46.5	2.4%
Pub Institution	21.6	1.1%
Recreation	105.1	5.5%
Reserve	47.5	2.5%
Residential	1,304.1	68.2%
Retail Commercial	31	1.6%
Rural Residential	19.3	1.0%
Industry	38.9	2.0%
Vacant	9.2	0.5%
Vacant Residential	43.2	2.3%
Grand Total	1,913.4 ha	100.0%

**note specific land use areas rounded*

Figure 18 shows the land use context and **Figure 19** identifies the significant features along and near the Cross Road corridor.

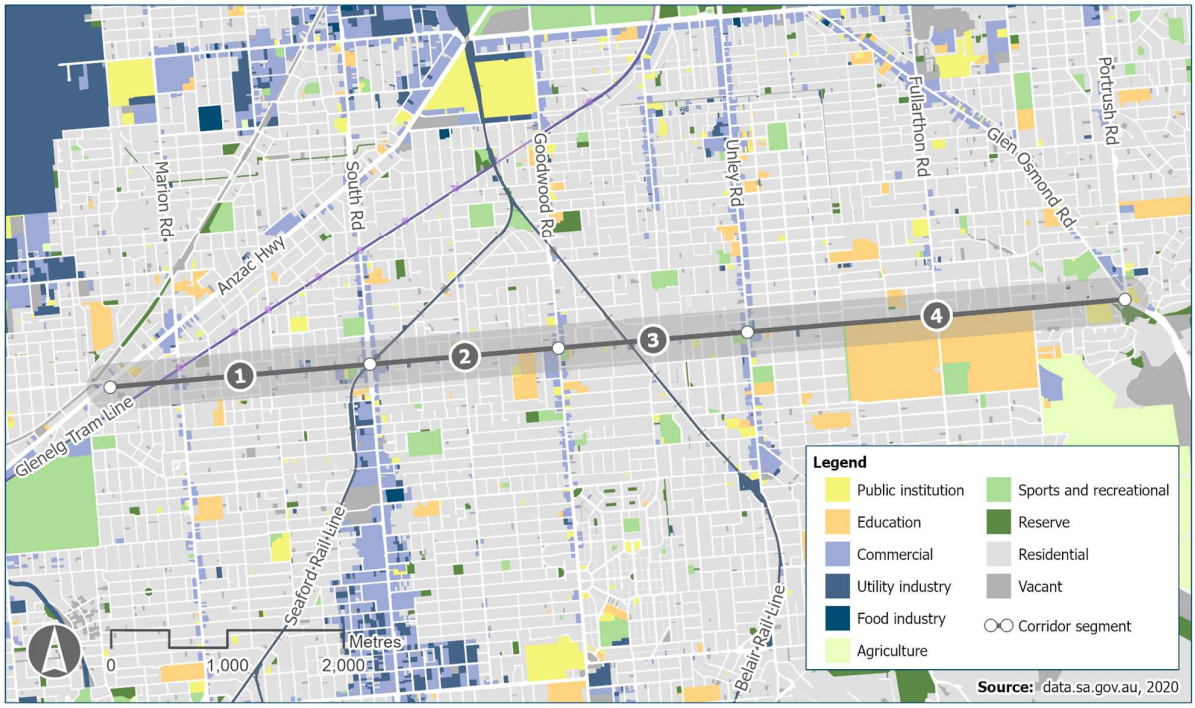


Figure 18: Land use surrounding Cross Road corridor

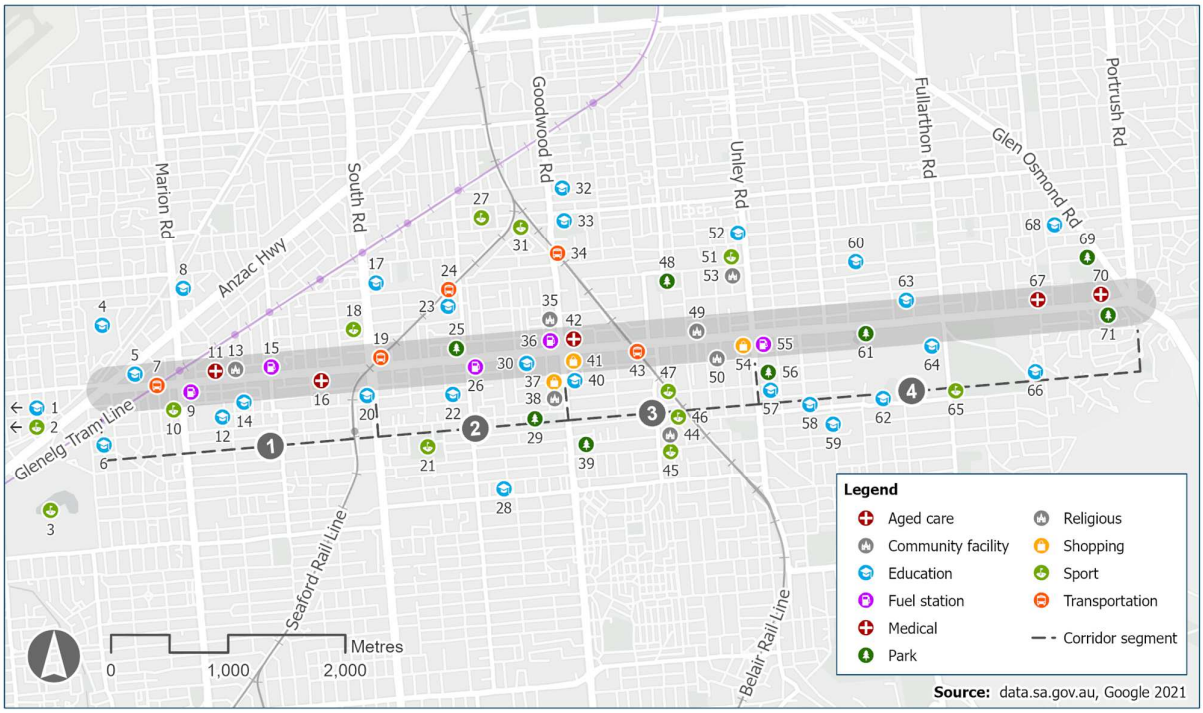


Figure 19: Significant features along and near the Cross Road corridor

Table 4 summarises these land uses and significant features per segment in more detail.

Table 4: Land use and significant features per segment

Segment		Land use	Significant Features Along Corridor
1	Cross Road from Anzac Highway intersection to South Road intersection	• Predominantly low density residential • Local services and commercial activities located in clusters in specific locations, including petrol stations. • Big box/commercial and retail at various locations, including the intersection of Cross Road and South Road and extending both north and south in a linear form along South Road • Large industrial/ commercial cluster located north-west of the corridor adjacent Adelaide Airport	• Education - St John the Baptist Catholic Primary School (5), Immanuel College (1), Plympton International College (4), Emmaus Christian College (12), Plympton South Kindergarten (14), Plympton Primary School (8), St Anthony's School (20) • Religious - Vermont Uniting Church (5) • Major Recreation – Glandore Oval (18), Plympton Oval (6), Camden Oval (2), Morphettville Racecourse (horse racing) (3), Plympton Glenelg RSL (10) • Multiple aged care facilities (11) (16) • Glenelg tramline dissects Cross Road between Marion Road and Anzac Highway (7) • Petrol stations (9) (15)
2	Cross Road from South Road intersection to Goodwood Road intersection	• Predominantly low density residential • Big box/commercial and retail at various locations, including the intersection of Cross Road and South Road and extending both north and south in a linear form along South Road • Consulting rooms, Petrol stations and major education • Major shopping and commercial at the intersection of Cross Road and Goodwood Road and Petrol Station (Cumberland Park) • Strip retail/commercial land uses occurring at various locations along Goodwood Road both north and south of the Cross Road/Goodwood Road intersection	• Education - Cabra Dominican College (30), Clarence Park Kindergarten (23), Clarence Gardens Kindergarten (22), Cumberland Preschool Kindergarten (28), Black Forest Primary School (17) • Woolworths, Big-W and ancillary retail/commercial (37) • Petrol stations (26) (36) • Religious – Church of the Trinity (35) • Cumberland Park Community Centre (38) • Emerson Railway Station (19), Clarence Park railway station (24) • Major Recreation – AA Bailey Recreation Ground (21), Avenue Road Reserve (29), Goodwood Oval (27), Millswood Croquet Club & Tennis Club (31), CF Page Memorial Park (25)
3	Cross Road from Goodwood Road intersection to Unley Road intersection	• Predominantly low density residential • Strip retail/commercial land uses occurring at various location along both Goodwood Road and Unley/Belair Road • Major retail and shopping precinct on Belair Road approx. 1km south of intersection with Cross Road	• Zone Bowling (41) • Unley Park railway station (43), & Millswood railway station (34) • Aged care – multiple on the corridor (42) • Religious - Hawthorn Uniting Church (50), Westbourne Park Uniting Church (44), St Columba's Anglican Church (49), Unley Park Baptist Church (53) • Education - Westbourne Park Primary School (40), Walford Anglican School for Girls (52), St Thomas School (32), Tabor Institute of Higher Education (33) • Aldi Solitaire (54) • Major Recreation – Price Memorial Oval (45), Batchelor Reserve (39), Unley Park Sports Club (bowling and tennis) (51), Hawthorn Bowling Club (46), Hawthorn Scout Group (47), Heywood Park (48)
4	Cross Road from Unley Road intersection to South Eastern Freeway intersection	• Predominantly low density residential • Major education land uses occurring along corridor • Major aged care precinct established on north side of Cross Road in proximity of SE Freeway • Strip retail/commercial land uses occurring at various location along Unley Road, Fullarton Road	• Petrol Station at intersection of Cross Road and Belair Road (55) • Education - Urrbrae High School (64), Concordia College (60), Highgate School (63), Adelaide University – Waite Campus (66), Glen Osmond Primary School (68), Mitcham Primary School (59), Unley High School, Mitcham Girls High School (57), St Joseph's School (58), Unley High School (62) • Major Recreation - Kingswood Reserve (56), Waite Oval (65) • The Monastery – church and conference centre (71) • Ridge Park (69) • Aged Care – major Southern Cross Care complex (70) and Premier Health Care complex (67) • Urrbrae Wetland (61)

3.2.2 Heritage

An initial heritage assessment has been undertaken to locate any National, State or Local non-aboriginal heritage items along the corridor.

There are no National heritage places along the corridor.

There are five State Heritage Places along the corridor as shown in **Figure 20**, including:

- Cabra Convent, Boarding School, Chapel and Gatehouse
- Ridge Park Nursing Home (former Dwelling)
- Former Urrbrae House Gatehouse, Waite Agricultural Research Institute
- Waite Arboretum, Waite Agricultural Research Institute
- Carmelite Monastery.

There are approximately 16 Local Heritage Places along the corridor. These all directly front the corridor and are located close to road frontages. Representative Buildings (contributory heritage places) are also located in close proximity to the corridor.

Figure 20: Heritage map

3.3 User transportation needs

3.3.1 General traffic

The Cross Road corridor is classified as a 'Major Traffic Route' within the Department's *A Functional Hierarchy for South Australia's Land Transport Network* (Functional Hierarchy)[10]. The corridor provides a key east-west link for freight and general traffic south of the Adelaide CBD, and therefore forms a key link in Adelaide's Outer Ring Route.

Cross Road provides an east-west link between South Road and Portrush Road, which are both part of the National Land Transport Network. The corridor also intersects with other key north-south corridors such as Marion, Goodwood, Unley and Fullarton Roads. Cross Road also acts as a local access road, providing connectivity to community/leisure facilities and residential areas to its north and south.

The Cross Road corridor length is 8.8km with cross-section ranging between 15m and 17m, comprising two traffic lanes in each direction, along with full or part time cycle lanes along some lengths. The speed limit is 60 km/h along its whole length, with no school zones or other speed limits present. There is very limited on-road parking (as clearway, cycle lane or bus zone restrictions are present) along most of the length, however, there is some all-day parking provided in Segment 4. There are 11 signal-controlled intersections (two staggered), 4 pedestrian actuated crossings and 3 level crossings of the Glenelg Tram and Seaford and Belair rail lines.

A map of the road corridor in relation to the surrounding arterial and motorway network is presented in **Figure 21**.

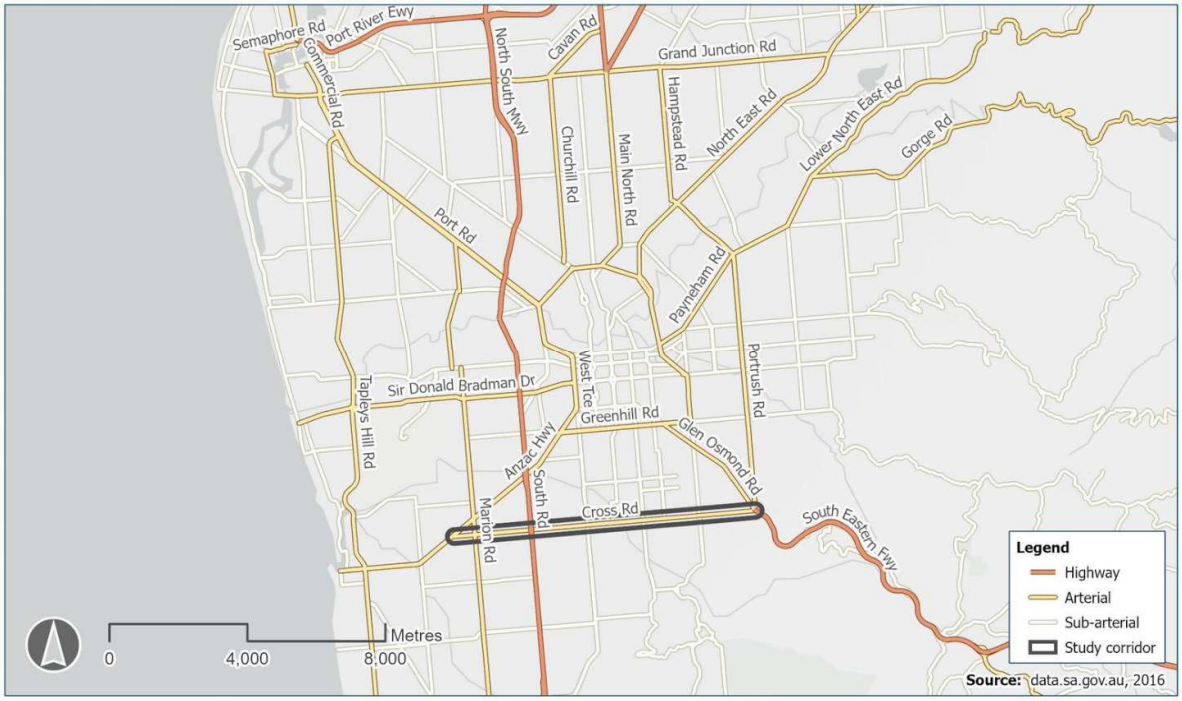


Figure 21: Cross Road corridor in relation to the surrounding arterial and motorway network

[10] Functional Hierarchy for South Australia Land Transport Network, 2013, https://www.sa.gov.au/__data/assets/pdf_file/0016/10609/A_Functional_Hierarchy_for_SAs_Land_Transport_Network.pdf

Figure 22 summarises eastbound and westbound traffic volumes for peak hour and 11-hour per segment[11].

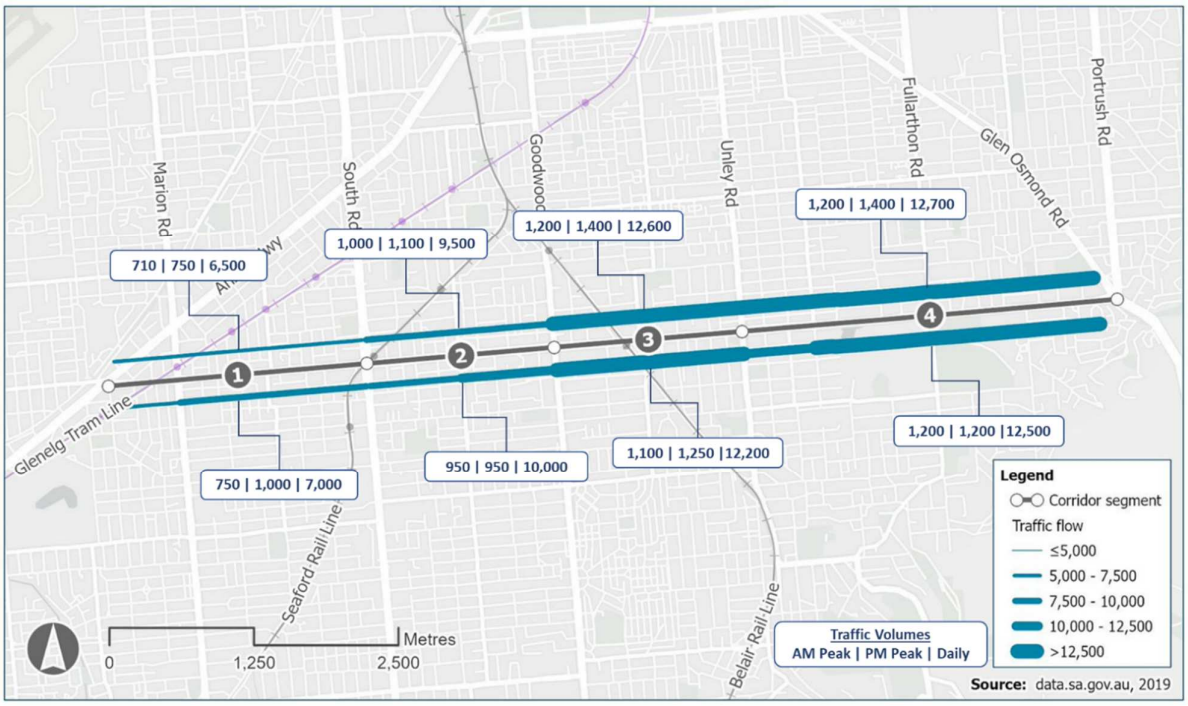


Figure 22: Cross Road Traffic Flows (single direction)

Table 5 lists Annual Average Daily Traffic Volume (AADT) per segment and associated general considerations that relate to these traffic volumes[12].

Table 5: General traffic summary by corridor segments

Segment	General traffic Summary	Average Annual Daily Traffic (AADT) – Segment Max	Average Annual Daily Traffic (AADT) – Segment Avg.
1 Anzac Hwy to South Rd	• Lowest traffic volume of the corridor given the segment is west of South Road • Predominantly connecting to residential areas and some smaller education land uses • Provides access to the key north south routes of Anzac Highway, Marion Road and South Road • Glenelg tram level crossing boom gates observed to be closed 27% of the time in the AM peak hour and 34% of the time in the PM peak hour[13] • Emerson level crossing (Seaford Rail Line) boom gates observed to be closed 32% of the time in AM peak hour and 47% of the time in the PM peak hour	18,700 (3.5% CV)	16,500 (3.2% CV)
2 South Rd to Goodwood Rd	• Predominantly provides direct access to residential areas and commercial land uses at Goodwood Road • Provides access to South Road, East Avenue, Winston Avenue and Goodwood Road	26,500 (3.5% CV)	25,400 (3.5% CV)

[11] Volume based on average of the 11-hour manual traffic count data available for major intersections within each segment (data has variable dates)
[12] AADT based on location SA Map Viewer - https://location.sa.gov.au/viewer/ (data has variable dates)
[13] Based on Department LXRP Prioritisation Tool

	Segment	General traffic Summary	Average Annual Daily Traffic (AADT) – Segment Max	Average Annual Daily Traffic (AADT) – Segment Avg.
3	Goodwood Rd to Unley Rd	• Predominantly provides direct access to residential areas and commercial land uses at Goodwood Road and Unley Road/Belair Road • Relatively high traffic volume on this segment compared to Segments 1 and 2 as it facilitates access to key north south roads of Goodwood Road, Unley Road and Belair Road • Also connects to Victoria Avenue and Hilda Terrace • Unley Park level crossing (Belair Rail Line) boom gates observed to be closed 21% of the time in the AM peak hour and 17% of time in the PM peak hour	31,800 (4% CV)	30,900 (4% CV)
4	Unley Rd to South Eastern Freeway	• Carries the highest traffic volumes of the corridor, likely because of its connection to the South Eastern Freeway and Portrush Road • Provides access to local residential, aged care and various education land uses • Also connects to local roads which provide access to several parks and reserves	33,100 (5% CV)	29,600 (4.3% CV)

3.3.2 Freight and heavy vehicles

3.3.2.1 National context

In 2019, the State Government commissioned the *GlobeLink Scoping Study*[14], which analysed freight movements within a catchment area of south-east South Australia, including Greater Adelaide, and western Victoria. This study showed that within that catchment area, road transport dominates domestic freight, hauling 88% of tonnage, and that a significant percentage of journeys are within the State.

Figure 23 identifies the key insights for SA's road freight from the GlobeLink report.

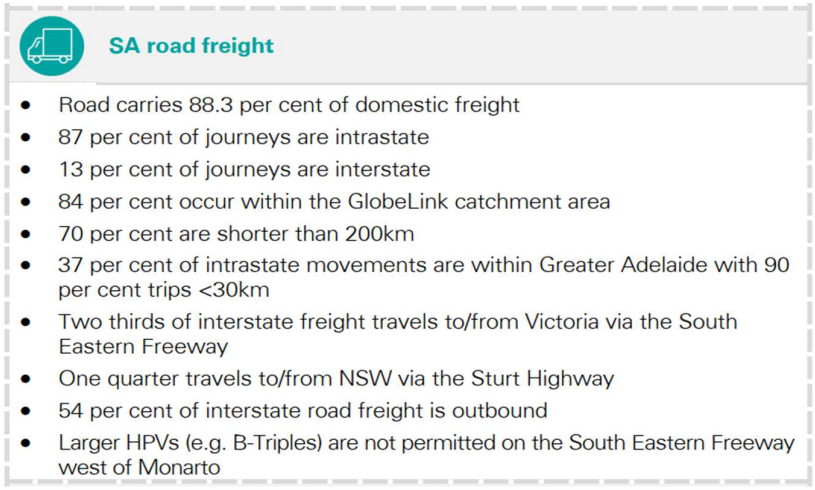


Figure 23 Road Freight Insights Source: GlobeLink Scoping Study

[14] GlobeLink Scoping Study Report Business Case, KPMG, December 2019, https://www.dpti.sa.gov.au/infrastructure/completed_projects/globelink

The South Eastern Freeway, a key National Freight Route, connects Adelaide to regional Victoria and Melbourne carrying approximately two thirds of the State's interstate freight (refer **Figure 24**).

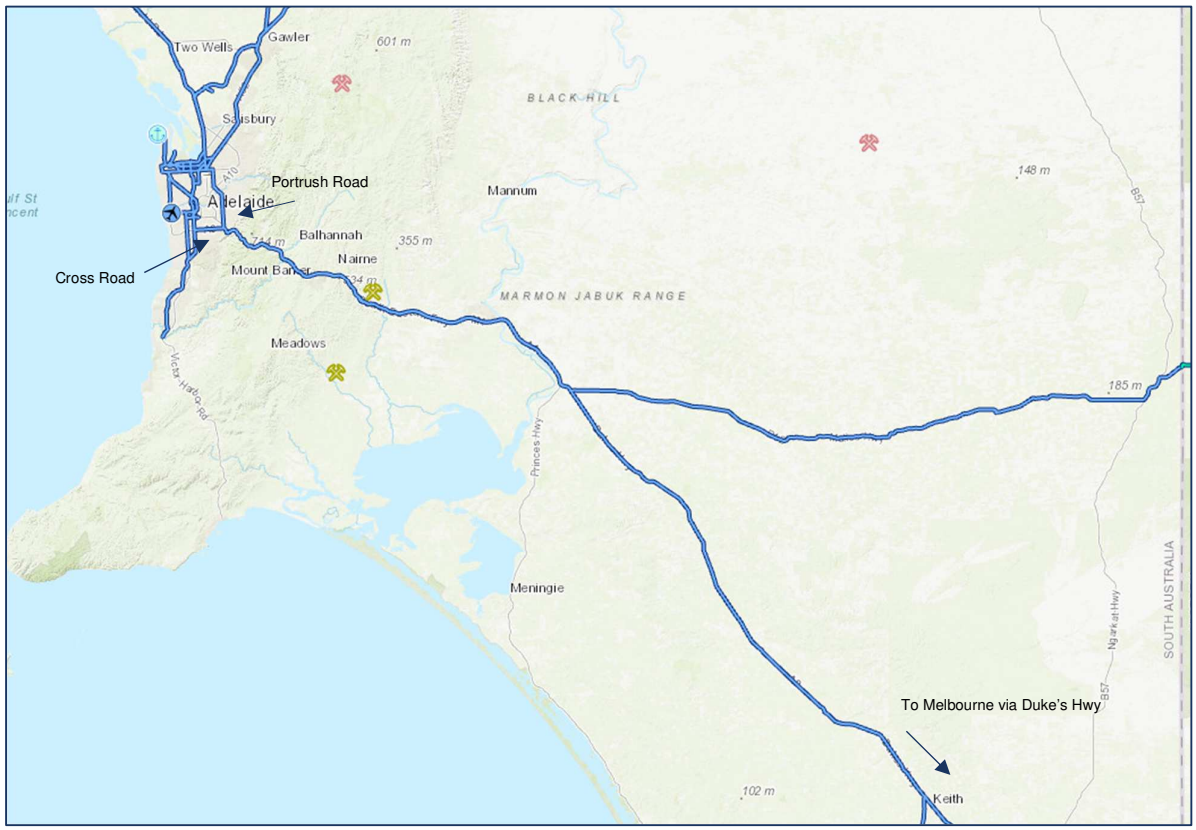


Figure 24: National Key Freight Routes (blue)

The South Eastern Freeway connects with two other National Key Freight Routes, Portrush Road and Cross Road which are key connections between Adelaide's Port, Airport and industrial areas (refer **Figure 25**).

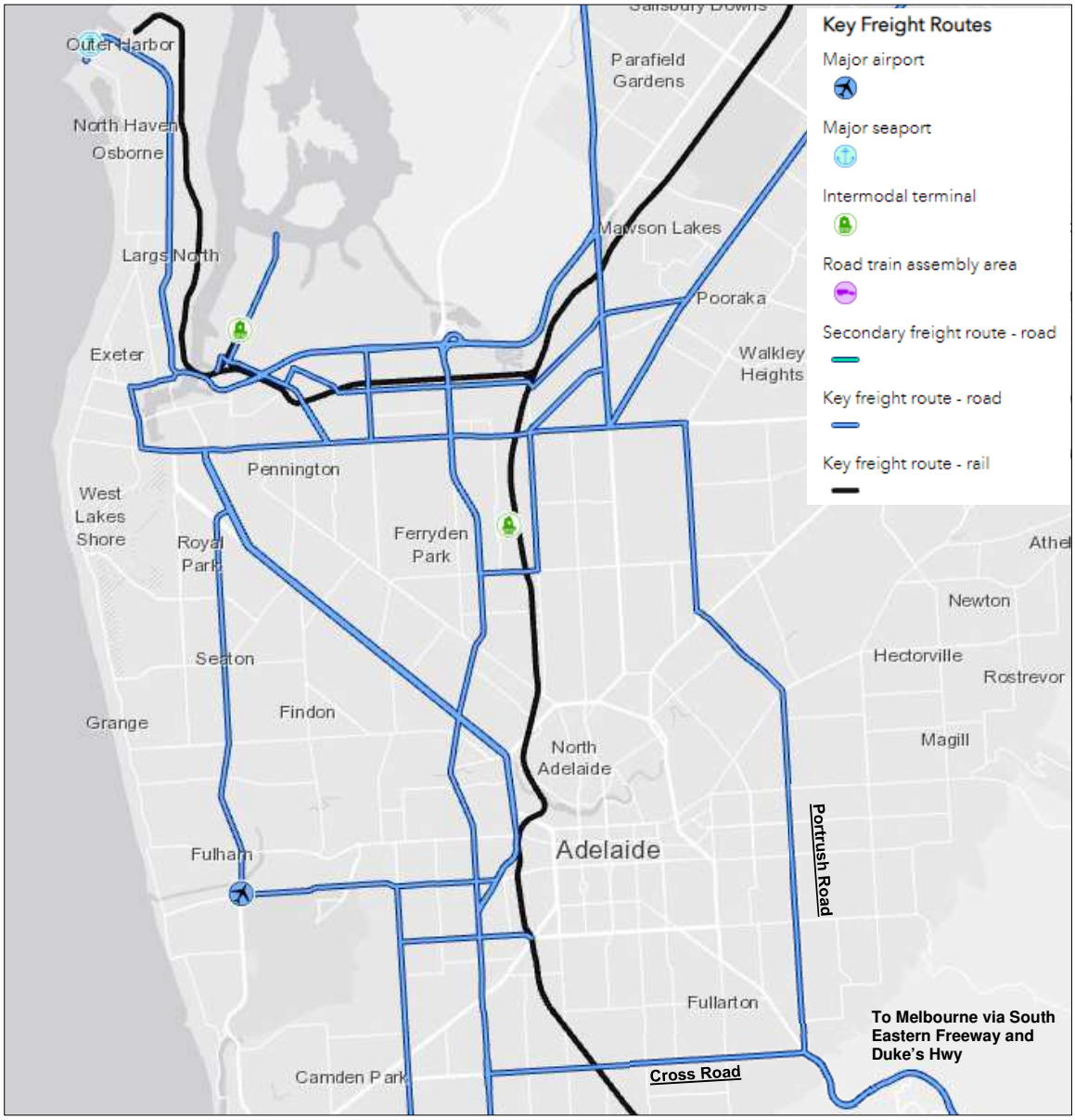


Figure 25: National Key Freight Routes within Urban Adelaide (blue)[15]

[15] https://www.infrastructure.gov.au/transport/freight/network.aspx

3.3.2.2 South Australian context

As set out above, a large proportion of South Australia's freight journeys are intrastate (87%), with over one third of these journeys within Adelaide itself. This highlights the importance of the freight routes in Adelaide.

Cross Road is designated as a primary freight route within the Functional Hierarchy. As described further below, a large proportion of the heavy vehicles that use Cross Road are not the larger articulated or restricted access vehicles, however, are instead are smaller freight vehicles likely to be making more local journeys. This contrasts with Portrush Road, which carries a much higher proportion of articulated and restricted access vehicles.

Figure 26 identifies the freight network in relation to the Cross Road corridor and surrounding commercial and industrial land use.

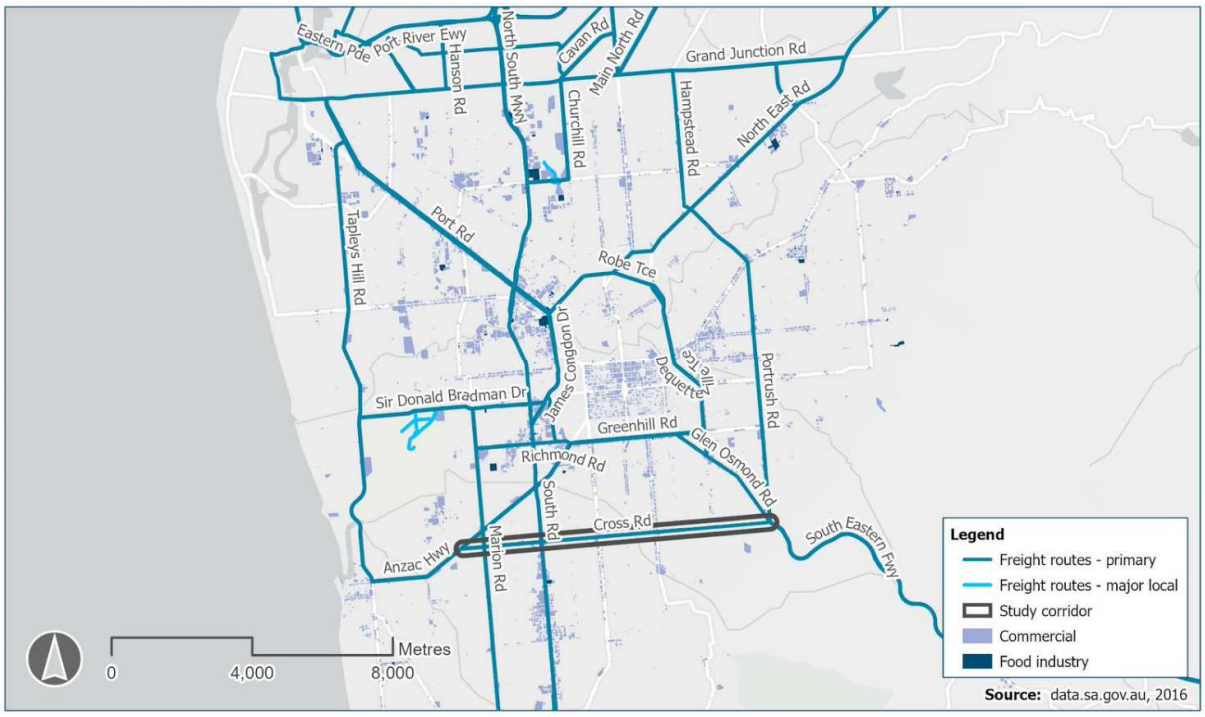


Figure 26: Cross Road freight corridor in relation to the surrounding freight network and land use

The Department's *RAVnet*[16] online mapping for approved heavy vehicle routes identifies the Cross Road corridor between the South Eastern Freeway and Marion Road as designated for Performance-Based Standards (PBS) Level 2A (refer **Figure 27**).

This section of the Cross Road corridor is also currently identified as a preferred route for over size, over mass (OSOM) vehicles[17]. Cross Road is identified by the Department as the last viable east-west link that connects larger OSOM vehicles to other north-south preferred routes through southern Adelaide. Furthermore, the Cross Road and Portrush Road corridors are the only route that a can accommodate the switch rooms that are manufactured in Lonsdale. The South Road corridor has gantries prohibiting the safe passage of these high loads.

[16] RAVnet, http://maps.sa.gov.au/ravnet/index.html
[17] https://www.sa.gov.au/topics/driving-and-transport/heavy-vehicles/operating-a-heavy-vehicle/approved-areas-and-routes-maps

Cross Road includes a provision for up to 4.0m wide load carrying OSOM vehicles (which have with some turning movement restrictions located at the intersections with Marion Road, Goodwood Road and Portrush Road/South Eastern Freeway) in accordance with *RAVnet*.

Larger OSOM vehicles operate under a National Heavy Vehicle Regulator (NHVR) permit if the combination does not comply with a mass, dimension or operating requirements set out in a gazette notice. Additionally, the rail owner needs to provide OSOM vehicle clearances to cross the rail line.

The 650m long section between Marion Road and the Anzac Highway (Segment 1) does not allow for B-Double or OSOM access. This section of the corridor is not part of the National Freight Route.

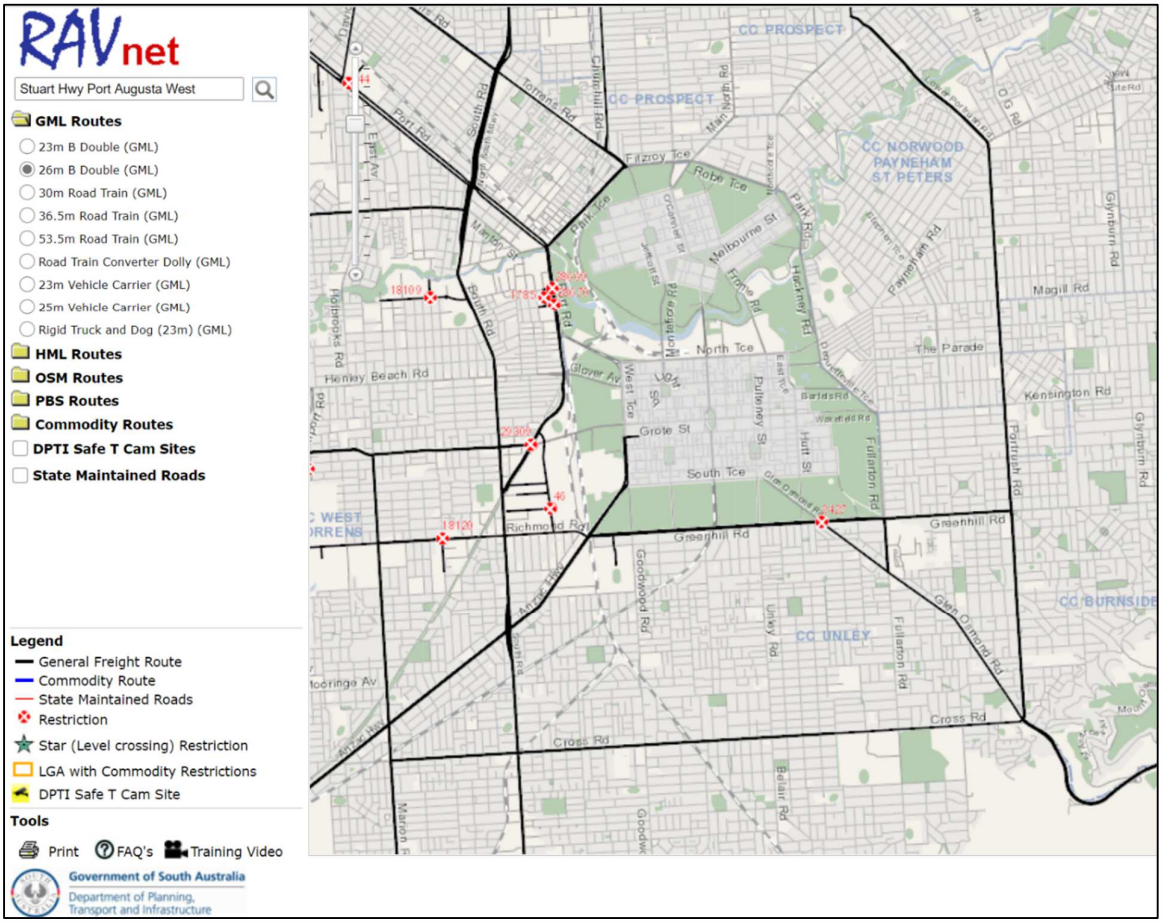


Figure 27: Freight Network for 26m B Double (GML)18

3.3.2.3 Existing heavy vehicle network patterns – turn volume data

A review of the existing travel patterns for heavy vehicles travelling from the South Eastern Freeway was undertaken using available turn volume data[19] to determine the existing distribution on Portrush Road, Cross Road and Glen Osmond Road as shown in **Table 6**. This data demonstrates that Portrush Road currently carries over 50% of all heavy vehicles in the AM and PM peak periods, with Glen Osmond Road carrying approximately 30% and Cross Road carrying the remainder.

[18] RAVnet
[19] Volume based on average of the 11-hour manual traffic count data available for major intersections within each segment (data has variable dates)

Glen Osmond Road, which connects the South Eastern Freeway to the Inner Ring Route, Greenhill and Richmond Roads and to industry located immediately south-west of the Adelaide CBD and ultimately to South Road, currently carries a greater proportion of heavy vehicles than Cross Road, despite Glen Osmond and Greenhill Roads not being designated National Freight Routes.

Table 6: Existing heavy vehicle travel patterns inbound from South Eastern Freeway

Route		Type[1]	AM	PM	Daily
1	Portrush Road	All CV	50%	56%	53%
		AV	66%	83%	74%
		RAV	95%	82%	86%
2	Glen Osmond Road	All CV	31%	33%	31%
		AV	19%	11%	17%
		RAV	5%	18%	13%
3	Cross Road	All CV	18%	11%	17%
		AV	15%	6%	9%
		RAV	0%	0%	2%

CV (commercial vehicles) AV (articulated vehicles) RAV (restricted access vehicles)[20]

Table 7 shows the existing daily heavy volumes and associated percentage of total volume along the Cross Road corridor. The data shows that restricted access vehicles (PBS Level 2a B-Doubles) percentage of total commercial vehicle volumes is relatively low. This indicates that heavy vehicles utilising Cross Road are typically smaller articulated and rigid trucks that most likely have local destinations.

Table 7: Daily heavy vehicle volumes

Segment		Direction	CV Vols	% CV Vols/ total Vols	AV Vols	% AV Vols/ total Vols	RAV Vols	% RAV Vols/ total Vols
1	Anzac Hwy to South Rd	Eastbound	201	3.2%	21	0.3%	1	0.0%
		Westbound	209	3.0%	19	0.3%	2	0.0%
		Two-way	410	3.1%	41	0.3%	3	0.0%
2	South Rd to Goodwood Rd	Eastbound	368	3.8%	60	0.6%	14	0.1%
		Westbound	375	3.7%	57	0.6%	6	0.1%
		Two-way	743	3.8%	116	0.6%	20	0.1%
3	Goodwood Rd to Unley Rd	Eastbound	462	3.7%	87	0.7%	12	0.1%
		Westbound	491	4.2%	90	0.8%	10	0.1%
		Two-way	952	4.0%	177	0.7%	22	0.1%
4		Eastbound	486	4.1%	88	0.8%	14	0.1%

[20] Heavy vehicles that operate under a notice or permit and vehicles operating under higher mass limits that can generally only access certain parts of the road network

Segment	Direction	CV Vols	% CV Vols/ total Vols	AV Vols	% AV Vols/ total Vols	RAV Vols	% RAV Vols/ total Vols
Unley Rd to South Eastern Freeway	Westbound	491	4.5%	75	0.7%	12	0.1%
	Two-way	977	4.3%	163	0.7%	25	0.1%

Daily volume percentages based on the 11-hour manual traffic count data available for major intersections within each segment

3.3.3 Existing network travel patterns

This section summarises origin-destination of trips for Cross Road and an associated select link analysis for trips originating from the South Eastern Freeway. A travel time comparison along Cross Road, Portrush Road and Glen Osmond Road for access to the northern suburbs has also been undertaken to provide context around existing network movement patterns.

Information was derived from AddInsight Bluetooth data based on May and August 2019 which represents pre-COVID-19 conditions[21].

Refer to the Cross Road and Portrush Road Corridors Travel Time, Speed and Trip Patterns Technical Note - *IPP-AMJV-410-001-TN-KR-DO-0041* in **Appendix C – Travel Time, Speed and Trip Patterns Technical Note** for further detail which also contains a sensitivity test for May 2021 conditions.

3.3.3.1 Origin – Destination Trips

Figure 28 and **Figure 29** shows all vehicle origin[22] and destination trips respectively for Cross Road which identifies:

- Most trips originate in close proximity of Cross Road
- Most trip destinations are in close proximity to Cross Road, however, they are to the west of South Road
- Overall Cross Road is used mainly for local east-west trips.

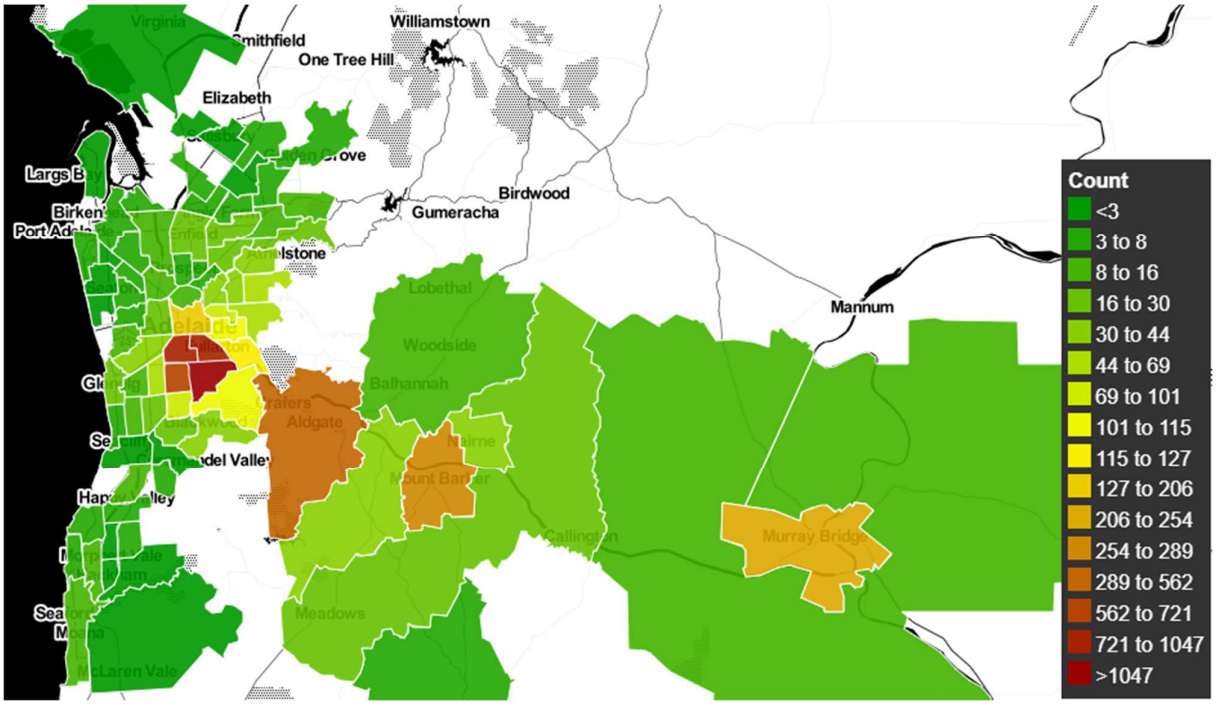


Figure 28: Cross Road – Goodwood Road to South Road origin (daily trips)

[21] Darlington Upgrade Project and Northern Connector Project under construction during this time period
[22] Note: origins are where the vehicle is first detected by AddInsight infrastructure and is not necessarily the actual vehicle origin

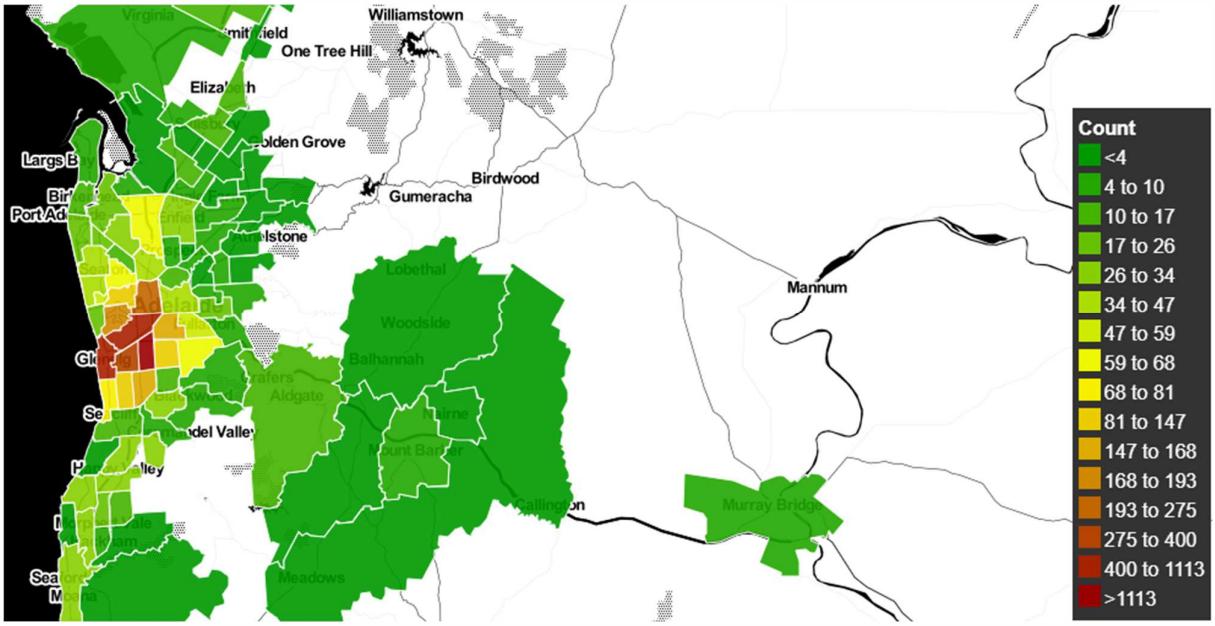


Figure 29: Cross Rd – Goodwood Road to South Road destination (daily trips)

3.3.3.2 Select link analysis

Figure 30 and **Figure 31** shows the select link analysis for vehicles originating from the South Eastern Freeway down-track[23], which assists in understanding overall network travel patterns and associated demand:

- Heavy vehicles – South Eastern Freeway
  - Portrush Road is the main freight route. Approximately 45% of South Eastern Freeway heavy vehicles trips reach Grand Junction Road. Less than half of this remains at Churchill Road which suggests a large percentage of the traffic uses Port Wakefield Road or Main North Road
  - Glen Osmond Road is the second most popular heavy vehicle route which provides access to South Road via Greenhill Road and Richmond Road
  - Cross Road has less demand compared to Portrush Road and Glen Osmond Road
  - There is freight demand located to the east of the North-South corridor reflected in the concentration of trips via Port Wakefield Road.
- All vehicles – South Eastern Freeway
  - The trip count once off the South Eastern Freeway quickly disperses, particularly on Cross Road and Glen Osmond Road
  - Glen Osmond Road is the most direct route to the Adelaide CBD for commuters
  - As with heavy vehicles, Cross Road has less demand in comparison to Portrush Road and Glen Osmond Road.

[23] South Eastern Freeway down-track (westbound) – this is AddInsight data filtered by travel speed to extract predominantly heavy vehicles i.e. HV must travel at 60km/h on some sections of the down-track.

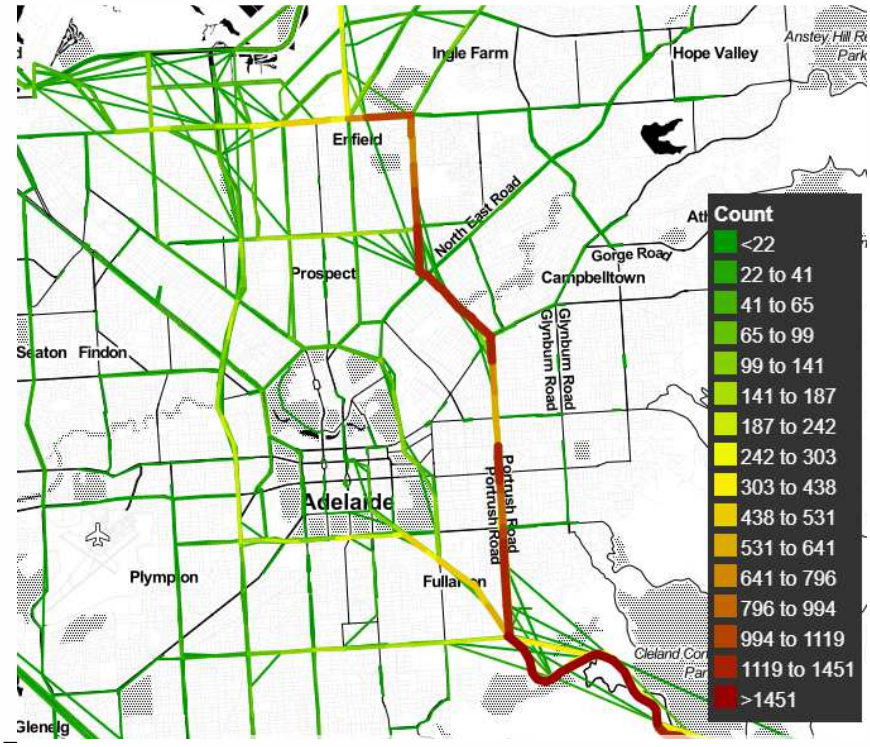


Figure 30: Routes taken by heavy vehicles originating from the South Eastern Freeway (daily trips)

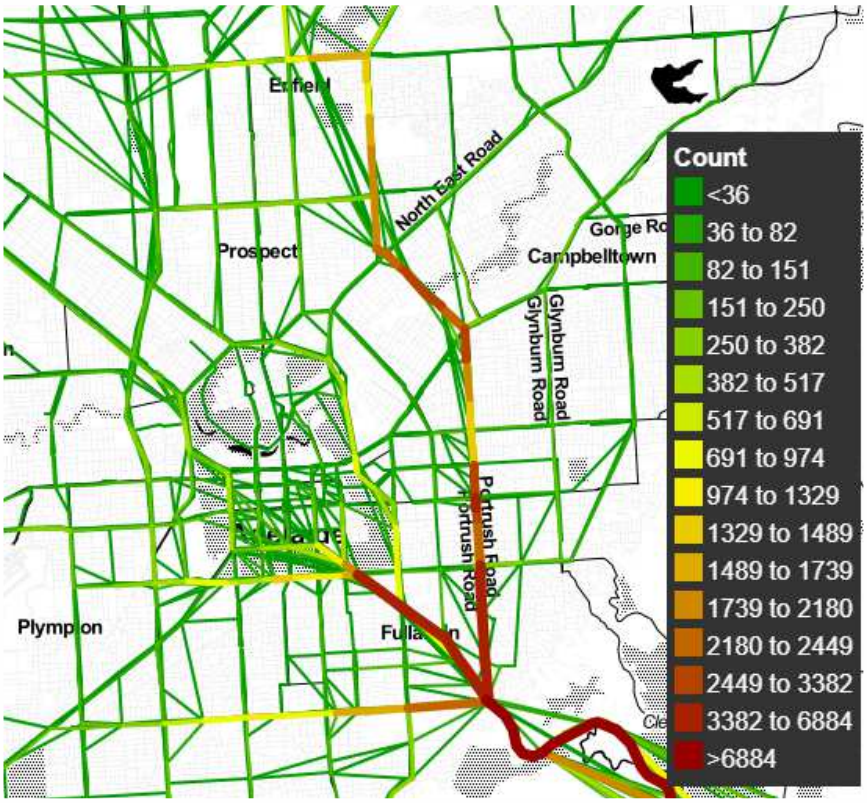


Figure 31: Routes taken by all vehicles originating from the South Eastern Freeway (daily trips)

3.3.3.3 Corridor travel time comparison

A travel time comparison was undertaken on the three following routes between the South Eastern Freeway to the intersection of South Road / Grand Junction Road:

- Via Portrush Road, Lower Portrush Road, Ascot Avenue, Taunton Road, Hampstead Road and Grand Junction Rd – 18.5km
- Via Cross Road and South Road – 19.9km
- Via Glen Osmond Road, Greenhill Road, Richmond Road and South Road – 18.4km.

The data tabulated for peak periods in **Table 8** and graphed for all times in **Figure 32** and **Figure 33** shows:

- Travel time in both directions is quickest via Portrush Road during peak periods
- Routes via Cross Road (towards northern suburbs) are slower in both peak periods and inter-peak
- Routes via Glen Osmond Road (towards freeway) are slower in both peak periods and inter-peak; however, travel times are similar to the route via Cross Road

This travel time comparison highlights why the route via Portrush Road is currently preferred by heavy vehicle operators with destinations in the northern suburbs. Due to the significant and consistently lower travel time the route via Portrush Road is likely to remain the preferred route for the majority of heavy vehicle operators even with significant improvements to the route via Cross Road.

Table 8: Comparison of average travel times and speeds between SE Freeway and northern Adelaide suburbs

Travel Route	AM (7:00-10:00AM)				PM (3:30-6:30PM)			
	Northbound		Southbound		Northbound		Southbound	
	Travel Time (mins)	Speed (km/h)	Travel Time (mins)	Speed (km/h)	Travel Time (mins)	Speed (km/h)	Travel Time (mins)	Speed (km/h)
via Portrush Rd	**34**	33	**36**	31	**35**	32	**37**	30
via Cross Rd	**41**	29	**38**	31	**42**	28	**42**	28
via Glen Osmond Rd	**39**	28	**40**	28	**38**	29	**45**	25

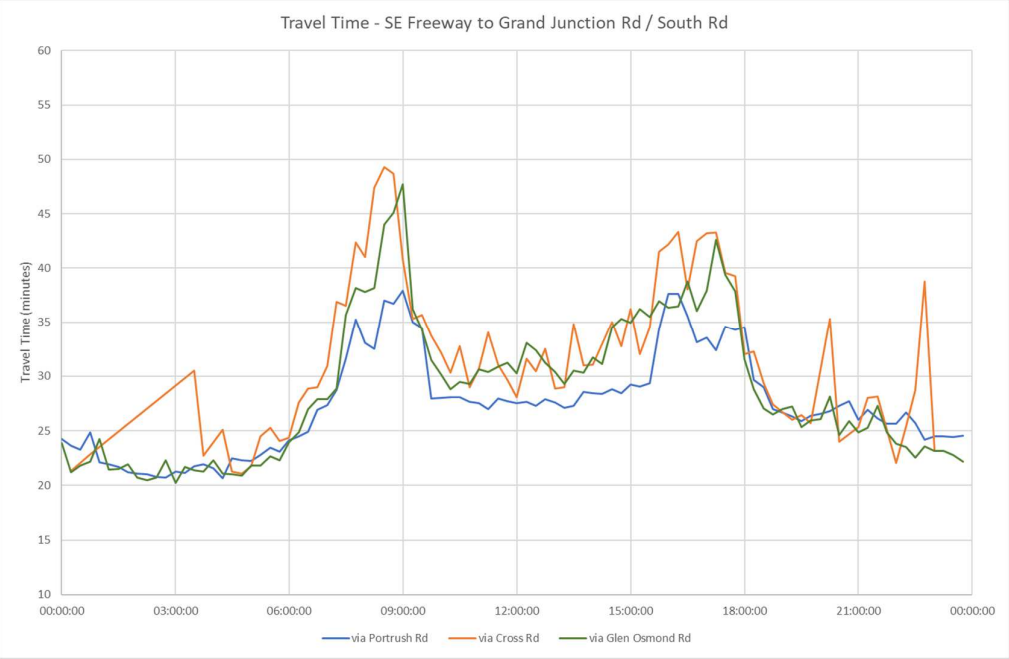


Figure 32: Travel time comparison SE Freeway to Grand Junction Road / South Road

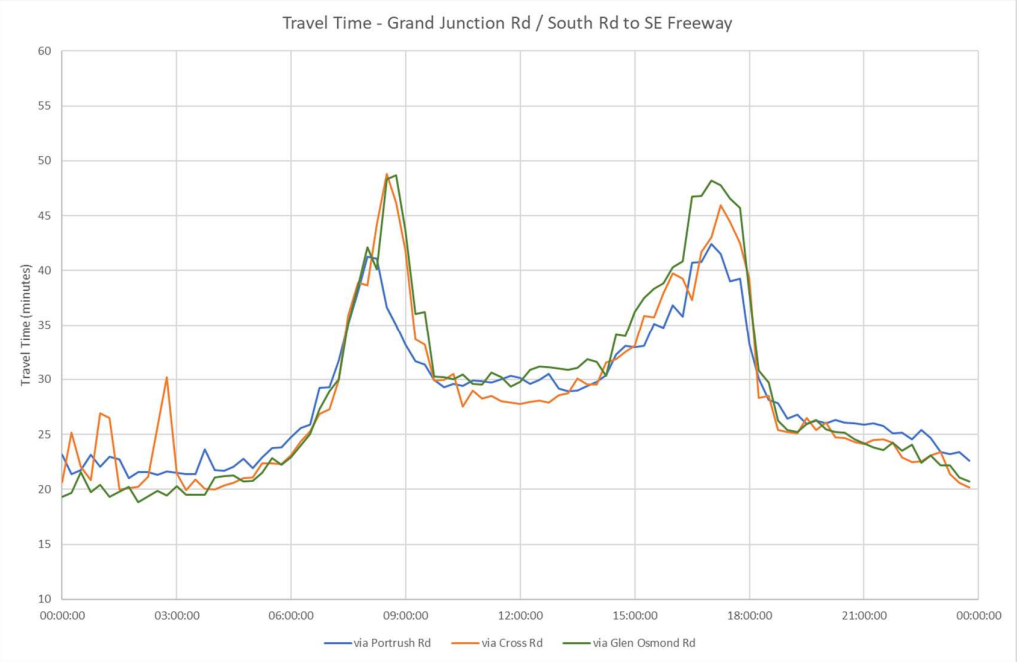


Figure 33: Travel time comparison Grand Junction Road / South Road to SE Freeway

3.3.4 Bus

Cross Road is classified as a Standard Frequency Corridor (Go Zone) in accordance with the Functional Hierarchy (refer **Figure 34**) which provide access to district centres and cross-suburban connections.

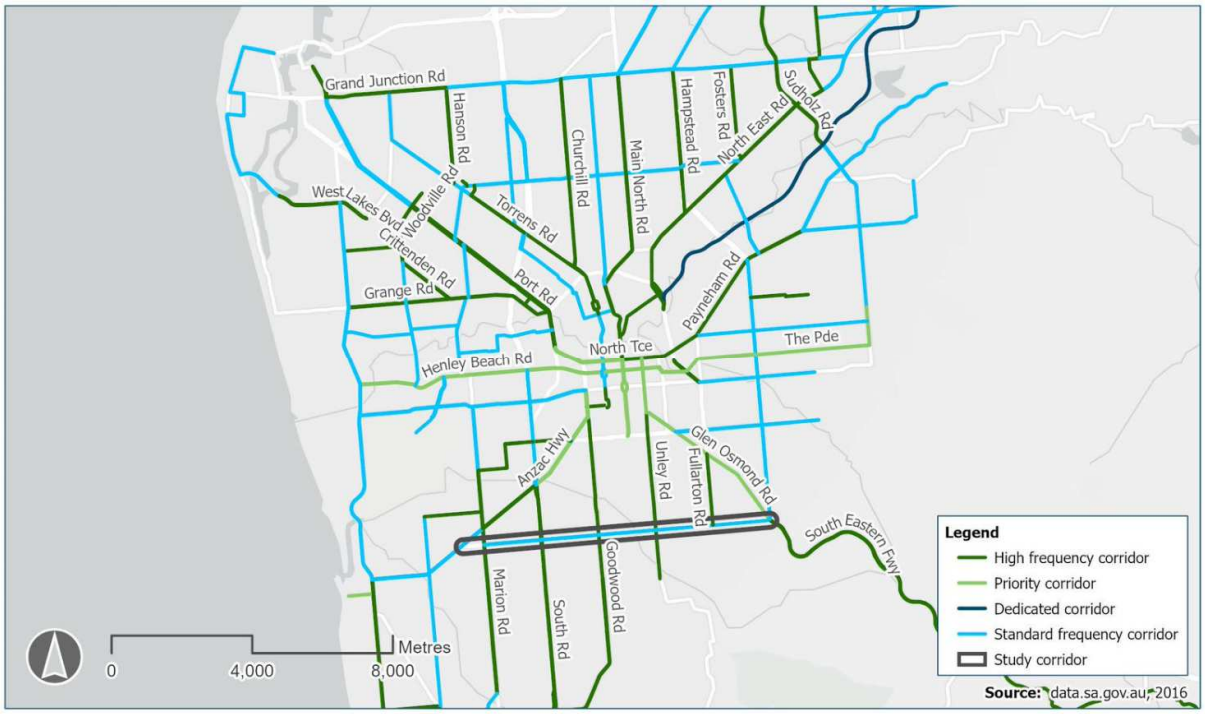


Figure 34: Cross Road public transport corridor in relation to the surrounding public transport network

Table 9 provides an overview of the bus routes operating along the four segments of the Cross Road corridor. There are three key Adelaide Metro routes of the *100, 170* and *300* (letters are minor variants).

There are 8 bus services in the peak hour in Segment 4 and 3-4 services per hour for Segments 1-3. The *100* is every 15-20 minutes in the peak; and the *170* and *300* every 30 minutes. The *892* only operates at 3:30pm on school days and is effectively a school bus. On Saturdays, the *100* and *300* are hourly; and only the *300* operates on Sundays (hourly). There are no services on the route before 6:30am and after 7:30pm.

Table 9: Overview of bus routes and serviced corridor segment(s)

Route	From/To	Seg. 1	Seg. 2	Seg. 3	Seg. 4
Adelaide Metro services					
100, 100B, 100C, 100N, 100P	Arndale Centre Interchange to Glen Osmond	✓	✓	✓	✓
170	Urrbrae to City				✓
300, 300C, 300G, 300H, 300J	Suburban Connector				✓
892	Urrbrae to Aldgate				✓
School services					
625	Charles Campbell Secondary School & Saint Ignatius College to Parkside				✓
628	Saint Ignatius College to Parkside				✓
782	Noarlunga Interchange to Urrbrae High School		✓	✓	✓
783	Urrbrae High to Old Reynella Interchange		✓	✓	✓
882	Mt Barker to Concordia College				✓
883	Aldgate to Mitcham Girls High School				✓
884	Urrbrae High School to Aldgate				✓
886	Mt Barker to Cabra Dominican College		✓	✓	✓
887	Mt Barker to Mercedes College				✓
888	Aldgate to Concordia College				✓
960	Cabra Dominican College to Glenelg Interchange	✓	✓		
961	Cabra Dominican College to Aberfoyle Park		✓		
988	Glenelg to Highgate	✓	✓	✓	✓
989	Aberfoyle Hub Centre Interchange to Urrbrae Agricultural High School	✓	✓	✓	✓
990	Urrbrae Agricultural High School to Plympton	✓	✓	✓	✓
991	Urrbrae Agricultural High School to Marion Centre Interchange	✓	✓	✓	
992	Urrbrae Agricultural High School to Walkerville				✓
997	Craigburn Farm to Cabra College		✓		

Figure 35 provides context of the wider catchments that are serviced by the Adelaide Metro routes that use Cross Road. The bus network provides limited direct connectivity to the CBD via the *170* which only uses a small section of the corridor, catering primarily for orbital services via the *100* and *300*.

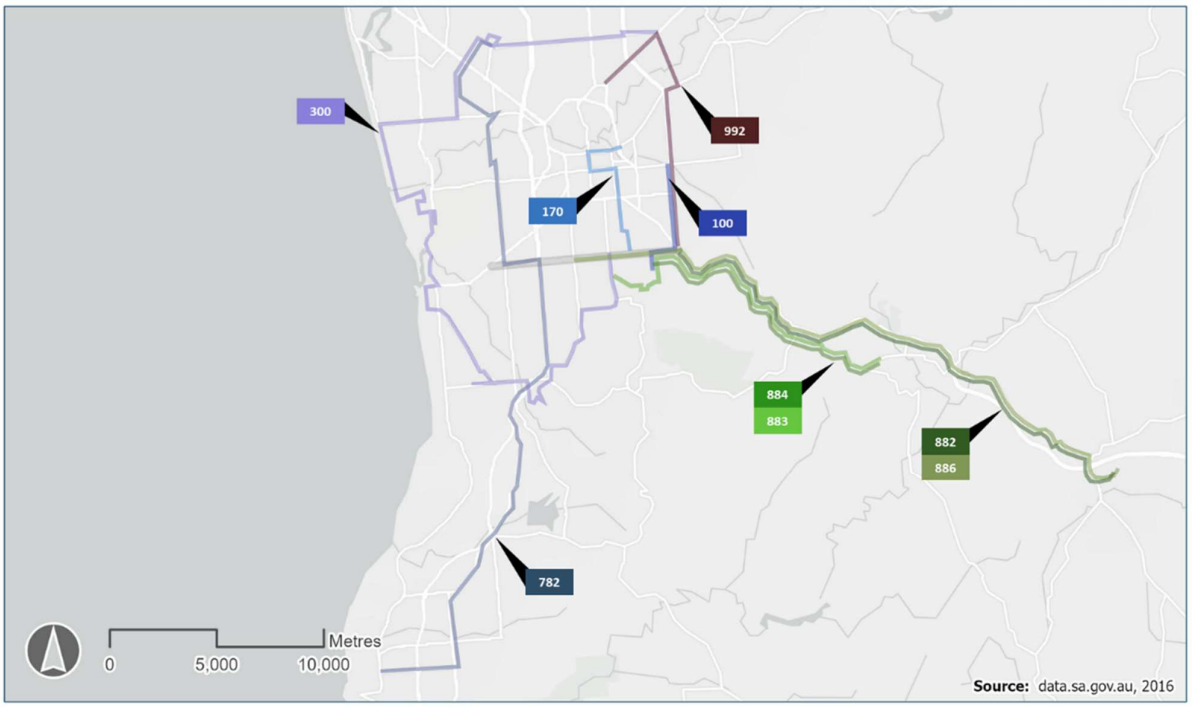


Figure 35: Public transport services using Cross Road corridor – regional context

Figure 36 identifies the north-south bus services that intersect with Cross Road. Given the predominately radial nature of Adelaide's bus network, many bus services connecting the southern suburbs of Adelaide with the CBD pass through intersections with Cross Road. These are typically higher frequency routes.

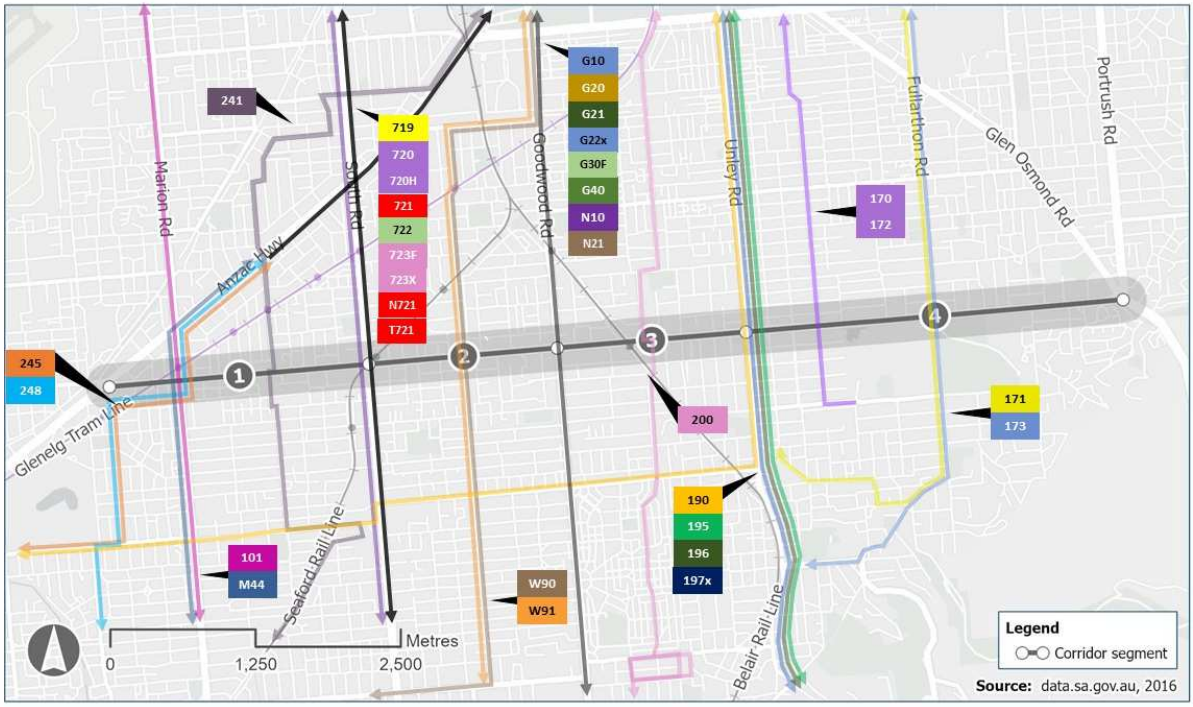


Figure 36: North-South public transport services crossing Cross Road

Figure 37 shows the bus stop locations along Cross Road and the area contained within a 200m walking zone. A total of 50 bus stops are located along the corridor, 23 eastbound and 37 westbound, including one temporary stop eastbound close to South Road and four school stops westbound (Cross Rd / South Rd, Cabra Dominican College and two stops at Urrbrae High School).

On average there is one bus stop every 383m eastbound and every 238m westbound, with the closest bus stops located at a distance of 100m in the eastbound direction and 54m and 60m in the westbound direction.

Although Cross Road is well provided for by bus stops, the extent and frequency of bus routes is limited, with only the *100* service and its variants extending for most of the corridor (Marion Road to South Eastern Freeway).

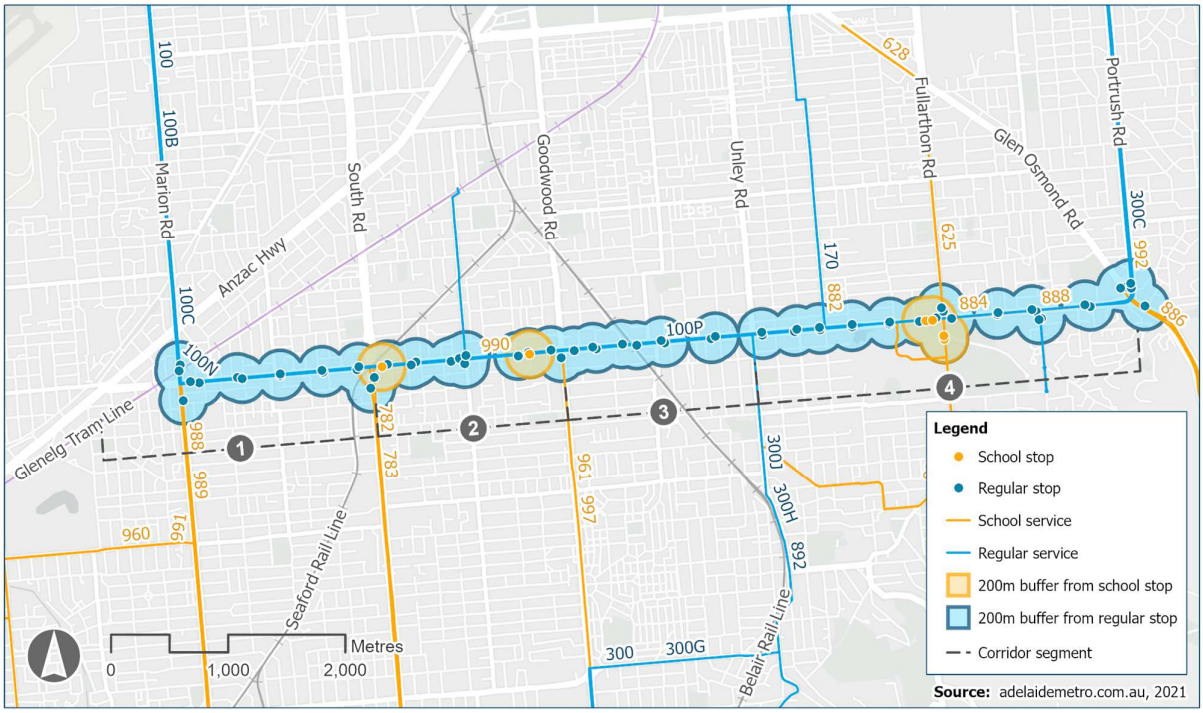


Figure 37: Bus routes along Cross Road and related bus stops and 200m catchments

Figure 38 shows average weekday bus boardings[24]. Higher boardings appear concentrated around education land uses (Cabra in Segment 1, Unley in Segment 4 and Urrbrae in Segment 4).

[24] Average per day, from data captured weekdays Mon-Fri of August 2019

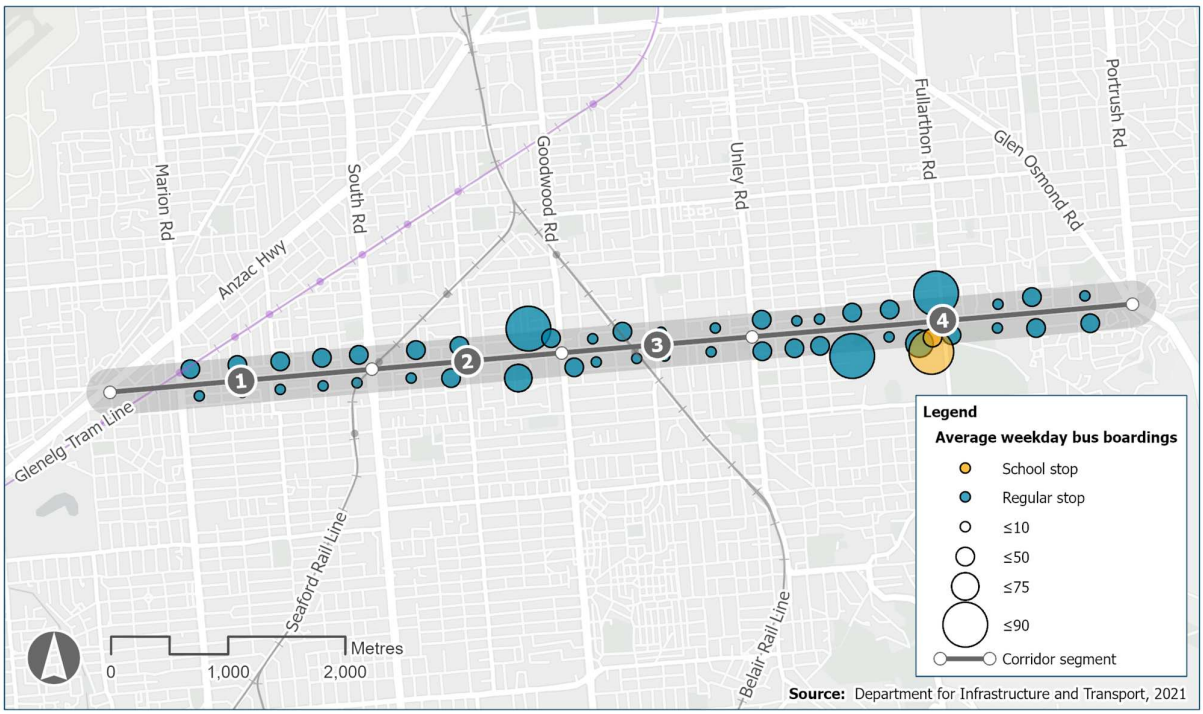


Figure 38: Average weekday bus boardings

3.3.5 Rail

Figure 39 identifies catchments surrounding tram and rail stations within the study area.

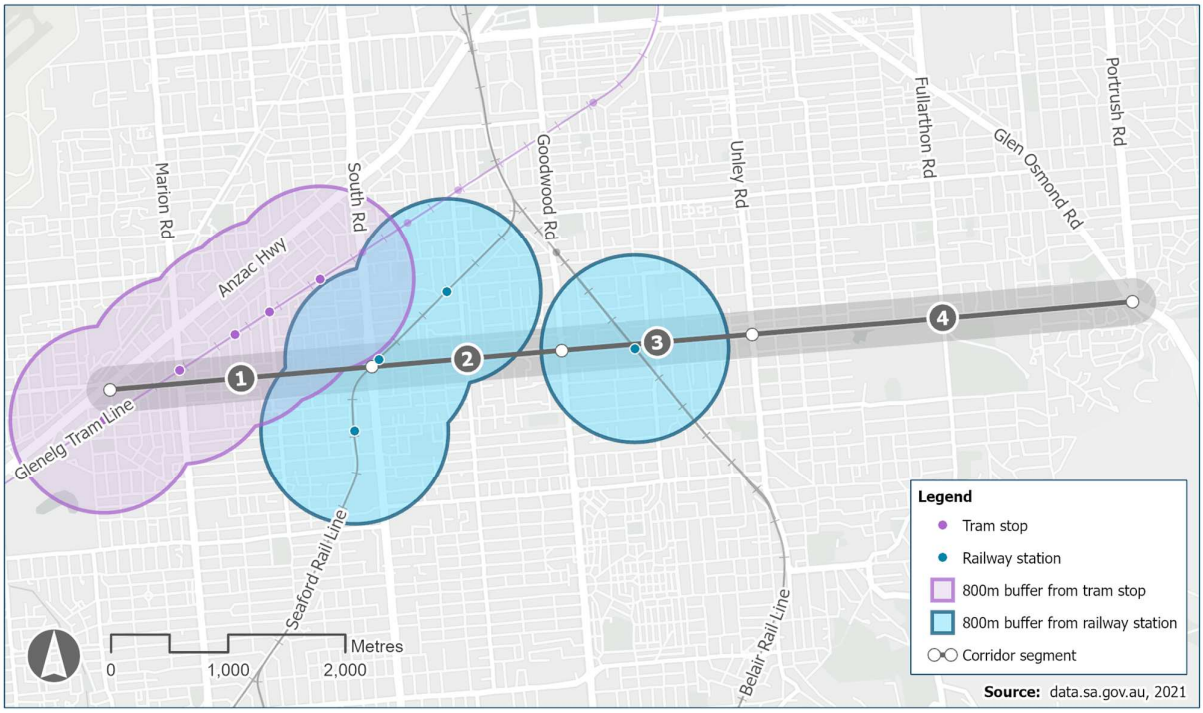


Figure 39: Tram and rail station catchments

Large portions of segment 1 and segment 2 are near stations serviced by the Glenelg Tram and Seaford Rail Line. The location of these catchments correlates where the highest concentration of public transport use is within the study area as per the journey to work mapping shown in Section 3.1

Unley Park Station associated with the Belair Rail line is located within Segment 3, however, access from the northern side is limited and indirect where pedestrians or cyclists are required to utilise the signals located approximately 130m away from the station at Victoria Avenue to cross the road.

Infrastructure Australia's Urban Crowding and Congestion report indicates that all 3 lines have a low volume/capacity ratio during the AM peak, demonstrating that services are not crowded[25].

3.3.6 Walking

As shown in **Figure 40** Cross Road does not have a 'Pedestrian Area' designation activity within Functional Hierarchy. These areas identify locations where significant pedestrian activity exists or is planned.

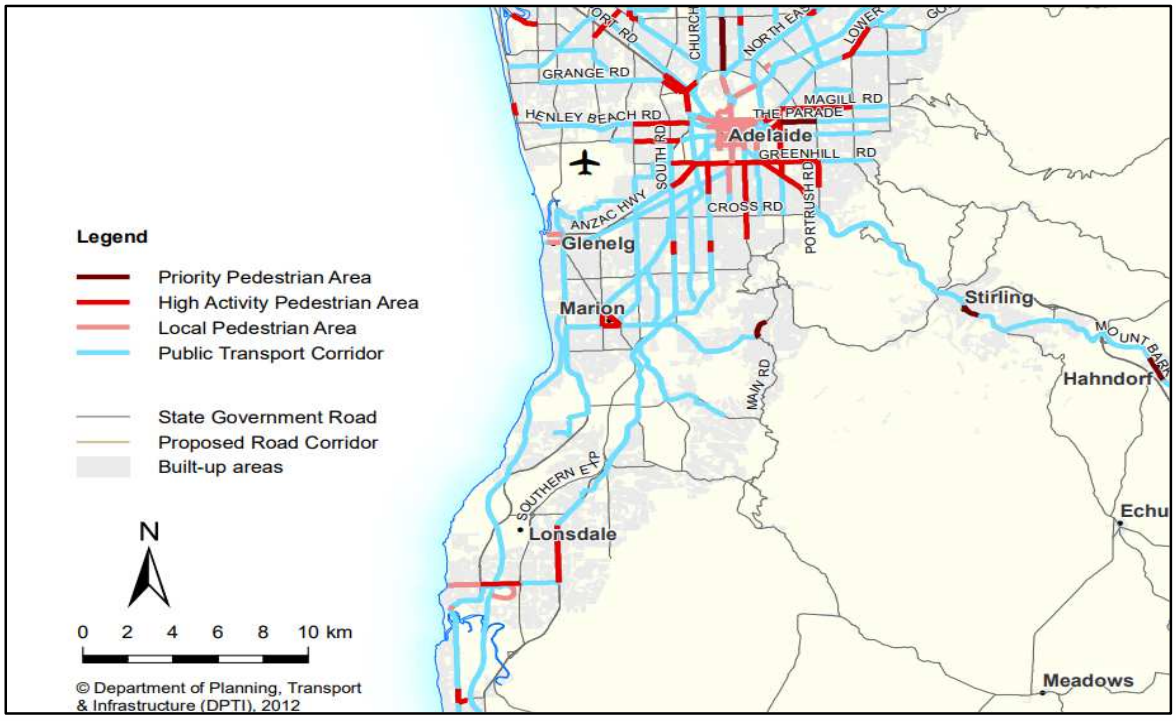


Figure 40: Greater Adelaide Pedestrian Designation

Cross Road intersects with a 'High Activity Pedestrian Area' along Unley Road / Belair Road as shown in **Figure 41**. This designation largely relates to the land uses along Unley Road itself, rather than at the intersection, although the Walford Parks Playing Fields located at the south west corner of the intersection is used by Walford Anglican School for Girls, which is located a 10 minute walk south on Unley Road.

The whole of the study corridor generally has provision for pedestrian footpaths on either side of the road, which are supported by several pedestrian crossing facilities shown in **Figure 42** north-south pedestrian crossings are available at 13 signalised intersections and 4 signalised pedestrian actuated crossings. Additionally, there are 8 north-south pedestrian refuge crossings.

[25] https://www.infrastructureaustralia.gov.au/sites/default/files/2019-08/Urban%20Transport%20Crowding%20and%20Congestion.pdf

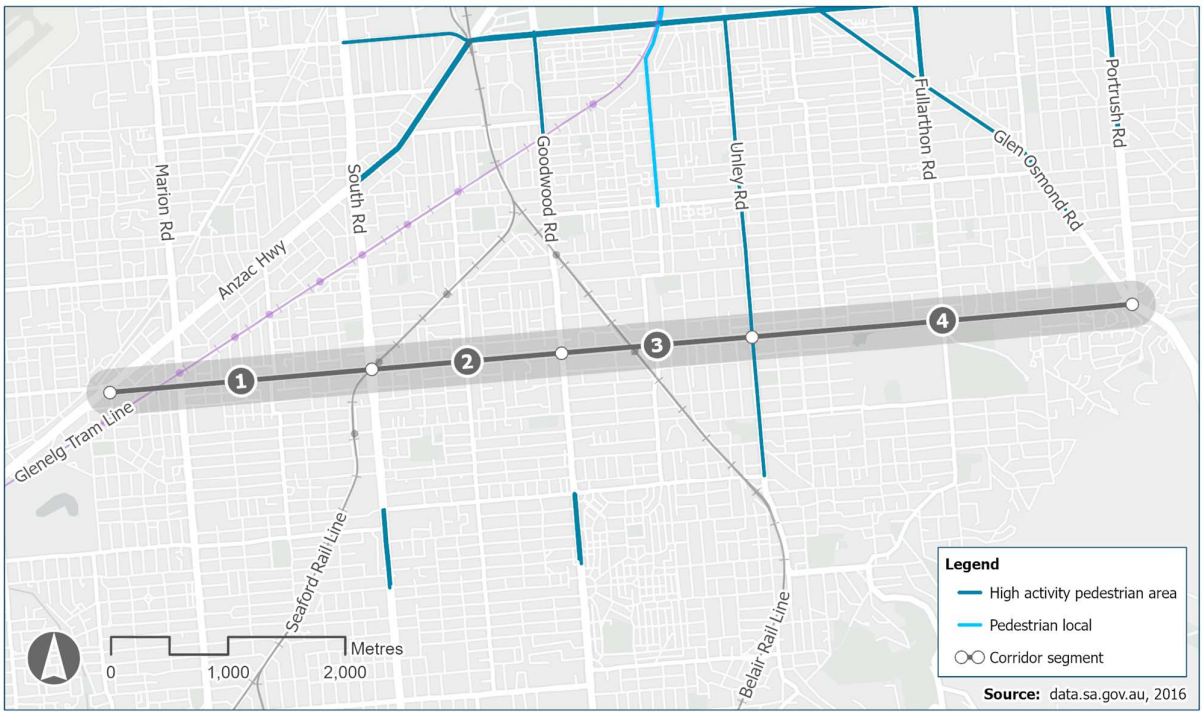


Figure 41: Pedestrian designation near Cross Road

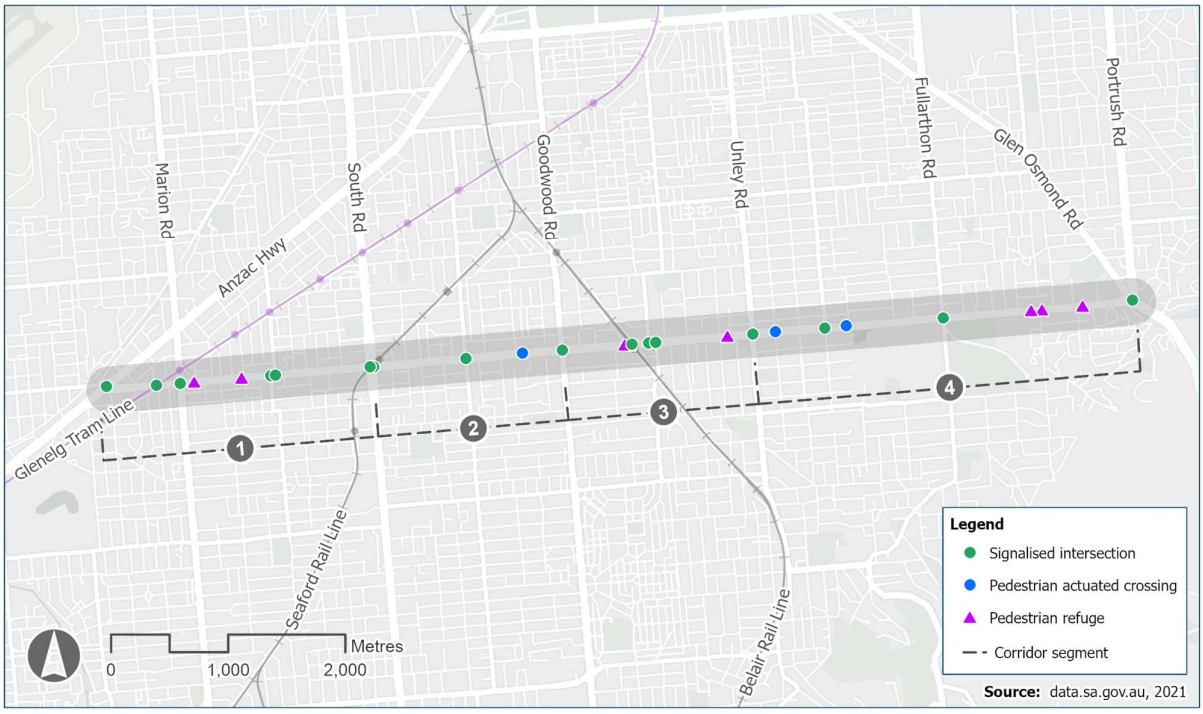


Figure 42: Pedestrian crossing opportunities

Cross Road is relatively flat between Anzac Highway and Fullarton Road with a gentle incline towards the east which is conducive to walking. The grade rises to a steeper incline between Fullarton Road and the South Eastern Freeway which may constrain the desire for east-west walking in Segment 4.

The main walking destinations are concentrated within local shopping precincts around Cross Road / Unley Road and Goodwood Road and the education uses scattered along or around the corridor. These areas are also highly targeted towards vehicle access, with significant amounts of off-street parking available. Many local destinations such as educational institutions, recreational and religious facilities, as well as disability and aged care services within a 200m walking distance from Cross Road are also typically accessed by pedestrians off the corridor.

In lieu of available pedestrian count data for the Cross Road corridor, Strava Heatmap has been utilised to provide an indication of key walking and running routes (refer **Appendix G – Data**). The data suggests that activity is prominent in the north-south direction along main roads or walking and cycling routes that provide access to the CBD. There is some level of east-west activity along the Cross Road corridor, particularly within Segments 3 and 4. Activity is limited within Segments 1 and 2 which has less interacting land uses and cross-corridor movements that create pedestrian activity.

3.3.7 Cycling

The whole Cross Road corridor is designated a 'major cycling route' within the Functional Hierarchy (refer **Figure 43**). These are defined as arterial roads where bicycle transportation is emphasised and provides direct/continuous links to centres, employment areas and key cycle trip attractors.

Figure 43: Greater Adelaide Cycling Designation

The adjacent major cycling routes connecting to Cross Road are shown in **Figure 44** and include Portrush Road, Fullarton Road, Unley Road, South Road, Marion Road and Anzac Highway. Cross Road also intersects with the Mike Turtur, Marino Rocks Greenways and Belair-City Bikeway.

Figure 44: Cycling Designation near Cross Road

On road bicycle lanes (approximately 1.2m wide) are provided within Segments 1 to 3 between Anzac Highway and West Terrace (near Duthy Street / Harrow Terrace intersection). Bicycle lanes along Segment 1 between Anzac Highway and South Road are limited to peak hours only (7:30am-9:00am and 4:30pm-6:00pm Mon-Fri) which enables on-road parking for vehicles outside of peak in some locations. Segment 4, Unley Road to the South Eastern Freeway, is the only segment without a dedicated bicycle lane (except for the Crafers Bikeway alongside the South Eastern Freeway at the far east of the segment). Refer to **Figure 45** showing the BikeDirect bicycle infrastructure provision.

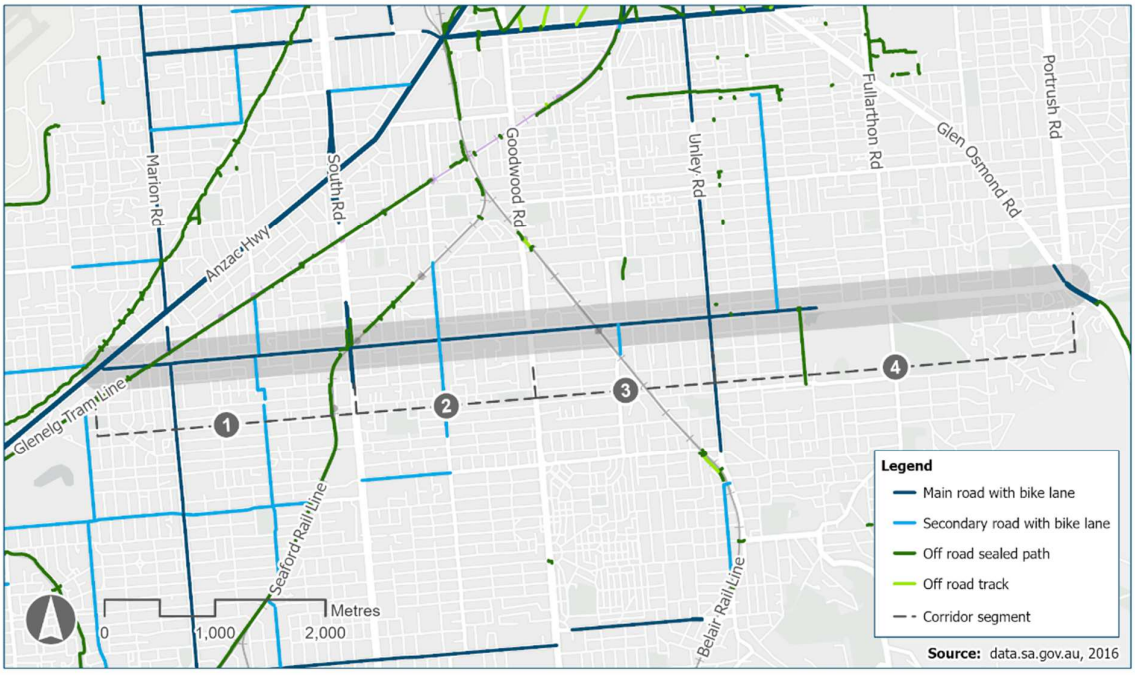


Figure 45: Cycle network in the proximity of the Cross Road corridor

As noted in **Section 3.1**, the current cycle to work mode share represents 3% of trips for workers residing within the corridor study area. The key employment area of the Adelaide CBD is accessible within a bicycle ride of 30 minutes or less.

In lieu of available cyclist count data for the Cross Road corridor, Strava Heatmap has been used to provide an indication of key cycling routes (refer **Appendix G – Data**). This shows that Cross Road provides a connection to the popular cycling routes along Anzac Highway in the west, which links to the coast, and the Crafers Bikeway alongside the South Eastern Freeway that ultimately connects to the Adelaide Hills areas of Eagle on the Hill, Crafers and Mt Lofty, all popular leisure cycling destinations. In addition to the main arterial roads of Marion Road, Goodwood Road, Belair / Unley Road and Fullarton Road, Strava Heatmap also identifies north-south demand across the Cross Road corridor (refer **Table 10**).

Table 10: East-west cyclist crossing demands

	Segment	North-South Cycling Demands as per Strava Heatmap
1	Anzac Hwy to South Rd	• Mike Turtur Bikeway – shared path connecting across Cross Road facilitated by an existing pedestrian actuated crossing
2	South Rd to Goodwood Rd	• Railway Terrace through to Emerson Road and shared use path along rail line, past Emerson Railway Station – signalised pedestrian crossing provided at South Road / Cross Road intersection, however, Strava indicates cyclists are using Railway terrace / Cross Road intersection • Winston Avenue / East Avenue – signalised intersection
3	Goodwood Rd to Unley Rd	• Victoria Avenue / Hilda terrace – signalised intersections (staggered)
4	Unley Rd to South Eastern Freeway	• Rugby Street – pedestrian actuated crossing • Harrow Terrace / Duthy Street – signalised intersection • Waite Road - likely access to / from Cross Road corridor

3.3.8 Car parking and loading

On street parking capacity was identified through consideration of parking restrictions along Cross Road.

Figure 46 shows the peak hour kerbside restrictions along Cross Road. These have been categorised as timed parking, unlimited parking, and no parking zones. As some restrictions are time limited, **Figure 47** shows the assessment for interpeak parking restrictions. Driveways were excluded from the assessment.

For the Cross Road corridor, differences between the time periods are a consequence of bicycle lane, clearway, and parking restrictions. Note that the interpeak period includes weekends.

Segments 2 and Segment 3 have an all-time bicycle lane, restricting any parking on the road. Along these segments, parking is confined to indented parking bays, and means parking availability is the same during peak and interpeak periods.

A peak period bicycle lane is in operation along Segment 1, operating Monday to Friday from 7:30am to 9am and 4:30pm to 6:00pm in both directions, restricting parking during these times. During interpeak periods, parking is available along a relatively significant proportion of the corridor.

Segment 4 provides the highest proportion of parking during peak and interpeak hours. This parking is mainly available on the north side of the corridor.

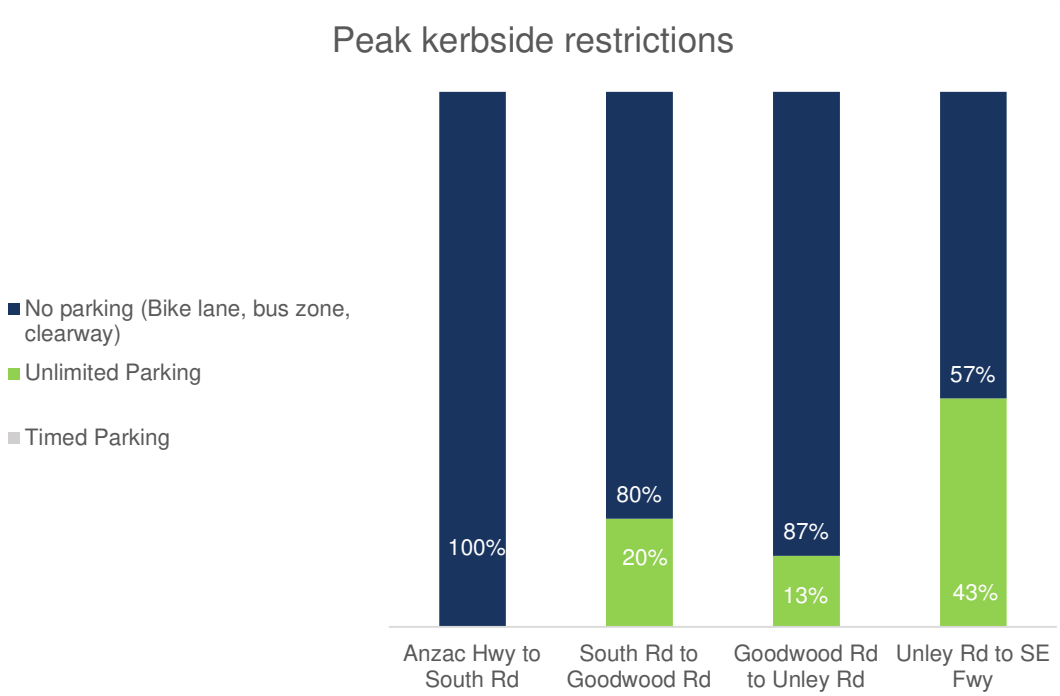


Figure 46: Peak kerbside restrictions along corridor

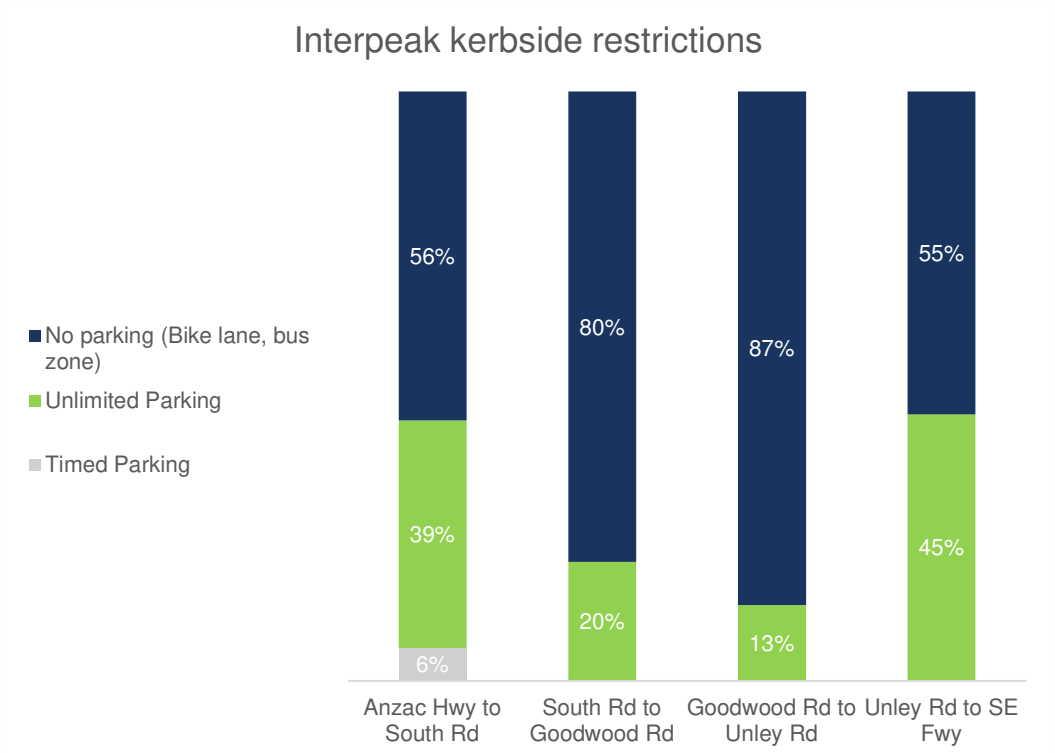


Figure 47: Interpeak kerbside restrictions along corridor

3.3.9 Stakeholder feedback

As discussed in Section 2.2, community engagement via an online tool (Social Pinpoint) has been undertaken for this Study as well as through workshops with Local Government.

The majority of feedback received from the community related to traffic issues – and these centred around congestion issues at Emerson Crossing and the Unley Park railway level crossing. Large number of comments were received from community and stakeholders that these locations were particularly congested in peak times resulting in long wait times and queuing.

Large numbers of comments were also received from the community about the need for traffic signals at the Waite Road/Cross Road intersection. This was reported to be particularly dangerous especially for right turns movements east onto Cross Road from Waite Road. It is also considered by respondents as dangerous for pedestrians and cyclists to cross.

Community and stakeholders also provided a range of comments and information about need for the enhancement of north-south movements across Cross Road, particularly for pedestrians and cyclists.

Freight was also an issue in the community, with all comments on this issue consistently being in opposition to Cross Road as a freight route and the increasing freight on Cross Road. Safety – particularly in proximity to schools along/close to the corridor – and noise and other environmental impacts, including amenity were cited as the main reasons for objections. Several respondents would like to see freight routed elsewhere. Local Government stakeholders also represented views of opposition to freight on this corridor.

3.4 Road safety assessment

A review of crashes which have occurred along the corridor has been undertaken to assess road safety along the corridor.

3.4.1 Crash overview

Crash history data for the Cross Road corridor was analysed over a five-year period, between January 2015 and December 2019. **Table 11** summarises the number of crashes in each segment by severity. The worst-performing segment for each crash type has been highlighted for ease of reference.

Table 11: Number of crashes by severity (2015-2019)

Segment		Length (km)	Number of crashes				
			Fatality	Serious injury	Minor injury	Property damage only	Total Crashes
1	Anzac Hwy to South Rd	2.3	0	7	79	136	222
2	South Rd to Goodwood Rd	1.6	0	4	29	77	110
3	Goodwood Rd to Unley Rd	1.7	0	2	37	96	135
4	Unley Rd to South Eastern Freeway	3.2	0	4	82	161	247
All Segments		**8.8**	**0**	**17**	**227**	**470**	**714**

In total, 714 crashes occurred along the corridor during the analysed five-year period. Of these crashes, there were 244 injury crashes (17 serious injury and 227 minor injury crashes) and 470 non-casualty crashes (property damage only). There were no fatal crashes recorded over this five-year period.

The highest number of crashes (247 crashes) occurred along Segment 4, which is the longest segment and also has the largest number of vehicles using it. The highest number of serious injuries occurred in Segment 1 (7 crashes recorded). The lowest number of crashes occurred in Segment 2 (110 crashes in total); this is also the shortest segment.

A benchmark performance analysis was undertaken to compare the FSI rate (Fatal and Serious injury crashes per km per year), casualty crash rate (number of crashes per km per year) and casualty crash rate per 100 million vehicle km travelled (MVKT) per year, as summarised in **Appendix D – Crash Analysis**.

The data shows that the Cross Road corridor has an average FSI rate of 0.40, casualty crash rate of 5.41, and casualty rate per km per 100 MVKT of 64.17. All these values are above the SA average crash rate. The highest crash rates are seen across Segment 1, with an FSI rate of 0.61, and a casualty rate per km and per 100MVKT of 7.50 and 121.76 respectively. The FSI rate across this segment is more than double that of Segments 3 and 4 (both with a FSI rate of 0.25). In terms of the casualty crash rate per 100 MVKT, Segment 1 is almost three times more than Segment 2 (which is 43.38 per 100 MVKT). Segment 2 also has the lowest casualty crash rate of 4.08.

It should be noted however that across the board, all FSI and Casualty crash rates are above the SA average. This is due to the limitations of the SA average value as this value constitutes a combination of all road types, including rural roads, which has lowered rates, which in turn lowers the average value of FSI and casualty crash rates. Hence the comparison of the Casualty Crash Rate per 100MVKT with the Average SA Rate is of greater meaning. This shows that Segment 1 is more than 4 times the average for South Australia and the other segments are more than 1½ times the SA Average.

There were on average, 368 serious injury crashes per year in Metropolitan Adelaide over the 2015-2019 period[26]. For the corridor, the average was 3.4 crashes, which comprises 1% of the Metropolitan Adelaide total.

The total number of crashes occurring along the corridor decreased over the five-year period for each individual corridor segment (refer **Appendix D – Crash Analysis**), and along the whole corridor (refer **Figure 48**). However, this was not a linear decline, with increases on the previous years in 2016 and 2018. The reduction between the first and last year analysed was due to fewer PDO crashes occurring in 2019 compared to 2015 (injury crashes in 2015 (43 in total) was less than in 2019 (45 in total).

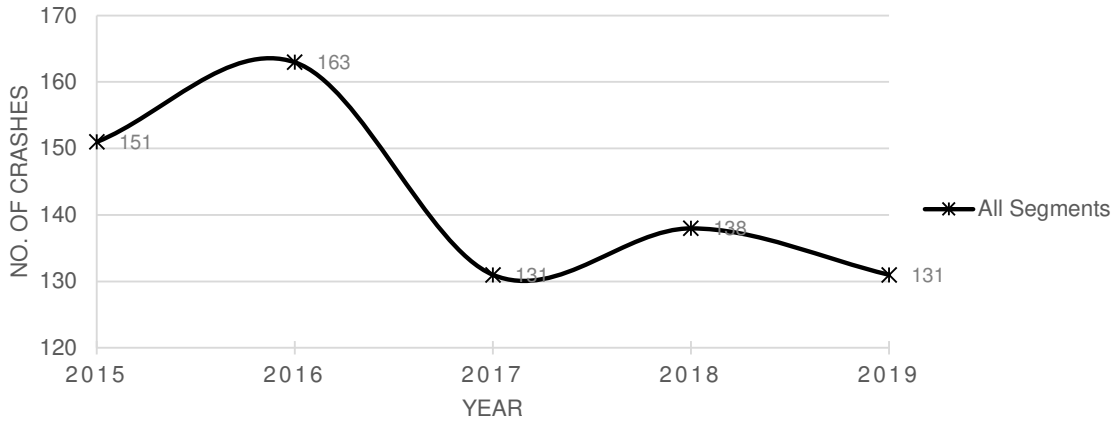


Figure 48: Crash trend summary for corridor over a five-year period (2015-2019)

3.4.2 Crash density and cluster analysis

The crash density and cluster map is shown in **Figure 49**. Crash density is highest at intersections, which is to be expected due to the increased number of conflict and decision-making points at these locations. The location of serious injury crashes (17) along the corridor has also been highlighted.

[26] 2009 Road Crash Casualties (dpti.sa.gov.au)

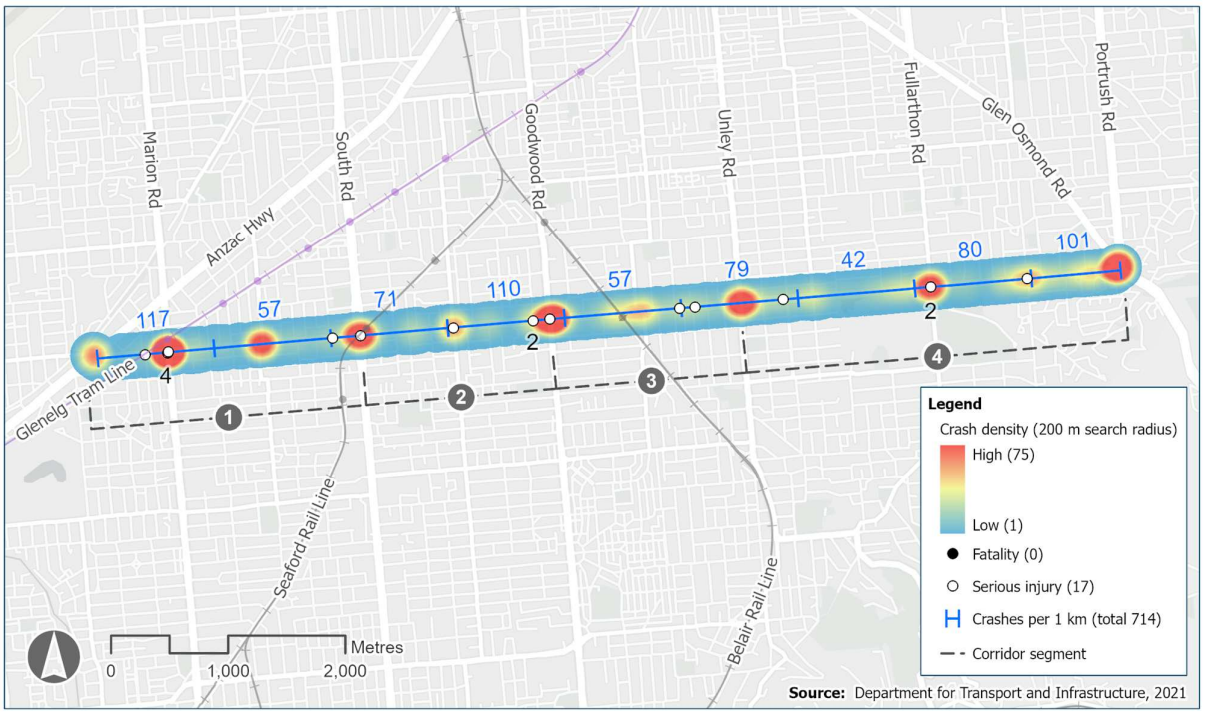


Figure 49: Crash density and cluster map

3.4.3 Key crash movement types

The crash types for the corridor have been summarised in **Figure 50**. A full summary of all crash types along each segment is shown in **Appendix D – Crash Analysis**. This shows a high proportion of crashes in Segment 1 involving right angle or right turning vehicles; and also, a high proportion of rear end (shunt) type crashes in Segments 1 and 4.

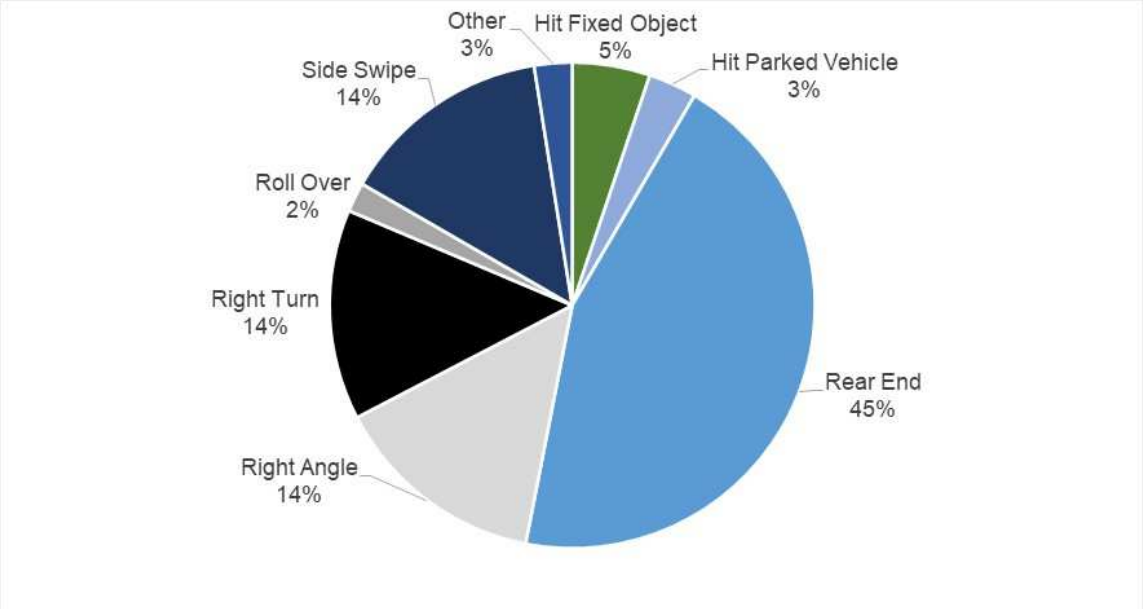


Figure 50: Crash types along the corridor (2015-2019)[27]

[27] Other is a combination of Head On, Hit Pedestrian, Hit Object on Road and Left Road/Out of Control

3.4.4 Vulnerable road user crashes

Vulnerable road users (pedestrians, cyclists and motorcyclists) were involved in a total of 95 crashes along the Cross Road corridor, with 7, 59 and 29 crashes respectively, as seen in **Table 12**. The percentages in this table show a proportion of the number of crashes per vulnerable road user per segment and the total number of crashes for the respective segment. It is noted that:

- Cyclists made up over half of all vulnerable road user crashes
- The highest number of vulnerable user crashes occurred in Segment 3 with the highest proportion of crashes being cyclists
- Segment 1 had the most motorcyclist crashes
- Segments 2 and 4 both had the highest number of pedestrian related crashes.

Table 12: Crashes involving vulnerable users

Segment		Length (km)	Total number of crashes and proportion of crashes involving vulnerable road users					
			Pedestrian		Cyclist		Motorcyclist	
1	Anzac Hwy to South Rd	2.3	0	0.00%	17	7.66%	10	4.50%
2	South Rd to Goodwood Rd	1.6	3	2.73%	5	4.55%	6	5.45%
3	Goodwood Rd to Unley Rd	1.7	1	0.74%	22	16.30%	7	5.19%
4	Unley Rd to South Eastern Fwy	3.2	3	1.21%	15	6.07%	6	2.43%
All Segments		**8.8**	**7**	**0.98%**	**59**	**8.26%**	**29**	**4.06%**

Figure 51 identifies where the crashes occurred along the corridor and demonstrates that a large proportion of the crashes occurred at or near intersections, with the Goodwood Road/Cross Road intersection seeing the highest concentration of vulnerable road user crashes.

Figure 51: Vulnerable road user crash along corridor heatmap

A more robust understanding of pedestrian and cycling trips along the corridor is required to understand if the concentration of crashes at this location is reflective of higher pedestrian and cycling activity at this location.

3.4.5 Heavy vehicle crashes

Table 13 identifies that Segment 4 had the highest number of crashes involving heavy vehicles with 54. While this is to be expected to some extent as Segment 4 also carries the highest number of heavy vehicles, the proportion of heavy vehicles involved in crashes in this segment is still relatively high.

Figure 52 shows the crash density along the corridor involving buses and heavy vehicles. This highlights the concentration of crashes at intersections and, particularly for heavy vehicles and buses, at the intersection with the South Eastern Freeway. A summary of crashes involving freight vehicles (by freight vehicle type) is shown in **Appendix D – Crash Analysis**.

Table 13: Crashes involving heavy vehicles

	Segment	Length (km)	Total Crashes	Buses		Heavy vehicles	
				Crashes	%of crashes in segment	Crashes	%of crashes in segment
1	Anzac Hwy to South Rd	2.3	222	5	2.25%	11	4.95%
2	South Rd to Goodwood Rd	1.6	110	3	2.73%	11	10.00%
3	Goodwood Rd to Unley Rd	1.7	135	3	2.22%	12	8.89%
4	Unley Rd to South Eastern Fwy	3.2	247	1	0.40%	54	21.86%
	Total	**8.8**	**714**	**12**	**1.68%**	**88**	**12.33%**

Figure 52: Commercial vehicle and bus crashes along corridor heatmap

3.4.6 Crash contributing factors

Table 14 and **Table 15** show the number of crashes related to behavioural factors and weather conditions.

For behavioural factors, there were 17 crashes recorded due to speeding and 7 crashes associated with driving under the influence. Segment 1 recorded the highest number of crashes due to speeding.

Table 14: Total crashes sorted by contributing behavioural factors

Segment		Length (km)	Number of crashes and proportion of number of total crashes resulting from behavioral factor			
			Speed		Drugs & alcohol	
1	Anzac Hwy to South Rd	2.3	7	3.15%	1	0.45%
2	South Rd to Goodwood Rd	1.6	1	0.91%	5	4.55%
3	Goodwood Rd to Unley Rd	1.7	3	2.22%	1	0.74%
4	Unley Rd to South Eastern Fwy	3.2	6	2.43%	0	0.00%
All segments		**8.8**	**17**	**2.38%**	**7**	**0.98%**

In terms of weather conditions, a total of 131 crashes occurred during darkness, with Segment 1 having the highest proportion at 60 (27%). In terms of wet surface crashes, the relative proportion is low for each segment and for the whole length with a total of 89 crashes that occurred when the road surface was wet.

Table 15: Total crashes sorted by contributing weather conditions

Segment		Length (km)	Number of crashes and proportion of crashes in the segment			
			Darkness		Rain	
1	Anzac Hwy to South Rd	2.3	60	27.03%	32	14.41%
2	South Rd to Goodwood Rd	1.6	17	15.45%	13	11.82%
3	Goodwood Rd to Unley Rd	1.7	15	11.11%	13	9.63%
4	Unley Rd to South Eastern Fwy	3.2	39	15.79%	31	12.55%
All segments		**8.8**	**131**	**18.35%**	**89**	**12.46%**

3.4.7 Road crash analysis summary

Analysis of road crash data for the period between 2015 and 2019 has identified that:

- 714 crashes occurred along the corridor, with the highest number of crashes (247 crashes) occurring along Segment 4
- Overall, the number of crashes occurring along the corridor decreased between 2015 to 2019
- No fatal crashes occurred over these five years
- The highest FSI rates were found to be in Segment 1 (0.61), followed by Segment 2 with a rate of 0.49
- Vulnerable road users (pedestrians, cyclists and motorcyclists) were involved in 95 crashes or 13% of all crashes along the corridor
- There were 12 crashes involving buses, with nearly half of these in Segment 1 (5 crashes), this is despite Segment 1 having the lowest number of Adelaide Metro services
- A total of 88 crashes involved heavy vehicles, with the highest number of crashes occurring in Segment 4 (54 crashes). Proportionally, 22% of all crashes in that segment involved heavy vehicles. Segment 4 also carries the highest proportion of heavy vehicles along the corridor
- The crash density along the corridor is highest at intersections, which is expected due to the increased number of conflict and decision-making points at these locations.

3.4.8 Rail level crossing crashes

3.4.8.1 Emerson Level Crossing

The following **Figure 53** shows rail crossing incidents at Emerson level crossing.

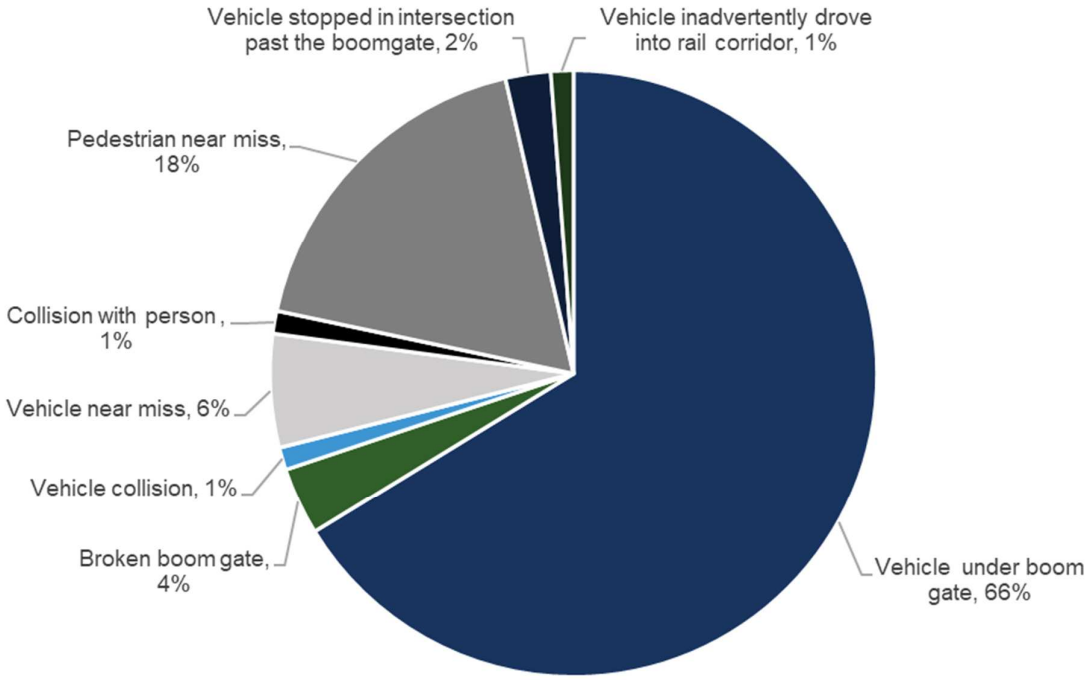


Figure 53: Emerson rail crossing collisions

Since 2015 there have been 83 recorded incidents by rail operations. The most common type of collision was caused by vehicles under boom gates (55 incidents). This is followed by pedestrian near misses (15 incidents).

3.5 Movement and Place classification of the corridor

3.5.1 Movement and Place framework

The road network has many functions on which we rely, including:

- Connecting our communities through the **movement** of people and goods
- Supporting **places** and public spaces in our urban areas and regional centres
- Facilitating **economic** growth and prosperity
- Facilitating **social** activities such as events and celebrations.

The concept of movement and place was introduced into South Australia with the publication of *Streets for People: Compendium for South Australian Practice (2012).* The movement and place classification system adopted for this assessment aligns with the *Streets for People* concept and link and place matrix, however, is updated for South Australia, and informed by the *Transport for Victoria (TfV) Movement and Place Framework* prepared, in 2019 to consider designation based on strategic function.

The Movement and Place classification matrix adopted for the Corridor Study is shown in **Figure 54** with 'P = Place' and 'M = Movement'. The number refers to level of strategic significance, with number 1 representing the highest strategic importance (National), and number 5 representing local importance. Ultimately the classification of a road segment within a corridor is dependent of the significance of ***Movement needs*** and ***Place function*** along the corridor, and also the varying modal priorities.

The Department's Functional Hierarchy has been considered, along with accessibility, connectivity and trip purposes to determine the position of each corridor segment along the Movement axis, while centre significance, land use and zoning and the level of activation along and across a street has been assessed and influences the position on the Place axis.

As such, refinements to the Movement and Place classifications have also been considered for specific application in South Australia, as detailed in **Table 16** and **Table 17** respectively. These classifications have been adopted for the Corridor Study.

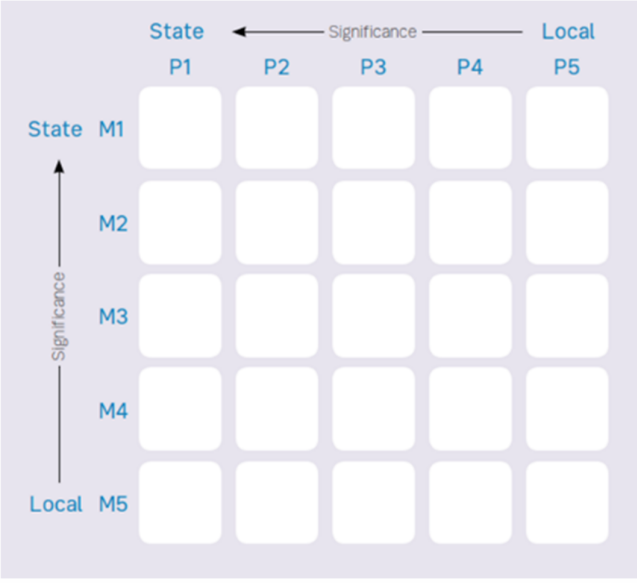


Figure 54: Movement and Place road classification matrix

Source: Movement and Place in Victoria – February 2019

Table 16: SA framework for determining a Movement status – DRAFT

	Visitors	Examples
M1	Mass, mainly non-stop, movement of people and/or goods on routes with a state or national-level function.	Examples include motorways, freeways, high-capacity limited access arterial routes.
M2	Significant movement of people and/or goods on routes with a state or national-level function and connects regional catchments.	Examples include major urban arterials carrying cross-city traffic.
M3	Moderate movement of people and/or goods on routes connecting district catchments.	Examples include urban arterials.
M4	Movement of people and/or goods on routes that connect neighbourhood catchments.	Examples include collector roads
M5	Movement of people and/or goods on routes that connect local catchments.	Examples include local access roads.

Table 17: SA framework for determining a Place status – DRAFT

	Visitors	Land uses*	Frontage activation** and pedestrians	Examples
P1	• Recognised tourist precincts • Premier shopping destinations with high density retail activities • Premier dining precincts • Cultural and concert venues with 1,500+ capacity • High quality urban street design and amenity	Urban Activity Centres, Capital City Streets	• Continuous frontage activation lengths of 750+ metres on both sides • Presence of significant on-street activities and/or high pedestrian volumes	• Rundle Street, North Tce, Rundle Mall, Jetty Road Glenelg, Main Road (Hahndorf)
P2	• Popular and well-known destinations with visitors from metropolitan-wide catchments with a large number of on-street staying activities • High quality urban street design and amenity • Smaller capacity cultural and concert venues (500-1,500) • High quality urban street design and amenity	Land uses including Suburban Activity Centres, main street or urban corridor designated zones	• Continuous frontage activation lengths of 500+ metres on both sides • Presence of on-street activities and/or high pedestrian volumes	• Prospect Road, Norwood Parade, King William Road
P3	• Commercial and service type destinations used by visitors from a district (immediate and adjacent Councils) with visible on-street staying activities like public seating and outdoor dining • Small capacity cultural and concert venues (under 500)	Land uses including Suburban Activity Centres, main street, business, community or urban corridor designated zones	• Main streets with frontage activation lengths of 500 metres on BOTH sides • Suburban Activity Centres with frontage activation lengths of 250+ metres on BOTH sides	• Brighton Road • Unley Road
P4	• Neighbourhood main streets or commercial precincts used by local visitors, mainly from the immediate Council-wide area with a low level of on-street staying activities • Presence of large schools with 600+ student enrolments with frontages facing the street	Land uses including Suburban or Local Activity Centres, business, community or urban corridor designated zones	• Main streets or commercial precincts with frontage activation lengths of 250+ metres on BOTH sides	• Duthy Street
P5	• Local places of residence • Commercial destination mainly catering to vehicle access OR with small numbers of customers arriving mainly by appointment	Land uses including Residential or Industry and some commercial		

** These land uses are noted examples. There may be other zone types or streets where Place status is higher due to nature or intensity of existing activities.*

*** Note that along arterials, the use of building setbacks can push active frontages further away from the road (these setback areas are often open and used for car parking with buildings visible behind). Buildings set back up to 60 metres are considered to count towards activation of the corridor, contributing to its Place status.*

Importantly, Movement and Place are separate and come together to consider issues and opportunities as represented in **Figure 55**.

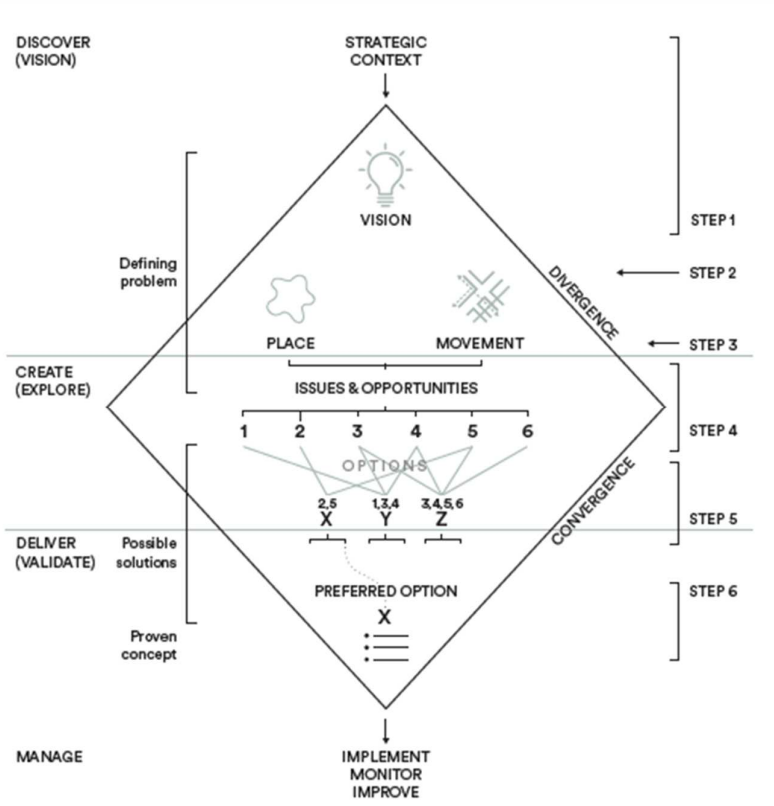


Figure 55: The 6 steps in the core movement and place process

Source: adapted from TfNSW practitioners Guideline to Movement and Place 2020

3.5.2 Movement classification

The Cross Road corridor facilitates strategic movement between the South Eastern Freeway and the inner southern and western areas of the Adelaide Metropolitan area. All segments of Cross Road have been applied with an M2 Movement classification, given the strategic function and multi-modal importance of the entire corridor length.

Key characteristics of Cross Road justifying the Movement classification include it being identified as:

- Part of Adelaide's Outer Ring Route, the National Key Freight Route network
- Designated as the following within the Department's Functional Hierarchy:
    - Major Traffic Route
    - Freight Route
    - Major Cycling Route (Metro)
    - Standard Frequency Public Transport Corridor (GoZone).

An M2 classification correlates to ''regional" significance. For reference, it is considered that an M1 classification in the South Australian context would be motorways, freeways, or high-capacity limited access arterial routes.

3.5.3 Place classification

The Place classification has been evaluated in terms of 'significance' and degree of activation along the corridor in line with the guidance provided by the TfV framework.

This also includes taking into consideration the number of significant destinations, such as education facilities and business centres. In addition, pedestrian connectivity and the level of urban realm were taken into consideration. The Place classification of Cross Road has been identified as ranging from P4 to P5, which are of neighbourhood or local significance.

The current degree of activation along the corridor is relatively low, with few locations where stopping and staying along the roadside is attractive or required. This is due to the predominantly residential and open space nature of the corridor. The central area of the corridor for segments 2 and 3 encompass the district centre of Cumberland Park. However, this is predominantly on a north-south axis with little activation generated along Cross Road.

Figure 56 shows the movement and place status of each corridor segment and identifies the significant features at city-wide, district and local level.

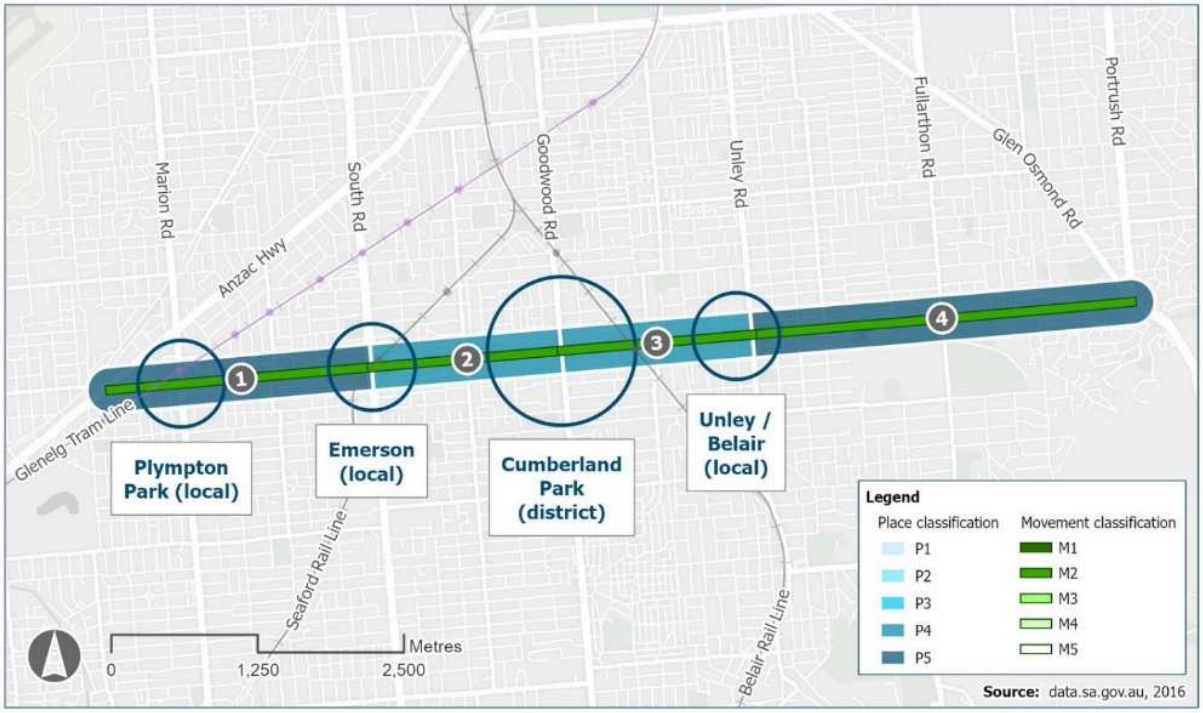
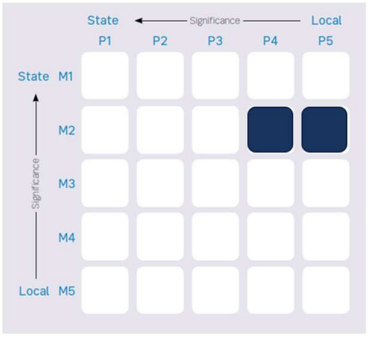


Figure 56: Movement and place summary

Refer to **Table 18** for the existing movement and place designations for each segment.

Table 18: Movement and Place Designations and Matrix

	Segment	Movement Classification	Place Classification	Matrix
1	Anzac Hwy to South Rd	M2	P5	
2	South Rd to Goodwood Rd	M2	P4	

3	Goodwood Rd to Unley Rd	M2	P4	
4	Unley Rd to South Eastern Fwy	M2	P5	

4 Vision and objectives

4.1 Strategic alignment

The strategic planning documents summarised in Section 2.4 above highlight a wide array of visions, priorities, goals and objectives that impact on the corridor.

4.1.1 Movement

A prevailing theme from *SA Growth State*, *the 20-Year State Infrastructure Strategy* and the *30-Year Plan for Greater Adelaide* is for the protection and enhancement of key economic corridors for the purposes of moving goods to places of economic importance. As a designated National Freight Route, the Cross Road corridor supports the movement of goods within Greater Adelaide.

The *Integrated Transport and Land Use Plan* reinforces this by highlighting the importance of Adelaide's Inner and Outer Ring Routes (of which this corridor forms an integral part) for the movement of people and service providers without the need to travel through the CBD or local streets.

Further highlighting the importance of Cross Road for the movement of people and goods, 'Adelaide's Outer Ring Route capacity' was released as a 'High Priority Initiative' by Infrastructure Australia on 26 February 2021.

4.1.2 Place

Community and land use strategies from state and local government have consistent themes that promote healthy lifestyles and connectedness through active travel, public transport and access to nature. There is also a clear direction for place-making that results in vibrant, quality and attractive places that are universally accessible. These strategies also place high importance on protecting and enhancing the natural environment.

4.2 Vision statement for the corridor

Based on the consolidated themes of movement and place a draft strategic vision has been prepared for the corridor:

The Cross Road corridor protects and enhances a key economic function and provides for safe and efficient movement of people and goods, whilst providing accessibility to residential, commercial, education and recreation precincts

4.3 Objectives for the corridor

To achieve the vision, a number of objectives for the corridor have been prepared, as outlined in **Table 19**. These objectives link with the overarching transport policy outcomes of the *20-Year State Infrastructure Strategy (2020)*. Key Performance Indicators (KPI) and target metrics have been devised to ensure measurement of each objective is achievable.

Table 19: Corridor objectives

Objectives for this corridor	Key transport themes of the 20 Year State Infrastructure Strategy (2020)[28]				Key Performance Indicators (KPI) – this plan	Key Performance Indicators (KPI) – Further investigation required	Targets	Policy reference
	Make SA more productive	Maintain livability	Improve safety of the road network	Improve efficiency of key economic and freight corridors				
Reduce the number and severity of road crashes on the corridor		✓	✓		• Number of FSI crashes • Casualty crashes per 100MVK	• MVKT for metro roads	• Reduce FSI crashes • Reduce vulnerable road user crashes	• South Australia's Road Safety Strategy to 2031 • The 20 Year State Infrastructure Strategy • National Freight and Supply Chain Strategy • Road Safety Strategy to 2031
Improve operation of the Outer Ring Route	✓		✓	✓	• Journey time reliability	• Network resilience • Access to key destinations	• Improved journey time reliability • Improved access to key destinations	• The 20 Year State Infrastructure Strategy
Improve efficiency of general vehicle traffic on the Outer Ring Route	✓			✓	• Journey time reliability • Traffic speed ratio		• Efficient and reliable movements at all times of day	• The 20 Year State Infrastructure Strategy • National Freight and Supply Chain Strategy
Facilitate access for freight to and from South Australia's southeast on the National Freight Route	✓			✓	• Journey time reliability • Traffic speed ratio	• Freight specific journey time reliability • Freight specific speed ratio	• Efficient and reliable movements at all times of day • Improved access to key destinations	• The 20 Year State Infrastructure Strategy • National Freight and Supply Chain Strategy • A Functional Hierarchy for South Australia's Land Transport Network (2013)

[28] Key themes consolidated from transport related priority initiatives of the 20 Year State Infrastructure Strategy

Objectives for this corridor	Key transport themes of the 20 Year State Infrastructure Strategy (2020)[28]				Key Performance Indicators (KPI) – this plan	Key Performance Indicators (KPI) – Further investigation required	Targets	Policy reference
	Make SA more productive	Maintain livability	Improve safety of the road network	Improve efficiency of key economic and freight corridors				
Improve urban realm / amenity		✓			• Tree canopy cover • Frontage activation • Urban realm quality	• Noise improvements • Emissions from transport	• Reduced noise • Reduced emissions from transport	• Climate Change Action Plan (2021 – 2025) • Environment Protection (Noise) Policy 2007 • The 30-Year Plan for Greater Adelaide (2017 update)
Provide for direct pedestrian and cyclist desire lines along arterial roads with provision of safe crossing facilities		✓	✓		• Crossing opportunities • Cycling facilities along the corridor • Cycle parking	• Walking accessibility • Cycling environment • Desire lines	• Safe, convenient and compliant footpaths • Space specifically for cyclists • Priority for cyclists • Optimal cycling travel times	• A Functional Hierarchy for South Australia's Land Transport Network (2013) • Local Government policy (e.g. Unley Integrated Transport Plan)
Improve public transport safety, convenience and accessibility by improving access to stops and providing reliable transit times	✓	✓	✓		• Bus speed ratio • Bus stop facilities (not related to DDA)	• Bus journey time reliability • Bus stop facilities (inc. DDA)	• Improved bus stop facilities and compliance with the Disability Standards for Accessible Public Transport (DSAPT) • Bus schedule adherence • Increased patronage	• A Functional Hierarchy for South Australia's Land Transport Network (2013)

5 Current Performance

The evidence base for the corridor, using a range of data and assessments, enables objective corridor planning that:

- Informs the understanding of how well our roads are performing their function
- Facilitates benchmarking of the performance of our different road types within the road network
- Integrates land use and road network planning
- Allows decision makers to better prioritise investment, allocate road space and improve the outcomes of our customers' journeys

A range of different performance indicators have been applied along the length of the corridor related to:

- Key customer groups
- Movement and place performance
- Each of the different planning segments along the corridor
- Each of the nominated peak periods.

The performance results have been considered against the existing movement and place classifications. This assessment provides the basis for identifying potential performance gaps to inform future initiatives for the corridor.

5.1 Reporting metrics

5.1.1 Performance Indicators

The Performance Indicators used for this corridor study are listed below in **Table 20**.

Table 20: Performance Indicators

No.	Performance Indicator	Data source
	Movement of traffic, public transport and freight	
1	Vehicle speed ratio	• **AddInsight** – Data from May 2019 and August 2019 assessed.
2	Journey time reliability	• **AddInsight** – Data from May 2019 and August 2019 assessed
3	Bus schedule adherence	• **Swiftly**[29] – Data extracted for the month of May 2021; speed ratio analysed excluding dwell times.

[29] Swiftly is a transit data platform application utilised by South Australian Public Transport Authority (SAPTA) to assess data and inform management of the Metropolitan Adelaide bus network

No.	Performance Indicator	Data source
	Movement of cyclists and pedestrians	
4	Cycling facilities along the corridor	• **On-site assessment of cycling facilities** – site observation
5	Pedestrian facilities along the corridor	• **On-site assessment of pedestrian facilities** – site observation
6	Pedestrian ability to cross the corridor	• **On-site assessment of pedestrian crossing facilities** – Combination of GIS data and site observation.
	Place quality and environmental	
7	Tree canopy cover	• **Tree canopy cover data (LIDAR)** – % tree canopy cover along the footpaths of the corridor
8	Bus stop conditions	• **On-site assessment of bus stop conditions** – site observation
9	Urban realm quality	• **On-site assessment of pedestrian facilities** – site observation
10	Cycling parking	• **Count of on-street parking, as a number per km** – site observation
11	Pedestrian seating	• **Count of on-street pedestrian seats, as a number per km** – site observation
12	Frontage activation	• **Qualitative assessment –** degree of activation of frontages

Additional context indicators which provide additional insights regarding the movement and place performance were developed and are reported within **Section 3**.

A strategic review of asset conditions associated with pavement and structures along the corridor was excluded from the current performance assessment. The Investment Plan developed for the corridor does not consider asset management as the Department develops plans that consider asset condition.

5.1.2 Scoring

Scoring methodologies were developed for each performance indicator, which are detailed in **Appendix E – Movement Performance Indicators** and **Appendix F – Place Performance Indicators**. In lieu of any local guidance documents, the methodologies were created for the corridor study suited to the local South Australian context[30].

Performance scores for each segment have been calculated for each performance indicator. A score of '7' indicates a high level of user service, whereas a score of '1' indicates a low level of user service to reflect the Movement and/or Place function for user groups.

The process below has been used for the *Cross Road Corridor Study*:

- Data was collected and calculated as per the performance indicator methodologies within each segment
- The following peak periods were used for performance indicator analysis and reporting:
    - 1-hour peaks:
        - AM: 8:00am to 9:00am
        - PM: 4:00pm to 5:00pm
    - Peak periods:
        - AM: 6:30am to 9:30am (3 hours)
        - PM: 3:00pm to 7:00pm (4 hours)
- A score of 1 to 7 was applied to the results of the assessment.

[30] The scoring methodology is subject to further refinement

5.2 Movement performance indicator assessment

5.2.1 Traffic performance based on speed efficiency (general traffic, freight and bus movements)

The aim of this indicator is to measure the performance of all traffic movements (including general traffic, public transport (bus) and freight) by assessing the vehicle speed ratio. The average travel speed is calculated using the average travel time and length for each segment between two designate start and end points.

Additional details of the scoring metrics for this performance indicator along with a comparison of the peak hour and peak period speed efficiency scores per segment for both eastbound and westbound traffic are detailed in **Appendix E1 – Speed Efficiency**.

Figure 57 and **Figure 58** present the speed efficiency performance indicator scores along the corridor for the AM and PM one-hour peak periods. **Figure 59** and **Figure 60** show the speed efficiency performance indicator scores along the corridor for the three-hour period in the AM and the four-hour period in the PM respectively.

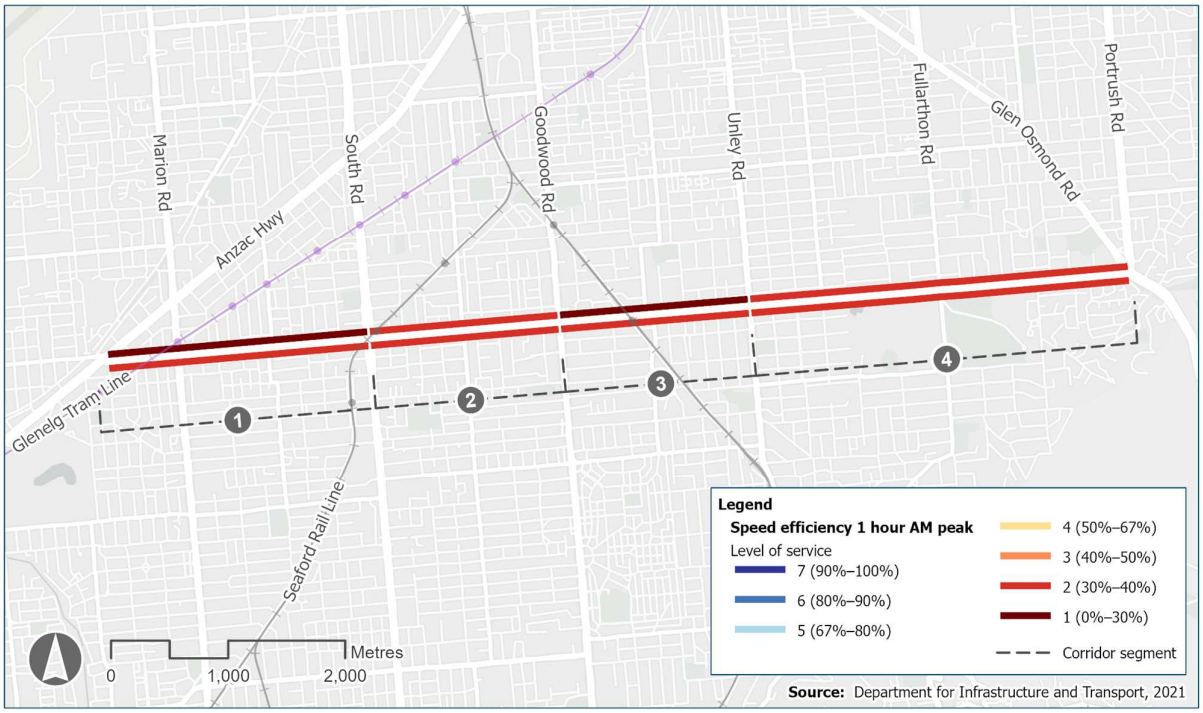


Figure 57: Average speed efficiency along corridor for 1-hour AM peak

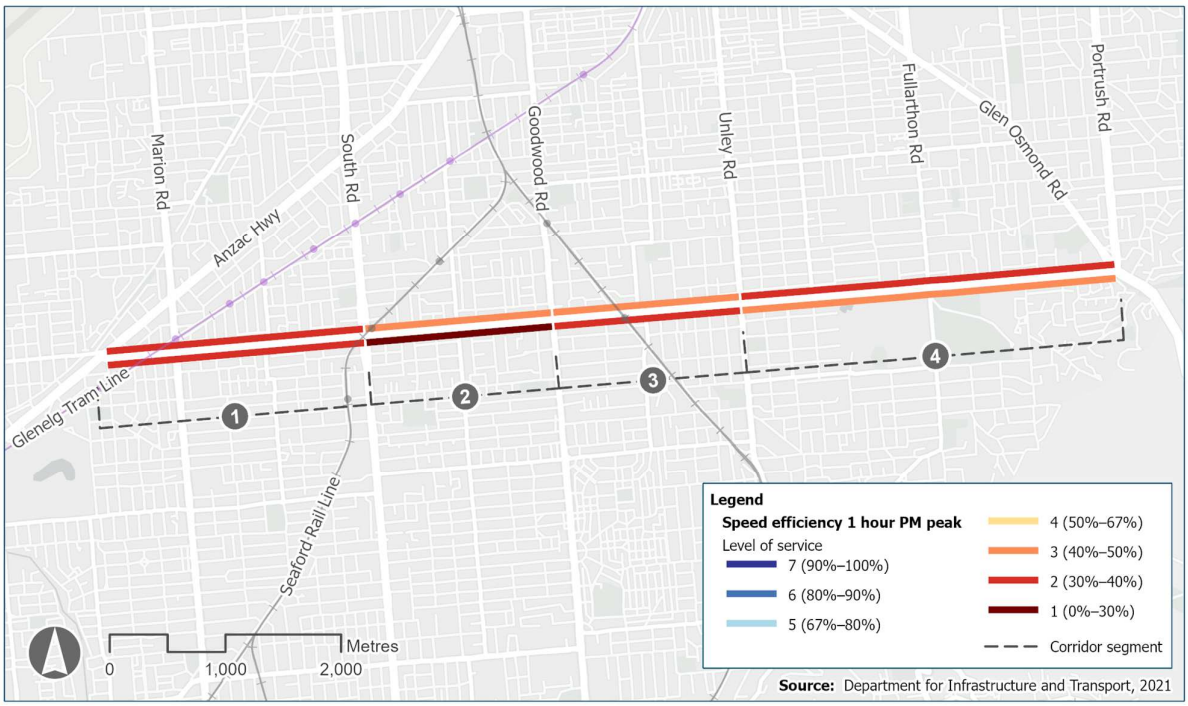


Figure 58: Average speed efficiency along corridor for 1-hour PM peak

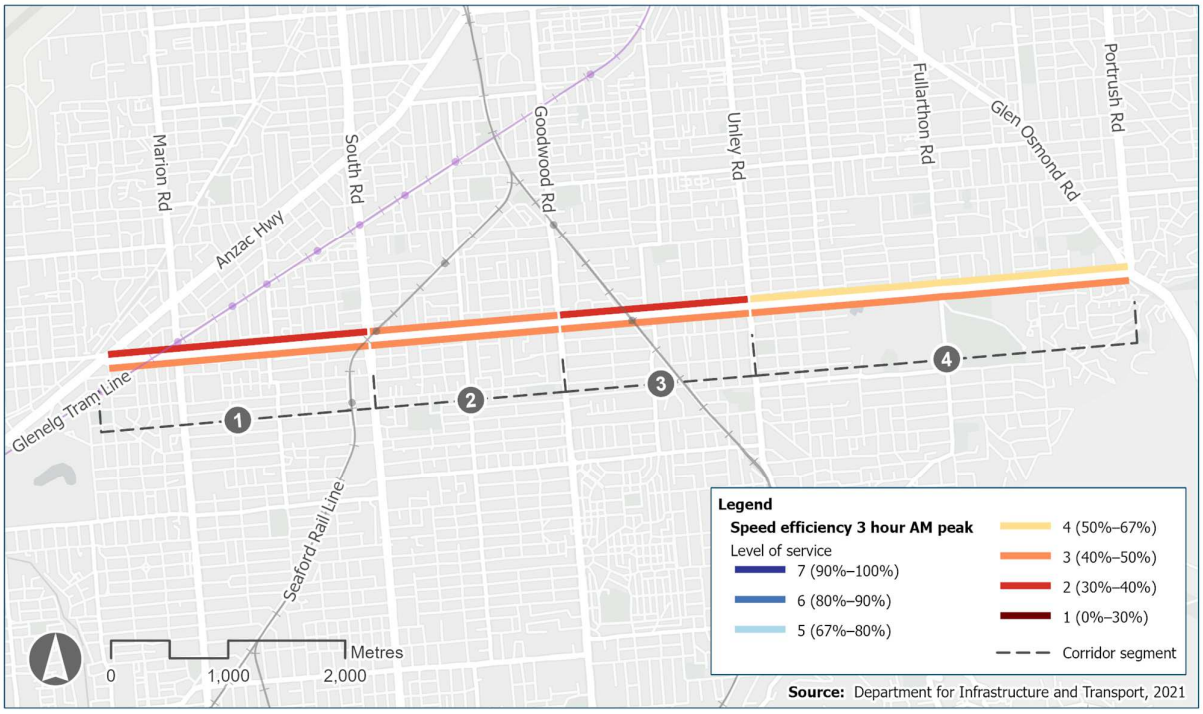


Figure 59: Average speed efficiency for 3-hour AM peak period

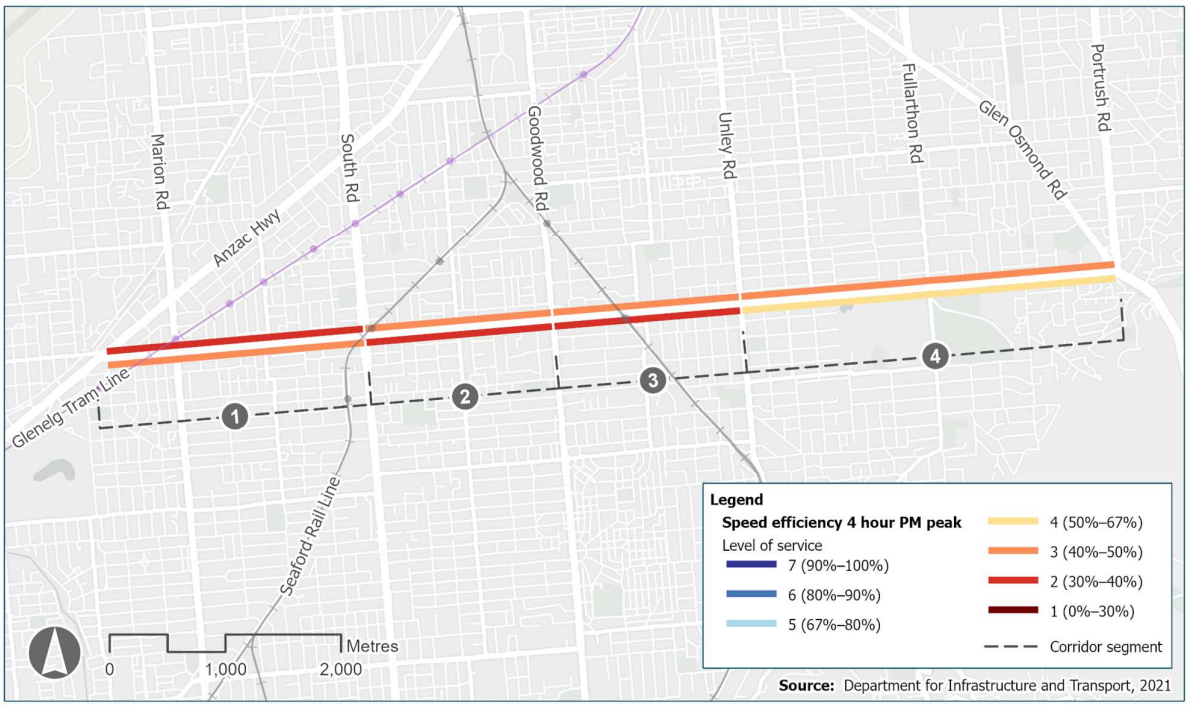


Figure 60: Average speed efficiency for 4-hour PM peak period

5.2.1.1 Summary: traffic performance based on speed efficiency

Table 21 shows a summary of the performance indicator scores for peak hour speed efficiency along the Cross Road corridor. Overall, the corridor has low scores in both directions during peak hours.

Table 21: Speed efficiency Performance Indicator scores

Segment		Eastbound		Westbound	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
1	Anzac Highway to South Road	1	2	2	2
2	South Road to Goodwood Road	2	3	2	1
3	Goodwood Road to Unley Road	1	3	2	2
4	Unley Road to South Eastern Freeway	2	2	2	3

Despite the significant difference in traffic levels along the corridor, where Segment 1 for example carries 13,500 vehicles a day and Segment 4 carries 25,200 vehicles, scores for speed efficiency are low along the entire length. The lower speed efficiency scores are most likely attributed to the number of traffic signals along the corridor. There are 11 signal-controlled intersections (two staggered), 4 pedestrian actuated crossings and 3 level crossings (the Glenelg Tram and Seaford and Belair rail lines) that give priority to rail and tram services along the corridor. Most signalised intersections along the corridor also give priority to the north-south movements during peak periods.

The slightly higher speed efficiency in Segment 4 could therefore be due to the lower concentration of signalised intersections (with up to 1.6km between signals) and/or no level crossings within this segment. This segment also has fewer signals, with only 2 traffic signals and 2 pedestrian actuated crossings.

5.2.2 Journey time reliability

Journey time reliability (JTR) measures the travel time consistency in different time periods, such as AM, PM, and inter-peak time periods. It determines the percentage of on-time expected arrival, for all modes along road corridors during AM, PM, and inter-peak durations over a certain time period. For the purpose of these corridor studies, the ***buffer index*** will be used as a measurement of JTR which is based upon guidance provided by the US Department of Transport[31] on assessment of travel time reliability.

The buffer index is expressed as a percentage and its value increases as reliability get worse. This percentage has then been converted into performance indicator score between 1 – 7.

Refer to **Appendix E2 – Journey Time Reliability** for further details on methodology for journey time reliability calculation including graphs comparing buffer index for peak hour and peak periods.

Figure 61 and **Figure 62** present the JTR performance indicator scores along the corridor for the AM and PM one-hour peak periods.

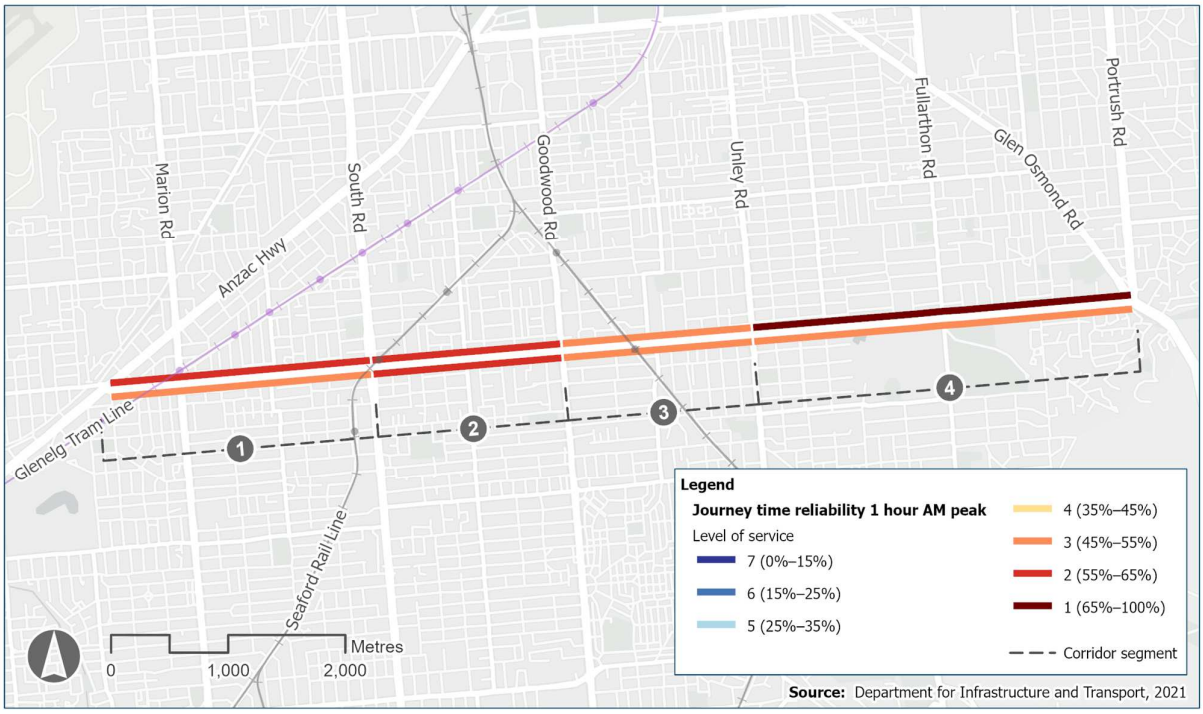


Figure 61: JTR along corridor for 1-hour AM peak

[31] https://ops.fhwa.dot.gov/publications/tt_reliability/ttr_report.htm. The buffer index is calculated as the difference between the 95th percentile travel time and average travel time, divided by the average travel time

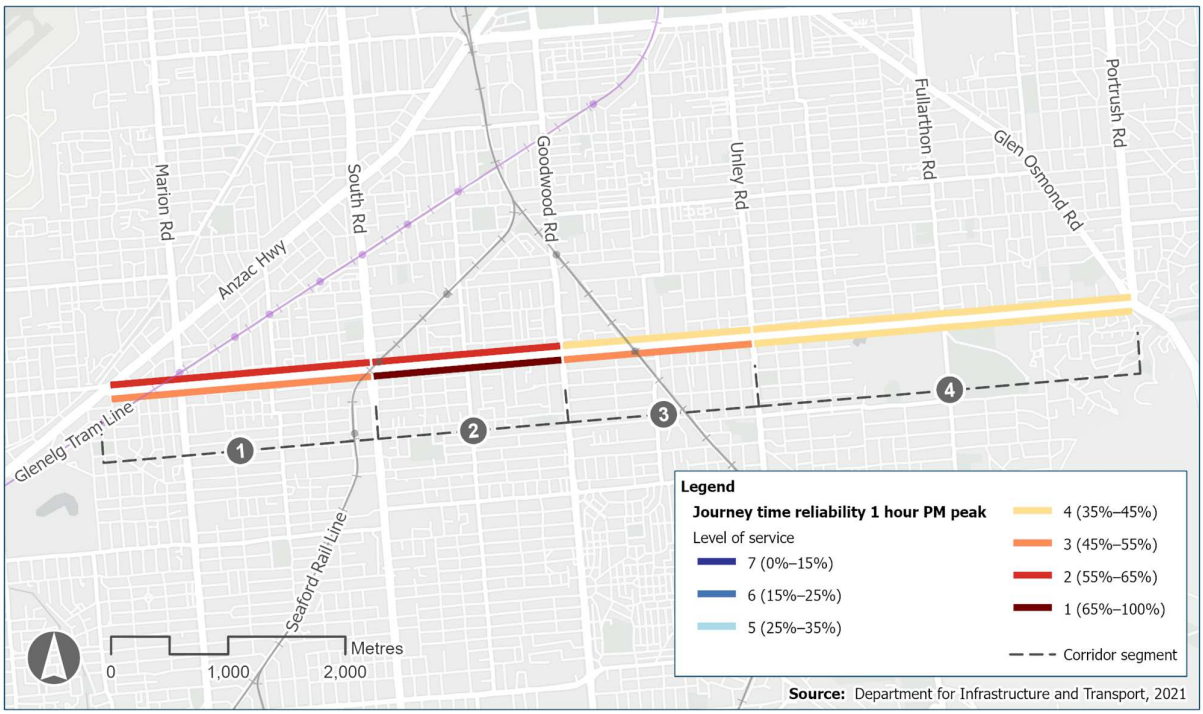


Figure 62: JTR along corridor for 1-hour PM peak

5.2.2.1 Summary: Journey time reliability

Table 22 shows a summary of the performance indicator scores for peak hour journey time reliability along the Cross Road corridor.

Table 22: Journey time reliability Performance Indicator scores

Segment		Eastbound		Westbound	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
1	Anzac Highway to South Road	2	2	3	3
2	South Road to Goodwood Road	2	2	2	1
3	Goodwood Road to Unley Road	3	4	3	3
4	Unley Road to South Eastern Freeway	1	4	3	4

Journey time reliability indicator scores along the corridor are generally low, with the scores indicating that the AM peak hour is more unreliable than the PM peak hour in both directions. These scores generally align with the speed efficiency scores presented above, with Segments 1 and 2 overall having the lowest scores for both traffic related indicators.

5.2.3 Bus schedule adherence

The aim of this indicator is to measure the bus schedule by considering the bus speed ratio. The average travel speeds of buses have been extracted from Swiftly, excluding bus dwell times and areas where no data is available (on account of there being no bus routes within the segment).

Figure 63, **Figure 64** and **Figure 65** present the bus speed efficiencies (as a percentage) for blocks along the corridor for the AM, interpeak and PM peak periods respectively.

Additional details of the scoring metrics for this performance indicator and a comparison of the peak period are detailed in **Appendix E3 – Bus Schedule Adherence**.

Figure 63: Average bus travel speed during the AM peak

Figure 64: Average bus travel speed during the interpeak

Figure 65: Average bus travel speed during the PM peak

5.2.3.1 Summary: bus schedule adherence

The bus speed efficiency 'blocks' have been aggregated and averaged for each of the corridor segments. **Table 23** shows a summary of the resulting performance indicator scores for bus speed efficiency per corridor segment.

Table 23: Bus speed efficiency Performance Indicator scores

Segment	Performance score		
	3-hour AM Peak	6-hour Interpeak	4-hour PM Peak
1 Anzac Highway to South Road	3	4	3
2 South Road to Goodwood Road	3	5	3
3 Goodwood Road to Unley Road	3	4	2
4 Unley Road to South Eastern Freeway	4	5	4

The data assessment indicates good speeds and hence good performance scores for the interpeak periods on most segments. The highest average speeds and scores in the peak periods are in Segment 4 (Unley Road to the South Eastern Freeway). The lowest speeds and scores are on Segment 3 (Goodwood Road to Unley Road) in the PM Peak period.

These scores in part correlate with the speed efficiency results presented in **Section 4.3.1**. Segment 4, for example, while carrying the largest number of vehicles of the four segments and with the largest number of bus routes using it, has the highest performance score for speed efficiency and the highest bus travel speed performance score. This may be due to the absence of any level crossings along this section of the corridor and/or fewer intersections. Likewise, the segment that scores the lowest for speed efficiency – Segment 3 – also has the lowest performance score for bus speed adherence. Note that Segment 3 only has one bus route that travels along it (between Arndale Centre Interchange to Glen Osmond).

5.2.4 Cycling facilities along the corridor

A performance indicator assessing the "cycling facilities along the corridor" has been based upon the following weighted assessment parameters:

- Connectivity (10% weighting)
- Facility type – mid-block (50% weighting)
- Facility type – intersection or crossing approach (20% weighting)
- Wayfinding (5% weighting)
- Buses (10% weighting)
- Freight (5% weighting).

Table 24 provides a summary of the resulting "cycling facilities along the corridor" performance indicator scores (i.e. the accumulated weighted score for each assessment parameter) per segment. See **Appendix E4 – Cycling Facilities along the corridor** for further details of the individual assessment criteria components and the score per performance indicator per segment. Note that a Performance Indicator Score of 7 equates to the highest level of performance possible.

Table 24: Combined cyclist facility performance indicator score

	Segment	Performance Score
1	Anzac Highway to South Road	2.1
2	South Road to Goodwood Road	4.8
3	Goodwood Road to Unley Road	3.1
4	Unley Road to South Eastern Freeway	1.7

The assessment shows that performance scores for cycling facilities are low along the corridor. The specific issues that have resulted in these overall scores include that:

- While Segment 1 from Anzac Highway to South Road scores well for freight criteria (due to the less freight activity in this segment), lower scores are given to the connectivity and facility type criteria (narrow bicycle lane and peak period only operation), and wayfinding criteria.
- Segment 2 from South Road to Goodwood Road scores relatively well in most categories, particularly for wayfinding and intersection or crossing approach.
- Segment 3 from Goodwood Road to Unley Road scores well for freight, connectivity and midblock facility types. However, scores for intersection or crossing facility type re low. No wayfinding on this segment results in a very low wayfinding score.
- Segment 4 from Unley Road to the South Eastern Freeway has the lowest score of all segments. This is for two key reasons – bus and freight flows are higher on the segment, and there is a section of over 2km where there are no bicycle facilities, including cycle lanes.

5.2.5 Pedestrian facilities along the corridor

A performance indicator assessing the "pedestrian facilities along the corridor" has been based upon the following weighted assessment parameters:

- Average footpath width from frontage to kerb, including buffer (60% weighting)
- Interruptions by wide crossovers (commercial or multiple tenancy blocks) (15% weighting)
- Interruptions by side streets, where there is no priority at grade path for pedestrians (25% weighting).

Further details of the individual assessment criteria components which make up this performance indicator, including the scoring basis for each component, are outlined in **Appendix E5 – Pedestrian facilities along the corridor.**

Table 25 provides a summary of the resulting "pedestrian facilities along the corridor" performance indicator scores (i.e. the accumulated weighted score for each assessment parameter) per segment.

Table 25: Pedestrian facilities along the corridor performance scores

	Segment	Performance Score
1	Anzac Highway to South Road	2
2	South Road to Goodwood Road	2
3	Goodwood Road to Unley Road	2
4	Unley Road to South Eastern Freeway	3

The average performance score for the corridor is 2.3.

Pedestrian facilities identified along the corridor are generally characterised by:

- Paved footpaths on both sides of the road and connections to side streets throughout
- Pram ramps provided throughout at crossing locations, with Tactile Ground Surface Indicators at approximately 50% of locations.

The low scores reflect that the Cross Road corridor strategic priority is to provide for movement, therefore the allocation of space in the corridor has been used to provide for road users, with a minimal allocation of space for pedestrian facilities. Higher quality and wider facilitates, (e.g., paving between street trees) have been

provided in areas of higher demand such as Cabra Dominican College, Cumberland Park Big W, and near pedestrian crossings. The surrounding side street network is grid based and provides for efficient parallel movement of pedestrians along the corridor and access to significant places.

5.2.6 Pedestrian ability to cross the corridor

Opportunities for pedestrians to cross the corridor include:

- Signalised crossings with traffic signals at the intersections of major roads
- Signalised pedestrian crossings
- Refuge islands.

Performance scoring of each section of the corridor was undertaken based on the presence of medians, crossing facilities and speed. The performance scores do not consider the presence of bus stops, places of interest or distances to nearest crossing points.

Refer to **Appendix E6 – Pedestrian ability to cross corridor** for further information regarding the scoring methodology and assessment.

The resulting performance indicator scores for each corridor segment are shown in **Table 26**.

Table 26: Performance Scores – Pedestrian Ability to Cross the Corridor

	Segment	Performance Score
1	Anzac Highway to South Road	4
2	South Road to Goodwood Road	4
3	Goodwood Road to Unley Road	4
4	Unley Road to South Eastern Freeway	3

The similar performance scores across the segments are reflective of the similar road widths, speed environment and degree of crossings provided in each section.

A total of 22 crossing locations were identified, of which 17 are signalised crossings and 5 are unsignalised refuge islands. The average walk distance between crossings is in the range of 315m-520m depending on the segment, the maximum distance between crossings is in the range of 720-820m.

Pedestrian crossings enable walking access from bus stops for both the outgoing and return journeys. Of the 25 bus stops that are located along the corridor, 17 have access to a pedestrian crossing closer than another stop, with 14 pedestrian crossings located within 100m of the bus stop. An assessment of the accessibility of bus stops to crossings has been undertaken, refer to **Appendix E6 – Pedestrian ability to cross corridor** for further information.

Important locations along the corridor such as education facilities, shopping centres and railways stations are provided with crossings. A higher importance has been recognised at locations such as schools that have been provided with signalised crossings. An exception is the Unley Park railway station, which is not provided with a signalised crossing. The nearest signalised crossing being the Victoria Avenue signalised intersection (approx. 100m east of the station). At the midblock locations of the very large allotments of Urrbrae Agricultural High School and University of Adelaide Waite Campus no crossings are provided, however access to these facilities is mostly off Cross Road anyway.

The ability to provide pedestrian crossings is constrained by:

- Suitability of providing a crossing point within the constrained corridor, including suitable locations for verge landings and provision of right turn slots
- Reduction in road performance where signalised pedestrian crossings are provided.

5.2.7 Summary of movement performance

The summary of movement performance for each mode and time period is presented in **Table 27**. It highlights the low performance indicator scores for a large proportion of the corridor for vehicle movement in both the AM and PM peak hour. Meanwhile, the score for the movement of pedestrians and cyclists is low for almost all of the corridor. These scores are, in part, due to the number of traffic signals, at-grade level crossings as well as the pedestrian actuated crossings along the corridor.

The indicator that has the highest score consistently for the length of corridor was related to the ability for pedestrians to cross the corridor. This is reflective of, in part, the number of opportunities to cross the corridor, most of which are linked to particular trip attractors such as education or leisure land uses.

Table 27: Summary of movement performance by segment

Performance Indicator				Segment			
				1	2	3	4
				Movement classification			
				M2	M2	M2	M2
Movement of traffic, public transport, and freight	AM peak hour	1a	EB: Vehicle speed ratio peaks	1	2	1	2
		2a	EB: Journey time reliability	2	2	3	1
		1b	WB: Vehicle speed ratio peaks	2	2	2	2
		2b	WB: Journey time reliability	3	2	3	3
	PM peak hour	1a	EB: Vehicle speed ratio peaks	2	3	3	2
		2a	EB: Journey time reliability	2	2	4	4
		1b	WB: Vehicle speed ratio peaks	2	1	2	3
		2b	WB: Journey time reliability	3	1	3	4
	AM	3	Bus schedule adherence	3	3	3	4
	PM			3	3	2	4
Movement of cyclists and pedestrians	4		Cycling facilities along the corridor	2	5	3	2
	5		Pedestrian facilities along the corridor	2	2	2	3
	6		Pedestrian ability to cross the corridor	4	4	4	3

5.3 Place, quality, and environmental performance indicator assessment

5.3.1 Tree canopy cover

The following performance indicators have been determined utilising a LIDAR GIS vegetation layer:

- Place tree canopy coverage – typical 4m footpath and verge width to measure proportion of vegetation shade for pedestrians along the corridor
- Urban realm tree canopy coverage – 50m buffer to measure proportion of tree canopy cover along the corridor[32].

Figure 66 provides an example of the tree canopy cover mapped along a segment of the corridor using LIDAR data. Refer to **Appendix F1 – Tree canopy** for maps for the other segments.

Figure 66: Tree Canopy Cover along Segment 1 – Anzac Highway to South Road

[32] Note, in some instances along Cross Road, the application of a 50m buffer excludes some areas within the road reserve. It is recommended that a wider area be measured in the future to determine further opportunities for planning off the Corridor on State Government owned land.

5.3.1.1 Tree canopy coverage

Place tree canopy cover is used to determine the relative amount of shade, which is beneficial to pedestrians (i.e. over footpaths and verges). Based on the TfNSW Road Network Plans, expressing tree canopy as a percentage of available footpath area is a relevant indicator for pedestrian shade and therefore improved Place.

The scoring of this performance indicator is detailed below in **Appendix F1 – Tree canopy**.

Table 28 shows the performance scores for the segments for tree canopy coverage over footpaths and verge widths.

Table 28: Performance scores - tree canopy coverage over footpaths

	Segment	Performance Score
1	Anzac Highway to South Road	3
2	South Road to Goodwood Road	7
3	Goodwood Road to Unley Road	7
4	Unley Road to South Eastern Freeway	7

The scores show high levels of tree canopy cover over footpaths for Segments 2, 3 and 4, while Segment 1 from Anzac Highway to South Road has the lowest cover.

5.3.1.2 Urban realm tree canopy coverage

Tree canopy coverage within the corridor has also been considered as a percentage with a 50m total buffer width (25m from the centreline). The scoring of this performance indicator is detailed in **Appendix F1 – Tree canopy**.

Table 29 shows the comparative scores for the tree canopy cover for the urban realm per segment of the corridor.

Table 29: Performance scores - tree canopy coverage over buffer widths

	Segment	Tree Canopy Cover Buffer Score
1	Anzac Highway to South Road	3
2	South Road to Goodwood Road	7
3	Goodwood Road to Unley Road	7
4	Unley Road to South Eastern Freeway	7

As with the assessment in **Section 4.4.1.1**, Segments 2, 3 and 4 have high levels of cover, while Segment 1 is comparatively low.

5.3.2 Bus stop conditions

The bus stop performance indicator has been broken down to consider three criteria which have been weighted as follows:

- Bus stop facilities (60% weighting)
- Ease of crossing at a bus stop (40% weighting).

The overall performance indicator score is calculated based on total weighted score rounded to closest integer. The segment score shown in **Table 30** is defined as the average score over all bus stops in the specific segment.

Table 30: Bus stop condition level of service per segment

	Segment	Average score
1	Anzac Highway to South Road	5
2	South Road to Goodwood Road	4
3	Goodwood Road to Unley Road	4
4	Unley Road to South Eastern Freeway	5

All segments score relatively well, with most stops having basic facilities. Almost all bus stops have poles, signs and tactile markers. Distances to crossing points were relatively short in a number of cases; however, there were some with distances to crossing points in excess of 300m. Overall bus stop condition and positioning along the corridor is to a good standard.

5.3.3 Urban realm quality

On-site assessment of public realm quality for the Cross Road corridor has been undertaken by urban design professionals, with considerations given to the following criteria:

- Urban scale
- Materiality and street furniture
- Cultural animation and public art
- Landscape, greening and WSUD
- Legibility and wayfinding
- Human comfort
- Safety and security.

Each criterion above was assessed for each segment of the corridor (between smaller side street sections, for each side of the corridor) on a 7-point scale. Additional details of the scoring metrics for each criterion are detailed in **Appendix F3 – Urban Realm**.

Table 31 summarises the performance indicators scores for each corridor segment (rounded to the nearest whole number), and also provides comparison of the scores for each side of the corridor.

Table 31: Public realm scores by segment

	Segment	Length (km)	Performance Score		
			Northern side	Southern side	TOTAL
1	Anzac Highway to South Road	2.3	1.8	2.2	2
2	South Road to Goodwood Road	1.6	2.9	2.9	3
3	Goodwood Road to Unley Road	1.7	2.7	2.7	3
4	Unley Road to South Eastern Freeway	3.2	2.8	2.6	3

The assessment indicates that Segment 1 has the lowest overall score, in part due to the substantially lower scores for materiality and street furniture, landscape, greening and Water Sensitive Urban Design (WSUD) and human comfort.

Table 32 provides an overview of the weighted average results for the entire Cross Road corridor and a high-level summary of the outcomes for each criterion.

Table 32: Urban realm assessment elements and summary of observations

Urban Realm Element	Aspects Considered	Weighted average score for the corridor	High level summary of observations
Urban Scale	• Scale of signage, lighting and public realm elements (human scale or scaled to car movement) • Places to congregate and socialise	2.1	In general, signage & lighting are not scaled for pedestrians. Combined footpath and verge widths are very narrow when compared to the carriageway width. There are virtually no places to congregate, socialise or rest, apart from bus stops. The public realm is not engaging for pedestrians; however, cycle lanes are provided in most segments of Cross Road.
Materiality and street furniture	• Ground surfaces and paving • Street furniture • Condition and design • Quality	2.7	Generally, consistent provision of standard interlocking paving throughout in various states of wear. Street furniture limited to bus stop shelters, benches and bins at selected locations, but not all bus stops. Quality of provided furniture varies between councils, e.g. some bins are in decorative enclosures whilst others are connected to rudimentary bin stands.
Cultural animation and public art	• Murals, artworks and sculptures • Cultural narratives	1.2	Generally, no cultural animation or public art present, apart from one minor sculpture at the Mike Turtur Bikeway.
Landscape, greening and WSUD	• Trees, shrubs and understorey planting • Maturity and condition/level of maintenance of landscape • Diversity of species • Presence of WSUD initiatives	3.7	Street trees are the only soft landscape element in all four segments. The quality of street trees varies from good quality in Segments 2 and 3, to low in Segment 1, and is related to existing soil conditions, streetscape design, maintenance practices, width of verges and existence of overhead powerlines.
Legibility and wayfinding	• Presence of directional signage for pedestrians • Amount of signage (too little or too much) • Understandable and legible	1.4	Generally, signage is limited to standard street signs. No dedicated signage for pedestrians except at the Mike Turtur Bikeway. Signs were predominantly old, hard to read, or non-existent for wayfinding, such as directional signs to train stations.
Human comfort	• Physical experience of the space • Sensory experiences: sounds, smells, noise • Exposure to radiant heat from surfaces • Shade and shelter, protection from the weather	3.6	Generally, footpaths used by pedestrians are of a similar width. Footpaths in all segments are very close to vehicular traffic and highly exposed to noise and air pollution. The key factor affecting human comfort is the proximity to vehicular traffic, quality of street trees, surface pavement, and availability of seating.
Safety and security	• Perception of safety within the space • CPTED principles • Sightlines within the space • Pedestrian separation from the road carriageway	3.0	Generally, narrow verge widths put pedestrians within close proximity to heavy vehicular traffic giving a perception of not being protected and safe. In Segments 2 & 3, the pedestrian zone is used for parking further intensifying this perception. Sightlines are good with few areas that are perceived as unsafe from a CPTED perspective.

The low overall scoring across the corridor indicates there is opportunity for improvement in urban realm quality. However, it is important to note that the current performance indicator scores for this indicator are reflective of the dominant vehicle movement function of the corridor.

5.3.4 Bicycle parking

The performance indicator scores for bicycle parking are based upon Austroads Bicycle Parking Facilities Guide, adapted for Place designation based upon land use and public transport stop types.

Further details of this performance indicator assessment and scoring are provided in **Appendix F4 – Bicycle parking**.

Table 33 shows the resulting performance scores for bicycle parking for each segment along the corridor. The 7-point performance scores are based on the percentage of bicycle parking parking relative to Place classifications for each individual corridor segment (Place classification and number of public transport facilities are unique to each segment), where a score of one (1) equates to 0%, and a score of seven (7) equates to 100% or more.

Table 33: Bicycle parking performance scores

	Segment	Performance Score
1	Anzac Highway to South Road	2
2	South Road to Goodwood Road	1
3	Goodwood Road to Unley Road	1
4	Unley Road to South Eastern Freeway	1

Segment 1 is the only segment where bicycle parking was observed directly on the corridor; two u-rails are located in-front of Glandore Supermarket (located along the north side of the corridor, west of Almond Grove), and one u-rail located in-front of Dinner King / Adelaide Food Services (located along the north side of the corridor, east of Almond Grove). Noting that there are also ten bus stops located along this corridor segment (refer Section 2.3.4), Segment 1 only achieves 9% of the target bicycle parking for the segment.

Neither of the train stations along the corridor provide bicycle parking, which also influences the low scores.

However, there are bicycle parking facilities at other trip attractors along the corridor, such as the Cumberland Park shopping centre, that are also not captured as part of this assessment as they are not directly on the corridor.

5.3.5 Pedestrian seating

Pedestrian seating along the corridor has been identified based on a desktop review. Pedestrian seating performance scores are calculated on a seat per kilometre basis and benchmarked against a target of 1 bench (2 individual seats) per 100m. This target is based upon work undertaken by Gehl Architects. Seating at bus stops has been excluded from the assessment. Refer **Appendix F5 – Pedestrian seating** for full pedestrian seating assessment and methodology.

Table 34 shows the resulting performance scores for pedestrian seating for each segment.

Table 34: Pedestrian seating performance scores

	Segment	Performance Score
1	Anzac Highway to South Road	1
2	South Road to Goodwood Road	1
3	Goodwood Road to Unley Road	2
4	Unley Road to South Eastern Freeway	1

The scores a result of the fact that Segments 1, 2 and 4 have no pedestrian seating along their length and that Segment 3 has only 2 seats.

5.3.6 Frontage activation

The frontage activation is one of the key indicators to assess the desire and encouragement to dwell along the corridor. The level of activation for Cross Road frontages has been assessed using a scale of five activation levels (i.e. active, pleasant, in-between, dull, inactive). Specific examples for activation levels have been provided in **Appendix F6 – Frontage activation**. Side streets have been excluded from this activation assessment.

The map in **Figure 67** shows the grain of analysis using the five activation levels ranging from A to E for each segment of the corridor.

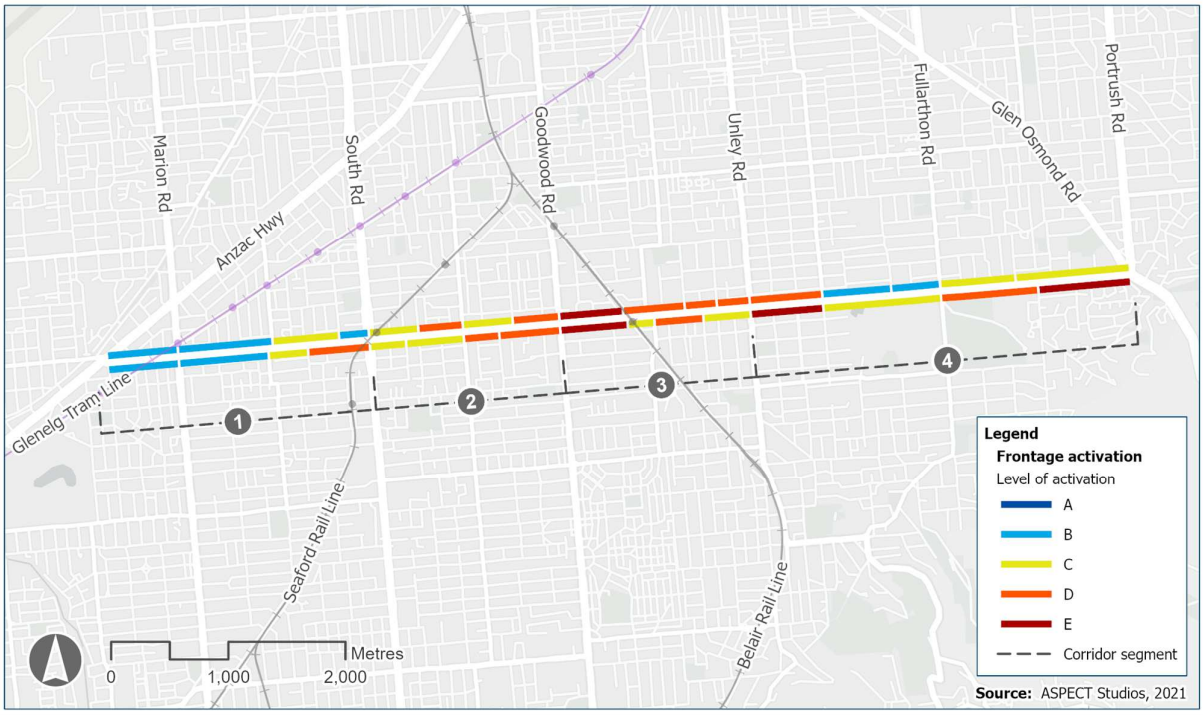


Figure 67: Level of frontage activation

Table 35 shows the resulting average performance scores for frontage activation along the corridor for each segment, after conversion to a 1-7 scale score.

Table 35: Frontage activation performance scores

	Segment	Performance Score
1	Anzac Highway to South Road	5
2	South Road to Goodwood Road	4
3	Goodwood Road to Unley Road	3
4	Unley Road to South Eastern Freeway	4

Table 36 provides a summary of the observations per segment. Overall, the western and eastern ends have higher scores in comparison to the middle sections of the corridor. Lower scores tend to be associated with high fences to character homes.

Table 36: Frontage activation observations

	Segment	Score	Summary of observations
1	Anzac Highway to South Road	Activation level of B & C Overall score of 5	Highest score of the corridor due to low to or open fencing on residential land uses. This reflects the less strategic nature of the segment of the corridor and the lower traffic levels.
2	South Road to Goodwood Road	Activation levels of C & D Overall score of 3.5	Lower levels of activation along this section of corridor, primarily due to the residential nature of this section of the corridor and high fences to character homes.
3	Goodwood Road to Unley Road	Activation levels of B, C, D & E Overall score of 2.5	Lower levels of activation along this section of corridor, primarily due to the residential nature of this section of the corridor and high fences to character homes.
4	Unley Road to South Eastern Freeway	Activation levels of B, C, D & E Overall score of 3.5	Mix of character homes with low or high fencing along northern side. Southern side performance reduced with the Waite Arboretum and University of Adelaide Campus having little activation to Cross Road.

5.3.7 Summary of Place performance

The summary of Place performance for corridor segments is presented in **Table 37**. The scores highlight the variability of Place performance along the corridor. Along most segments, the tree canopy cover score is high and bus stop condition and frontage activation is relatively high compared to other indicators. Meanwhile, scores for bicycle parking and pedestrian seating are low.

It should be noted that while the assessment has identified low scores for pedestrians and cyclists, the assessment criteria does not allow for identification of off corridor parking and seating opportunities such as those available at shopping centres along the corridor. The wider assessment identified that there is no bicycle parking at some other locations such as rail stations. The Place performance assessment indicated low scores for urban realm quality.

Table 37: Summary of Place performance by segment

Performance Indicator			Segment			
			1	2	3	4
			Place classification			
			P4	P5	P5	P4
Place quality and environment	7	Tree canopy cover	3	7	7	7
	8	Bus stop conditions	5	4	4	5
	9	Urban realm quality	2	3	3	3
	10	Bicycle parking	2	1	1	1
	11	Pedestrian seating	1	1	2	1
	12	Frontage activation	5	4	3	4

5.4 Summary of current performance

This section provides an overview of the current performance of the Movement and Place indicators for each segment.

5.4.1 Road network overview

As outlined in **Section 2**, the Cross Road corridor (between South Eastern Freeway and South Road) is designated a National Key Freight Route. It is surrounded by predominantly residential areas, and therefore also serves a local movement function in the network. Segment 4, which connects with the South Eastern Freeway (also a National Key Freight Route), carries the highest AADT (33,100), while at the western end of the corridor, Segment 1 has the lowest AADT (18,700).

The corridor is bisected by rail and tram lines, with boom gates at three locations along the corridor. These are in operation throughout the day, and as described earlier, can be down frequently during peak periods.

The road is predominantly clearways, with very little parking available on the road itself. There are also bicycle lanes along a significant proportion of the corridor.

5.4.2 Segment 1 Anzac Highway to South Road

Segment 1 has a low performance score on all Movement and Place indicators other than bus stop conditions and frontage activation. Speed efficiency is particularly low in this segment in the AM peak hour eastbound, with journey time reliability only marginally better. The existence of two rail line crossings in the Segment (Glenelg tram line and Seaford rail line) impact traffic movement along this segment of the corridor, with boom gates in operation several times in peak hours. With 15 trams (in both directions at a minimum) crossing the corridor between 8:00-9:00am, the boom gates at this location are down blocking traffic at least 9 times in that time period. Equally for the Seaford train line, boom gates are down several times during the peak. This segment of the corridor also has 4 traffic signals impacting on speed efficiency and journey time reliability.

5.4.3 Segment 2 South Road to Goodwood Road

South Road to Goodwood Road has low scores for all vehicle movement indicators, particularly journey time reliability in both directions in the peak hours. Speed efficiency in the PM peak westbound also scores very low. These scores are influenced by the rail line crossing at South Road, Emerson. There are 16 trains (in both directions at a minimum) that cross the corridor between 8:00-9:00am resulting in the boom down at least 10 times during that period.

Cycling facilities and pedestrian ability to cross the corridor along this segment score highly and are the best performing of the segments. Pedestrian facilities along the corridor however have scored very low.

Meanwhile, the Place performance of the segment is variable. Tree canopy cover is excellent and bus stop conditions are relatively good, however, bicycle parking and pedestrian seating have scored very low. There are no bicycle parking facilities directly along this Segment, including at the train station, which results in a very low score.

5.4.4 Segment 3 Goodwood Road to Unley Road

Performance indicator scores for Segment 3 are low for nearly all Movement and Place categories. Journey time reliability and speed efficiency scores very low in the westbound direction during the PM peak and low in both directions in the AM peak and eastbound in the PM. Like Segments 1 and 2, these scores are influenced by a rail line crossing that bisects the corridor at Unley Park. While the Belair line is less frequent than the Seaford line or the Glenelg tram, with only 6 trains an hour crossing the corridor, the boom gates impact the movement of traffic along the corridor.

Movement indicators for cyclists and pedestrians are also low, particularly pedestrian facilities, however this is reflective of the types of pedestrian movement along the corridor which is likely to be mostly to and from bus stops.

Place indicator scores are very similar to Segment 2, with excellent tree canopy cover but low or very low scores for most other indicators. As with Segment 2, there is no bicycle parking along the corridor, including at Unley Park station, which results in a very low score.

5.4.5 Segment 4 Unley Road to South Eastern Freeway

While this segment performs the best along the corridor for the vehicle Movement indicators, the results are still low, particularly for journey time reliability which is very low in the AM peak eastbound. Slightly better performance is seen in the PM peak in both directions, where journey time reliability scores higher (4). These results are achieved due to the absence of rail line crossings as is the case for other segments, fewer traffic signals and the major intersection with the South East Freeway at the end of the corridor.

Movement indicators for pedestrians and cyclists are all low in Segment 3. Of particular note is the lack of bicycle lanes in this segment of the corridor. Segment 4 scores similarly to the other segments for Place. Tree canopy cover is again excellent and bus stop conditions very good, however, urban realm quality, cycle parking and pedestrian seating score low or very low.

5.5 Review of current performance against corridor objectives

Table 38 maps the objectives against the performance indicator assessment to gain an understanding of how well the corridor is meeting the objectives.

Table 38: Review of current performance against corridor objectives

Corridor objectives		Performance	
Objective	**Target**	**Performance indicator assessment**	**Further data requirements**
Reduce the number and severity of road crashes on the corridor	Reduce FSI crashes	There is no performance indicator related to road safety, however, using the data available, the analysis has shown that the total number of crashes along the corridor was 13% less in 2019 compared to 2015, although it was not a consistent downward trend, with a significant spike between 2015 and 2016, before a steep reduction the following year. There were also no fatalities along the corridor and a 33% reduction in serious injuries over the 5 year time period assessed. This was from a very low base (it reduced from 3 to 2) and there was a significant spike in 2017 where 7 serious injuries were recorded. Given the clear National and State targets related to road safety, and as with the rest of the road network, the current trends will need to be monitored to identify if action is required.	A MVKT rate for metro roads would allow an understanding of how the crash rates along this corridor compare with other roads in Adelaide.

Corridor objectives		Performance	
Objective	**Target**	**Performance indicator assessment**	**Further data requirements**
Improve operation of the Outer Ring Route	Improved journey time reliability Improved access to key destinations	The current journey time reliability indicator is low along the corridor. Segments 1 and 2, which intersect with the South Road/future North South Corridor have particularly low scores and this impacts on the connectivity and reduces access in this location of Adelaide's Outer Ring Route. This issue may in part be a consequence of the at grade level crossing at South Road. Segment 4, which intersects with Portrush Road also has a particularly low score in the AM peak in a westbound direction which impacts on the connectivity and reduces connectivity in this location of Adelaide's Outer Ring Route. This issue may in part be a consequence of congestion at the Cross Road / South East Freeway / Glen Osmond Road / Portrush Road intersection.	Segment 1 and 2 - Once the reference design is finalised and the modelling results for the T2D are shared, this objective can be assessed further, at this stage, it is difficult to make any assessment of the connectivity. Segment 4 – Further location specific planning study investigations at the Cross Road / South East Freeway / Glen Osmond Road / Portrush Road intersection would assist to assess this objective further.
Improve efficiency of general vehicle traffic on the Outer Ring Route	Efficient and reliable movements at all times of day	Overall, the corridor scores low for the vehicle Movement indicators in the peak hour. It is concluded that this objective is currently not being met.	The assessment only considers peak hour and peak period. While this is generally the 'worst case' scenario, measuring inter-peak performance will provide a more complete assessment of the corridor's performance.
Facilitate access for freight to and from South Australia's southeast on the National Freight Route	Efficient and reliable movements at all times of day Improved access to key destinations	Low vehicle Movement performance indicator score along the corridor in the peak hour, reflects the inefficient and unreliable movement conditions for freight vehicles. This affects access to key destinations, increasing cost for users. The objective is currently not being met.	Freight movement patterns including when heavy vehicles are mostly using the corridor will enable a better understanding of the specific freight movement performance. Furthermore, to better understand access to key destinations, the assessment would benefit from a study of current and future freight movements across Adelaide.
Improve urban realm / amenity	Reduced noise Reduced emissions	There are no performance indicators related to these targets. Furthermore, without emissions calculations or noise monitoring, the proxy of vehicle numbers and speed efficiency have been used to identify whether this target is being met. With the large number of intersections and level crossings along this corridor, as well as low movement performance scores, the frequent breaking that would be required will negatively affect emissions and noise along the corridor.	To better understand progress towards this target, a monitoring program in addition to a better understanding of the current and future vehicle mix particularly targets related to electric vehicles etc would be beneficial

Corridor objectives		Performance	
Objective	**Target**	**Performance indicator assessment**	**Further data requirements**
Provide for direct pedestrian and cyclist desire lines along arterial roads with provision of safe crossing facilities	Safe, convenient and compliant footpaths Space specifically for cyclists Priority for cyclists Optimal cycling travel times	Some elements of this objective do not relate to the performance indicators used for this assessment and it is not possible to state whether the targets are being met. Movement indicators for pedestrian and cycle facilities are low along the corridor, and the lack of a cycle lane in Segment 4 and indented parking bays along some sections that reduce footpath width contributes to these scores. These indicators suggest that in some areas along the corridor the objectives are not being met.	Robust pedestrian and cycle data is required and a clearer understanding of desire lines along the corridor would enable a clearer picture on these targets.
Improve public transport safety, convenience and accessibility by improving access to stops and providing reliable transit times	Improved bus stop facilities and compliance with the Disability Standards for Accessible Public Transport (DSAPT) Bus schedule adherence Increased patronage	Bus speed ratio scores on the corridor are low, other than along Segment 4. As described elsewhere, journey time reliability also scores low, suggesting the reliable transit time objective is not being met.	Indicators do not allow statements to be made on patronage, safety, convenience or accessibility including the Disability Standards for Accessible Public Transport.

5.6 Current issues identification

The performance indicator assessment and supporting analysis highlights key issues related to the corridor's current performance listed below.

- Journey time reliability and speed efficiency during peak periods along most segments of the corridor is below low and is impacting all vehicles, including freight vehicles.
- A lack of bicycle parking and lanes (associated with Segment 4) is not conducive to cycling and pedestrian movement along a majority of the corridor.
- Tree canopy cover, bus stop conditions and frontage activation appear to be appropriate while most other Place indicators show that the corridor is less conducive to activities associated with Place and is more established as a movement corridor.

Given the strategic Movement function and the objectives of the corridor, and using the performance indicators, the key issues to be addressed primarily relate to traffic movement. Traffic movement is impacted by several factors that result in low scores, including the high number of traffic signals and rail line crossings along the corridor. On average, there are traffic signal approximately every 500m, though in practice, the signals with the most significant impact on Movement are concentrated in Segments 1-3 (Segment 4 has 2 traffic signals and 2 pedestrian actuated signals).

Furthermore, each segment intersects with major north-south routes including Marion, South, Goodwood, Unley and Fullarton Roads. These roads have priority during peak periods to cater for radial movements to and from the CBD. This prioritisation, in addition to capacity constraints at these intersections, also results in low Movement scores along the corridor.

The performance indicator assessment also highlights the current low scores for the corridor for pedestrians and cyclists. The low scores could be affecting people's decisions regarding mode choice, which therefore is reflected in for example, the low mode share for sustainable and active modes in the study area (based on journey to work data), however, a more detailed understanding of people's trip patterns and decisions influencing mode choice would be helpful to draw more robust conclusions.

6 Future Context

6.1 Population and demographics

6.1.1 Population

Population density (residents per hectare) in 2036 and the associated percentage change from the base 2016 data is provided within **Figure 68** and **Figure 69** respectively[33].

From 2016, forecast growth is approximately 6,800 people which represents a total study area population of 67,200 by 2036. This equates to a population density of 21 persons per hectare which is an increase of 2 persons per hectare from 2016.

Most forecast population growth is concentrated in Segment 1 to the west of South Road, which is primarily associated with high forecast population growth of approximately 4,700 people from 2016 to 2036 within the Plympton SA2. Residential infill opportunities near the study area within the Plympton SA2 include redevelopment of the Morphettville Racecourse and the City of West Torrens medium density residential area, which is situated to the north-west of the Glenelg Tram Line and adjacent to commercial zoning along Anzac Highway.

Forecast population growth in Segments 2, 3 and 4 is very low (0% - 5% in most cases). This reflects a lower comparative population growth in the Goodwood-Millswood SA2 of approximately 900 people and 1,100 people in the Unley-Parkside SA2.

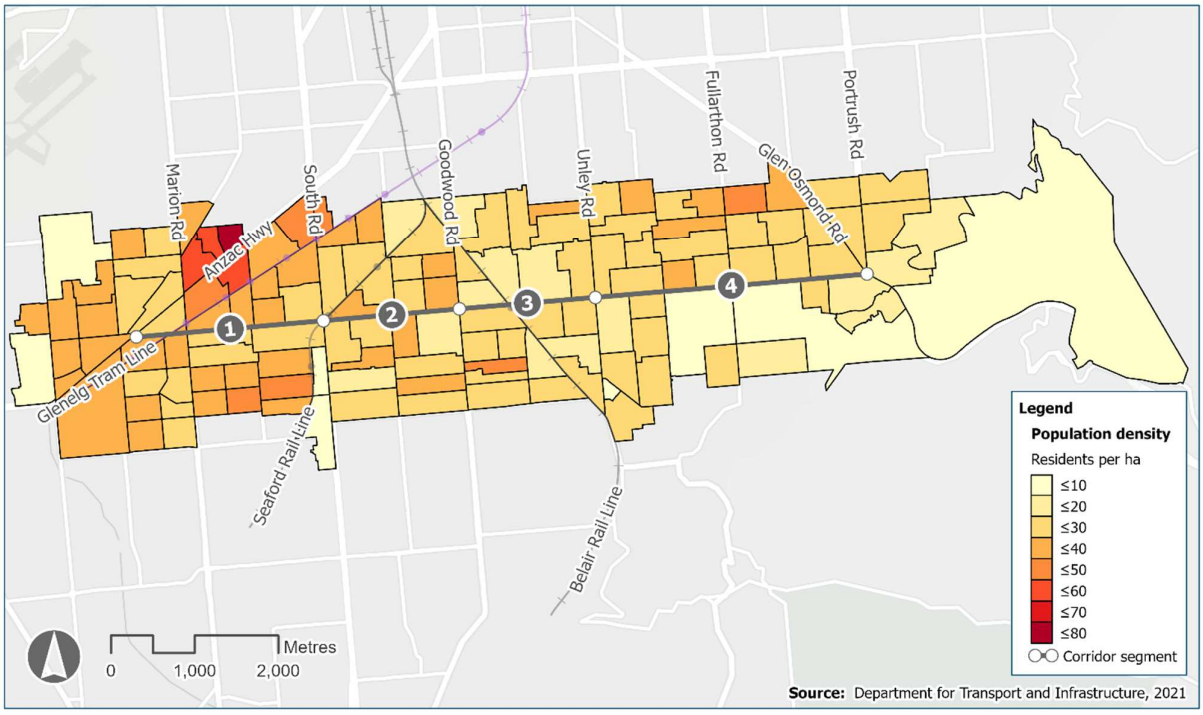


Figure 68: 2036 Population density

[33] May 2019 Population Projections for South Australia and Regions

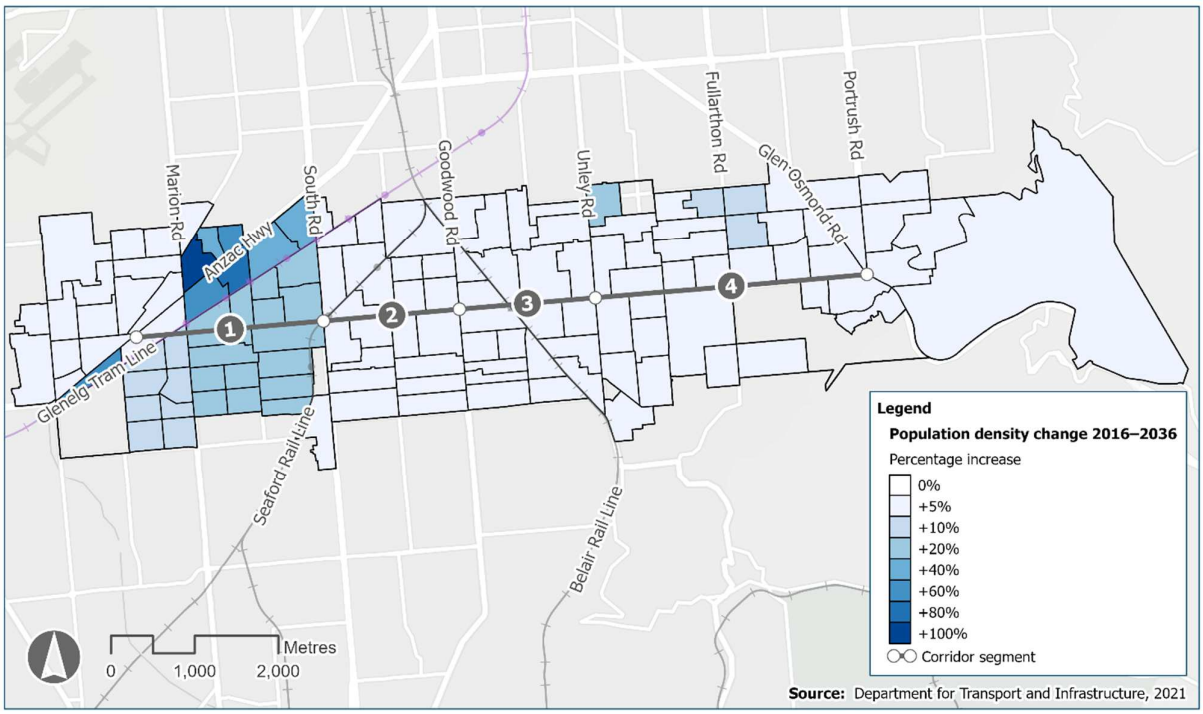


Figure 69: 2036 Population density change

6.1.2 Employment

Employment density (jobs per hectare) in 2036 and the associated percentage change from the base 2016 data are provided within **Figure 70** and **Figure 71**.

From 2016, jobs within the study area are forecast to grow by approximately 2,600 which results a total study area employment of 25,00 jobs by 2036.

Increase in employment density is spread throughout the study area, with the highest percentage increases expected off the corridor, near the Seaford Railway line and Glenelg tram line. Generally, growth is concentrated around the key intersections, which indicates some increase in commercial intensification in these locations.

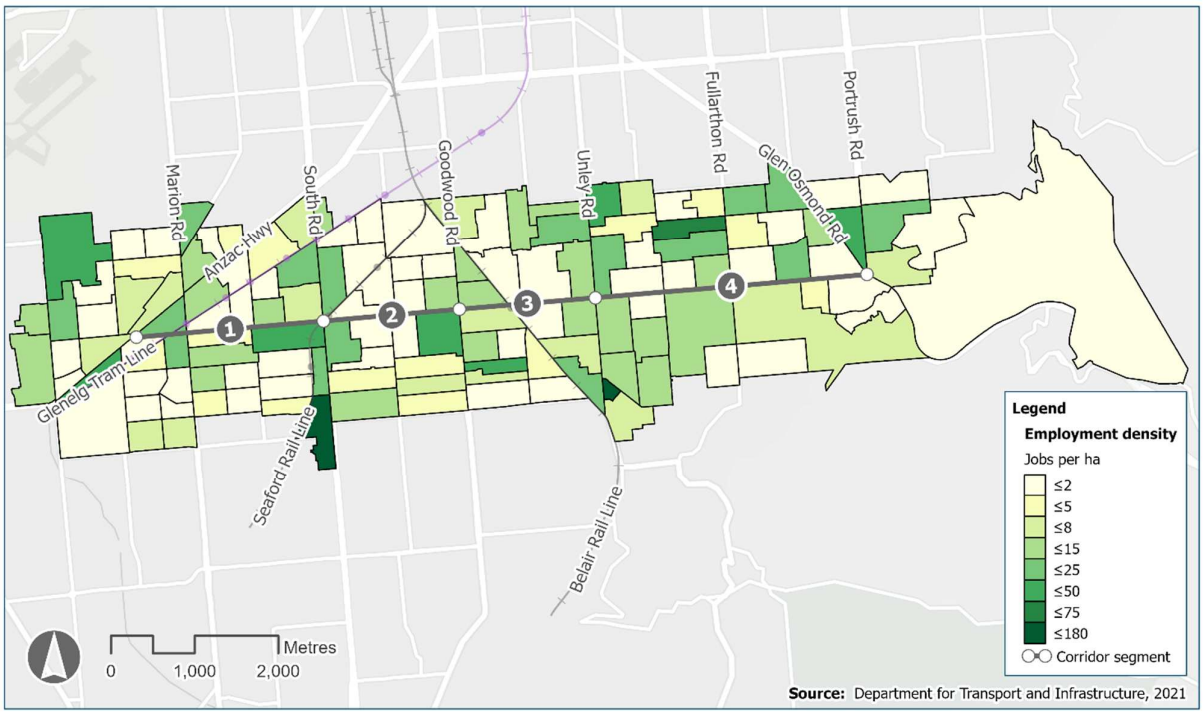


Figure 70: 2036 Employment density

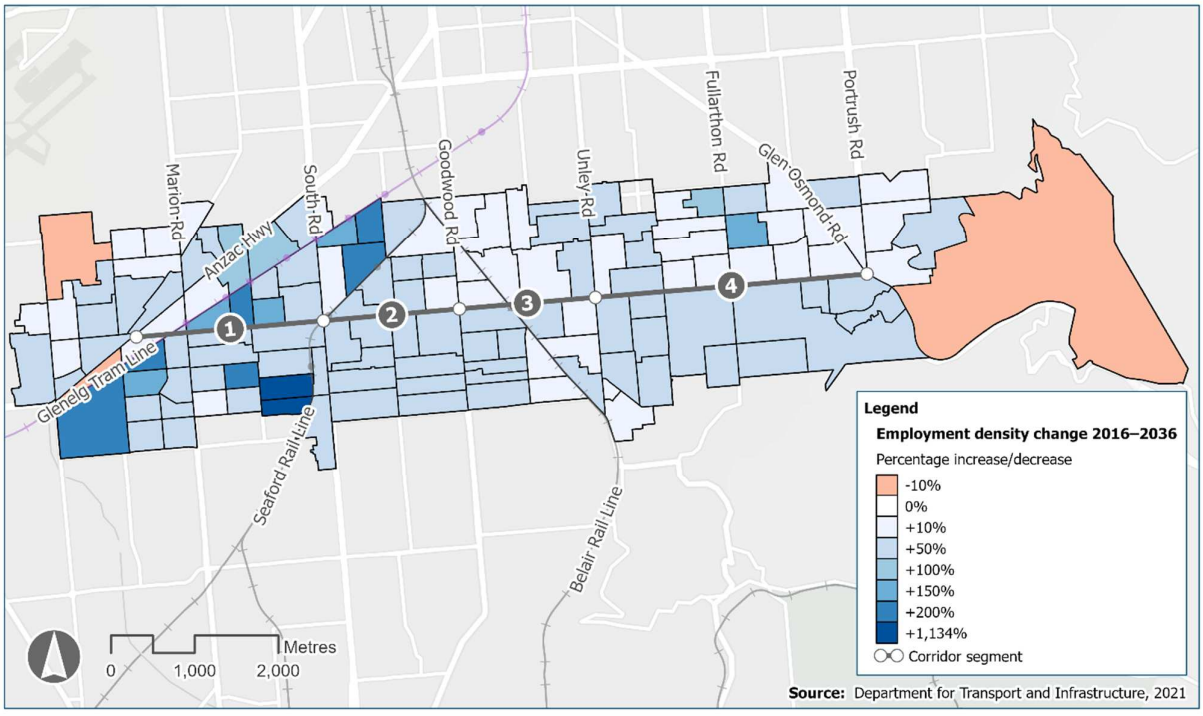


Figure 71: 2036 Employment density change

6.2 Future land use and zoning

The State has recently undergone major land use planning reform with the new Planning and Design Code coming into effect in late March 2021.

This resulted in the replacement of all individual Council Development Plans with a single State-wide Planning and Design Code (Code). The impacts of this change and the standardisation of land use policy has been considered as part of this review. Focus has been given to the potential for zone change along the corridor and the impact that this may have on corridor function holistically or at an individual segment scale. The following is noted:

- The Code in its current form will not result in substantial alteration to the desired land use forms and characteristics proposed along the corridor, being a 'like-for-like' manner (e.g. a residential zone will not be rezoned for commercial purposes under the Code).
- The dominant zoning characteristic along the corridor remains residential in nature, whilst the Code continues to support clustering of retail/commercial land uses at intersections.

There may be opportunities to review zoning policies along the corridor in the future to identify opportunities for urban development that could arise through land acquisition and changed road conditions.

While there are some 'live' development applications located along or in close proximity to the road corridor, it is unlikely those currently included here will influence the future of the corridor, however, other development applications that may come forward could constrain, have acquisition, or influence future corridor planning.

6.3 Future Movement

6.3.1 North-South Corridor project

The North–South Corridor initiative is included as a priority within the 20-Year State Infrastructure Strategy (2020) and Infrastructure Australia's Infrastructure Priority List 2021.

The North-South Corridor is identified in the following strategies as one of Adelaide's most important transport corridors – the South Australian Planning Strategy including the 30 Year Plan for Greater Adelaide, the Strategic Infrastructure Plan for SA and the Integrated Transport and Land Use Plan.

The Australian and South Australian governments have announced the delivery of the final and most complex section of the North-South Corridor – the 10.5km Torrens to Darlington (T2D) project. This is a significant transport infrastructure project for South Australia.

It is expected the final section of the North South corridor will be competed in 2030 and when it is, it will be the major transport spine for Adelaide's north–south traffic over a total distance of 78km.

The construction and completion of the project are expected to influence future travel patterns across the network. At the time of writing this report, the Reference Design for North-South Corridor T2D project was still being finalised.

6.3.2 Future movement projects

Other future movement related projects and policies will inform future movement along the corridor as per **Table 39**.

Table 39: Future Projects – Movement

Future Project	Description
	Infrastructure
Greater Adelaide Freight Bypass	Alternative and new road connections for freight to/from the South Eastern Freeway were investigated as part of the GlobeLink study [34]. The short-listed road options investigated in the study did not achieve a positive Benefit Cost Ratio or Net Present Value and are not currently being pursued further by the Government. However, current Department policy[35] is to undertake a Business Case for a Greater Adelaide freight bypass. The bypass is intended to enable trucks to be diverted from the South Eastern Freeway and Cross Road onto the North-South Freight Route, and via the Sturt Highway.

Regional North-South Freight Route Upgrade	The Department will be undertaking works to upgrade the established Regional North-South Freight Route between Sedan and Murray Bridge[36] to '*improve safety for road users, freight productivity, efficiency and network reliability.'*
	Key aspects of the project include:
	• Stage 1 – completed in early 2021 which involved 39 kilometres of shoulder sealing works between Sturt Highway and Murray Bridge to improve safety along the route
	• Stage 2:
	  ○ Works to widen and strengthen three road bridges along the route at Reedy Creek Bridge (Mannum Road, north of Murray Bridge), Marne River Bridge and Saunders Creek Bridge, (both on Ridley Road, south of Sedan).
	  ○ These bridge upgrades will increase the width of the bridges, giving oversize vehicles a viable alternative to using the South Eastern Freeway and improving freight productivity in regional South Australia.
	  ○ Barrier upgrades and shoulder resealing works at three further locations along Ridley Road, at Pine Hut Creek, Boundary Creek and Milendella Creek.
	• The project is scheduled for completion early 2022

Fullarton Road / Cross Road Intersection Upgrade	The Australian and South Australian Governments are jointly funding (50:50) the $61 million upgrade of the Cross Road and Fullarton Road intersection to *'improve travel times and safety for all road users, improve network reliability and support economic activity'*. The upgrade is an at-grade widening of Fullarton Road and Cross Road to provide for increased intersection capacity. This will influence function of the corridor by providing for increased east-west capacity in this isolated location. Additional turn lane capacity and the removal of existing conflicts with through movements may also result a reduction of local street movements (users currently avoiding an existing congested intersection). New cycle lanes are to be provided on the Cross Road approaches to the intersection. In accordance with the Department website[37] early works are anticipated to commence by mid-2021. Major construction works are scheduled to commence in late 2021, with project completion expected in late 2022, weather permitting.
	Policy
Bus stops	Under Schedule 1 of the Disability Standards for Accessible Public Transport 2002 (DSAPT) all public transport infrastructure is required to be fully compliant with the DSAPT standards by 31 December 2022, this includes bus stops. The DSAPT is made under section 31.1 of the DDA and is federal legislation.
Future Travel Patterns	Recent years have seen major technological developments, including the rapid uptake of mobile technology, which has for example, seen the widespread use of on-demand ride-sharing platforms such as Uber and Ola. Technology will continue to advance rapidly, and across the world significant investment is being made in, for example, the development of autonomous vehicles and new mobility services such as e-scooters. These developments will affect not only how vehicles operate and how they are accessed but could also change how the corridor is used in the future. The Department is currently developing a Future Mobility Strategy that may need to be reflected in this Corridor Plan later.

[34] https://dpti.sa.gov.au/infrastructure/completed_projects/globelink
[35] https://dpti.sa.gov.au/infrastructure/State_Budget_2021-22/greater_adelaide_freight_bypass
[36] https://dit.sa.gov.au/infrastructure/road_projects/northsouthfreight
[37] https://www.dpti.sa.gov.au/infrastructure/road_projects/fullarton_road

Future Project	Description
	Likewise, the way people access the goods and services has changed over time and will continue to do so. Increasingly people are receiving goods through a combination of click and collect, home deliveries and deliveries to workplaces. This is likely to result in growth in deliveries made by light goods vehicles across the city. Combined with this, people's expectations are changing, with demand for deliveries to be made within increasingly tight timescales. This presents a challenge for delivery services and can require running more vehicles in order to meet demand. Long terms changes in network travel patterns, traffic demand and public transport demand will also be influenced by recent conditions arising from COVID-19 including increase in working from home. These developments will need to be monitored at a network wide level over time to understand how the corridor is used in the future.

6.3.3 Future network influences

Future network policy for Cross Road requires holistic consideration of Adelaide's Outer Ring Route and other key corridors such as Glen Osmond Road. The need for this is particularly important considering the completion of the North-South corridor, which is expected to change travel patterns across Greater Adelaide.

6.3.3.1 Traffic volumes

Cross Road will continue to cater for local and regional traffic movements in line with its role as part of Adelaide's Outer Ring Route and National Freight Route Network.

Future forecast traffic data, extracted from MASTEM 3.1 (Land Use Scenario G), indicates in an unconstrained scenario there is reasonably high traffic growth on Cross Road to 2036. However, as the corridor is already operating near capacity, and aside from Fullarton Road there are no funded upgrades, actual growth in vehicle numbers is dependent on broader network and policy considerations.

SIDRA modelling was undertaken to assess the impact of future volumes along Cross Road and to provide a link between this corridor study and the concurrent IPP Intersection Planning Studies scope of works. Network models were established in SIDRA 9 in accordance with the Cross Road Corridor Traffic Modelling report provided within **Appendix H**.

Recommended next steps for the modelling is to inform potential future investment strategies and associated performance along the corridor. Given the complexity and number of dependencies related to future demand, it is recommended that further modelling be undertaken in conjunction with the North-South Corridor project models to provide a more robust assessment.

6.3.3.2 Heavy vehicles

The completion of the Torrens to Darlington section of the North South Corridor (NSC) will finalise delivering a non-stop north-south conduit along the western side of Adelaide's Metropolitan area.

The section of the NSC from Cross Road through to Grand Junction Road forms part of the Metropolitan Outer Ring Route (ORR). The remaining sections of road that complete the ORR include Portrush Road, Cross Road, Hampstead Road, Lower Portrush Road and Grand Junction Road. As well as a bypass of the CBD and inner urban areas, the ORR operates as the key route connecting the South Eastern Freeway, the Port of Adelaide, the Adelaide Airport and the intermodal terminals in northern Adelaide. The ORR currently identifies as a Major Traffic Route and Freight Route in 'A Functional Hierarchy for South Australia's Land Transport Network' and forms part of the National Key Freight Routes network. Additionally, an Infrastructure Australia report released in February 2021 identifies the ORR operation and performance as a 'high priority initiative'.

The movement of freight on the State's network has played, and will continue to play, an important function within the Metropolitan area. As online shopping increases, new and changing commercial and retail facilities emerge and consumer demand grows with population increases, the freight task will continue to support our State in trying to meet these demands.

It is anticipated that, as the State's economy continues to grow, so too will the freight task within South Australia. In addition to the growth in the economy, the State's freight task and the number of freight vehicles on our roads is influenced by the amount of goods that different freight vehicles can carry, technology advances and where freight need to get to and from on the network. Freight will always be present on our State roads, with general access vehicles (semi-trailer vehicles) being permitted anywhere, including on Council Roads. The Department are working to develop strategies to support the changing and increasing freight task.

In parallel with development of the Torrens to Darlington section of NSC, the Department is also working on strategies aimed at encouraging freight travelling longer distances that do not have a need to enter the Metropolitan area, to use alternate routes. One of these initiatives is the Regional North-South Freight Route Upgrade project being delivered by the Department. This involves a variety of network upgrades on the North-South Freight Route which runs between Murray Bridge and Sando, where the route connects into the Sturt Highway. These upgrades will improve safety and freight productivity by providing freight, including oversize vehicles, an alternate route to bypass the Metropolitan area. Additionally, the Department is undertaking works to develop a strategy, and Business Case to lobby funding, for a Greater Adelaide Freight Bypass. This bypass is intended to enable freight to be diverted from the South Eastern Freeway onto the aforementioned North-South Freight Route via the Sturt Highway.

Currently, freight movements to/from the freeway are distributed between Portrush Road, Glen Osmond Road and Cross Road. It is noted that most of these freight movements are likely to occur outside of peak traffic periods, such as overnight or during business hours, as travelling through peak traffic conditions is undesirable to the freight industry due to adding cost, with less reliable travel times during these peak traffic periods, to their often tight schedules. Analysis of vehicle movements indicates that the overall freight task for the State is anticipated to increase across the network in response to increases in economic growth and population. Evaluation of freight movements between the South Eastern Freeway and the ORR, which includes part of the NSC, following completion of the NSC indicates that the opening of the NSC will not result in Cross Road acting as a vacuum for freight from the South Eastern Freeway. Travel patterns of freight vehicles (and general traffic) is also influenced by where they need to move to and from; noting freight travelling longer distances, not having a need to enter the Metropolitan area, will be encouraged to divert around and not enter the Metropolitan area. Hence, the distribution of origins and destinations for freight within the Metropolitan area, together with the influence of logistics schedules and travel time reliability driving freight movements on the network, will maintain the need for freight to distribute via the ORR holistically and cannot rely on Cross Road providing the primary conduit between the South Eastern Freeway and the NSC.

6.3.3.3

6.3.3.3 OSOM vehicles

Cross Road will remain a preferred route for OSOM vehicles, including for larger OSOM vehicle combinations operating under a NHVR permit given there are no other viable east-west network alternatives in southern Adelaide. Larger envelopes are likely to be required in the future and this should be factored into future planning and design. Any significant changes to vegetation from existing along the corridor has the potential to inhibit heavy vehicle access, particularly for over-height combinations.

6.3.4 Future movement classification

Cross Road will continue to form part of Adelaide's Outer Ring Route and the National Key Freight Route Network. Therefore, the future movement classification for Cross Road is not anticipated to change from its current classification as M2.

Future network travel patterns and associated demand on Cross Road will be influenced by:

- Future role and function of Adelaide's Outer Ring Route;
- Future policy within the study area associated with mode shift opportunities, particularly along the intersecting north-south routes;
- Ultimate North South Corridor T2D design;

- Potential freight bypass routes via the Sturt Highway that are being explored by the Department; and
- The State's economic growth and associated freight task, changes in technology and land use.

6.4 Future Place

6.4.1 Future Place projects

Funded or place planned projects are shown in the **Table 40**.

Table 40: Future Projects – Place

Future project	Description
Infrastructure	
Land Use Development Morphettville Racecourse	Morphettville racecourse (northern portion) assumed to commence after 2026. The Morphettville Racecourse Development Plan Amendment was approved by the Minister for Planning in May 2020. The policy change enables a medium to high density housing and mixed use precinct to be developed on parts of the racecourse along with land fronting Anzac Highway.[39]
Policy	
Flora	The urban heat island effect is an increasing threat to Adelaide's liveability and the communities' resilience to climate change. The major contributor to the urban heat effect is an increase in impermeable surfaces which absorb and reflect the sun's heat, increasing surface and ambient air temperatures. This is exacerbated by declining canopy cover. Increasing tree canopy cover is a critically important strategy to reduce the urban heat island effect. One of the key objectives in the Government's Climate Change Action Plan is to accelerate urban greening to reduce urban heat, create habitat for wildlife, and improve liveability and amenity. Also the Government's 30 Year Plan for Greater Adelaide commits to increasing urban green cover by 20% in metropolitan Adelaide by 2045. It is recognised that councils currently have varying amounts of tree canopy cover. Therefore, the following applies: • For council areas with less than 30% tree canopy cover currently, cover should be increased by 20% by 2045. • For council areas with more than 30% tree canopy cover currently, this should be maintained to ensure no net loss by 2045. In response to the above, there are opportunities at future planning stages for initiatives along the corridor to identify and pursue feasible opportunities to expand Green Infrastructure (including water sensitive urban design) on public land, focusing on priority areas identified by Green Adelaide, corridors which provide for active travel, and new infrastructure projects. The assessment of current tree canopy cover across the corridor study area corridor study area will support Local and State Government's with identifying opportunities.

6.4.2 Place summary

No changes to existing place classifications of P4/P5 are expected in the future, though there may be local opportunities to enhance the place function at specific sites.

[39] https://www.sa.gov.au/topics/planning-and-property/development-plans/amendments-to-development-plans-proposed-by-the-minister/approved-2020/Morphettville-Racecourse-amendment

6.5 Future issues and opportunities identification

Cross Road will continue to carry an important function for the State and there is no significant population and employment growth forecast within the study area. Travel patterns into the future will be influenced by general changes in the economy as well as broader population growth and the way the Outer Ring Route will need to support movement of the associated people and goods. Furthermore, the major planned network investment for the North-South Corridor (Torrens to Darlington) in its nominated stages will influence travel patterns across the network, including the degree to which travel patterns along Cross Road will change.

Other possible future investment across the network, including level crossing removals, Portrush Road improvements or development of alternative freight access via Adelaide Hills Freight bypass, will also have a material impact on the traffic volumes experienced on Cross Road.

The *Cross Road Corridor Study* was produced without a corresponding Plan being prepared for Glen Osmond Road. Any strategic decision on the function of Glen Osmond Road could have a significant impact on the Cross Road corridor.

While no changes are expected to existing place classification (P4-P5), there are opportunities for improvements to amenity, green infrastructure and how people interact with the urban realm in specific locations along the corridor. These environmental and social outcomes have the potential to be enhanced in the future through specific, local initiatives.

7 Problem Identification

In consideration of the current issues identification (**Section 5.6**) and the future issues identification (**Section 6.5**), problem statements were defined for the Cross Road corridor. Specific key problems identified for the corridor are tabulated under each problem statement by mode and locality.

Problem Statement 1: Accessibility – The corridor has various impediments that reduce accessibility for corridor users

A fundamental need for any city is access for its citizens and businesses to various public and private transport options suited to their need for movement. The *Integrated Transport and Land Use Plan* identifies this as connecting "people to places and businesses to markets." This corridor study has identified constraints and barriers to achieving the desired access level for all corridor users. Improved accessibility for freight vehicles is required, along with improved accessibility to public transport via buses and passenger rail services. The corridor also has undesirable impediments to cycling and walking movements.

Table 41 identifies key accessibility problems along the corridor.

Table 41: Key Accessibility Problems

Mode	Location	Key Problem
Vehicles & Freight	Corridor	• Combination of pedestrian actuated crossings, closely spaced intersections with competing north-south demands, along with level crossings where boom gates are down between 20 to 50% of the time in the peak hours limit accessibility for vehicles and freight along the corridor
Vehicles & Freight	South Eastern Freeway intersection	• Congestion issues at this major intersection limits accessibility for freight along the corridor
Vehicles, Freight & Public Transport	Unley Road / Belair Road and Goodwood Road intersections	• Congestion issues at the intersection, exacerbated by competing north-south demands for access to the Adelaide CBD, limits accessibility for vehicles and freight along the corridor • Congestion issues at these key intersections limit ability for north-south bus services to access the Adelaide CBD
Active Travel (cycling)	Corridor	• Cycling infrastructure along the corridor is not continuous with no cycle lanes provides in Segment 1 and only part time cycle lanes (peak hour operation) provided in part of Segment 4
Active Travel (cycling)	Rail Stations	• No end of trip facilities located at rail stations which limits accessibility for active travel
Active Travel (cycling)	Unley Park Rail Station	• Access from north catchment limited as no formal pedestrian actuated crossing provided
Active Travel (cycling and walking)	Mike Turtur Bikeway Marino Rocks Shared Path	• Delineation and wayfinding issues connecting from the corridor to these off-road shared paths

Note: Fullarton Road excluded from above noting funded intersection upgrade under construction

Problem Statement 2: Safety – The corridor exposes its users to an environment where personal safety may be compromised

Once a corridor user has made a mode choice to meet their movement needs, there is a duty of care for the corridor asset owners and operators to provide the appropriate standard of safety for those users. The user must also use the corridor in a legally and safe manner, respectful of others corridor users needs. The *Road Safety Strategy* takes a Safe Systems approach to considering the way to improve road safety for all users. This corridor study has identified aspects of the corridor that could benefit from enhanced safety when consideration is given to this safe systems approach.

Table 42 identifies key safety problems along the corridor.

Table 42: Key Safety Problems

Mode	Location	Key Problem
All modes	Key signalised intersections: • South Eastern Freeway • Unley Road • Goodwood Road • South Road (inc. Emerson Level Crossing) • Marion Road • Anzac Highway Other minor intersections: • Waite Road • Hilda Terrace / Victoria Avenue (inc. Unley Park Level Crossing and Marino Rocks Greenway) • East Avenue / Winston Avenue • Winfried Avenue / Chitral Terrace	• High crash clustering (relative to corridor)
Active Travel (pedestrians and cyclists) Motorcyclists	Key signalised intersections • Unley Road • Goodwood Road • South Road (inc. Emerson Level Crossing and Marino Rocks Greenway) • Marion Road Other minor intersections: • Hilda Terrace / Victoria Avenue (inc. Unley Park Level Crossing) • East Avenue / Winston Avenue	• High crash clustering for vulnerable road users (relative to corridor)
Heavy vehicles	Key signalised intersections • South Eastern Freeway • Unley Road • Goodwood Road • South Road (inc. Emerson Level Crossing and Marino Rocks Greenway)	• High crash clustering for heavy vehicles (relative to corridor)
Active Travel (pedestrians)	Corridor	• Less than desirable crossing conditions for vulnerable users, noting the existing desire lines, surrounding land uses and existing (and in some instances non-compliant) transport infrastructure within the corridor's vicinity
All modes	Corridor	• High number of intersections for access to / from local roads along corridor which contribute to safety issues mid-block (conflict points)

Note: Fullarton Road excluded from above noting funded intersection upgrade under construction

Problem Statement 3: <u>Efficiency</u> – The corridor does not meet user's operational efficiency expectations

As users continue to access the corridor via a safe mode choice there is a level of expectation of the efficiency of that movement. This corridor study has identified aspects of the corridor that do not meet the current user's operational efficiency. Several issues identified are expected to worsen over the 15-year period of the study. It is locations such as these where adherence to network strategy is important in allocation of priorities based on strategic priorities. *A Functional Hierarchy for South Australia's Land Transport Network* provides a basis for such priorities.

Table 43 identifies key efficiency problems along the corridor.

Table 43: Key Efficiency Problems

Mode	Location	Key Problem
Vehicles and Freight	Corridor	• Journey time reliability and speed efficiency during peak periods along most segments of the corridor is below low and is impacting all vehicles, including freight vehicles
Vehicles and Freight	Key signalised intersections: • South Eastern Freeway • Unley Road • Goodwood Road • South Road (inc. Emerson Level Crossing) • Marion Road Other minor intersections: • Duthy Street / Harrow Terrace • Hilda Terrace / Victoria Avenue (inc. Unley Park Level Crossing) • East Avenue / Winston Avenue	• SIDRA modelling identified these as sites of potential future congestion

Note: Fullarton Road excluded from above noting funded intersection upgrade under construction

Problem Statement 4: <u>Social Impact</u> – The corridor provides an environment that is inconsistent with all the social needs of adjacent communities

Transport infrastructure can provide positive social benefits in the form of greater connectivity of communities and access to employment and education opportunities. When designed in absence of consideration for the community that live and work adjacent transport infrastructure, there can be unintended significant negative impacts to those communities. This corridor study identified aspects of the Cross Road corridor that provide a positive social impact, and aspects that are below the desired outcomes along the corridor. The cities of Unley, Mitcham, Marion and West Torrens each have strategic planning documents that articulate their community's needs along the corridor.

Table 44 identifies key social impact problems.

Table 44: Key Social Impact Problems

Mode	Location	Key Problem
Urban Realm	Corridor	• Low overall scoring across the corridor indicates there is opportunity for improvement in urban realm quality (landscape, greening, Water Sensitive Urban Design (WSUD) and human comfort) • However, it is important to note that the current performance indicator scores for this indicator are reflective of the dominant vehicle movement function of the corridor

8 Phase 4 – Investment Plan

Following investigation of current context, current performance and future context, a separate *Investment Plan* was developed as part of Phase 4 of the *Cross Road Corridor Study*.

The *Investment Plan* provides a 'pipeline' of potential initiatives that, when implemented, would contribute to improved performance of the existing infrastructure along the corridor in line with the vision, objectives and desired outcomes between 2021 and 2036.

The *Investment Plan* has also assessed the potential initiatives to identify the degree of contribution to resolving the corridor's problems.

In developing the potential initiatives within the *Investment Plan*, the following major assumptions have been made.

- The North-South Corridor is fully implemented and operational by 2030
- Cross Road remains a strategic link on Adelaide's Outer Ring Route and National Key Freight Route network, however, remains in the form of a major arterial road through to 2036. That is, it is not developed to a non-stop motorway standard by 2036
- The movement (M2) and place (P4-P5) classification for Cross Road does not change from the current classification.

Refer to the separate *Cross Road Investment Plan Report - IPP-AMJV-420-001-PL-KR-DO-0048* for further detail.

Appendices

Appendix A – Stakeholder Engagement Report

IPP-AMJV-420-001-RP-SH-DO-0050

Appendix B – 2km Study Area

A study catchment extending 2km either side of the road corridor was defined for the purpose of the population and demographics analysis[40].

This was undertaken as a direct comparison for other Department Corridor Studies.

Population

In 2016, the study area contained approximately 109,500 people[41]. This equates to a population density of 16 persons per hectare. The population density for the 2km radius is lower than that of the 1km radius, 19 persons per hectare. This is a result of the larger catchment areas spanning over the Adelaide Hills.

Refer to **Figure 72** for a map of 2016 population density (residents per hectare). Density is relatively consistent along the corridor, representative of the low density residential and educational land uses. It can also be seen that population density starts to slightly increase towards the city- around Goodwood, South and Unley Road.

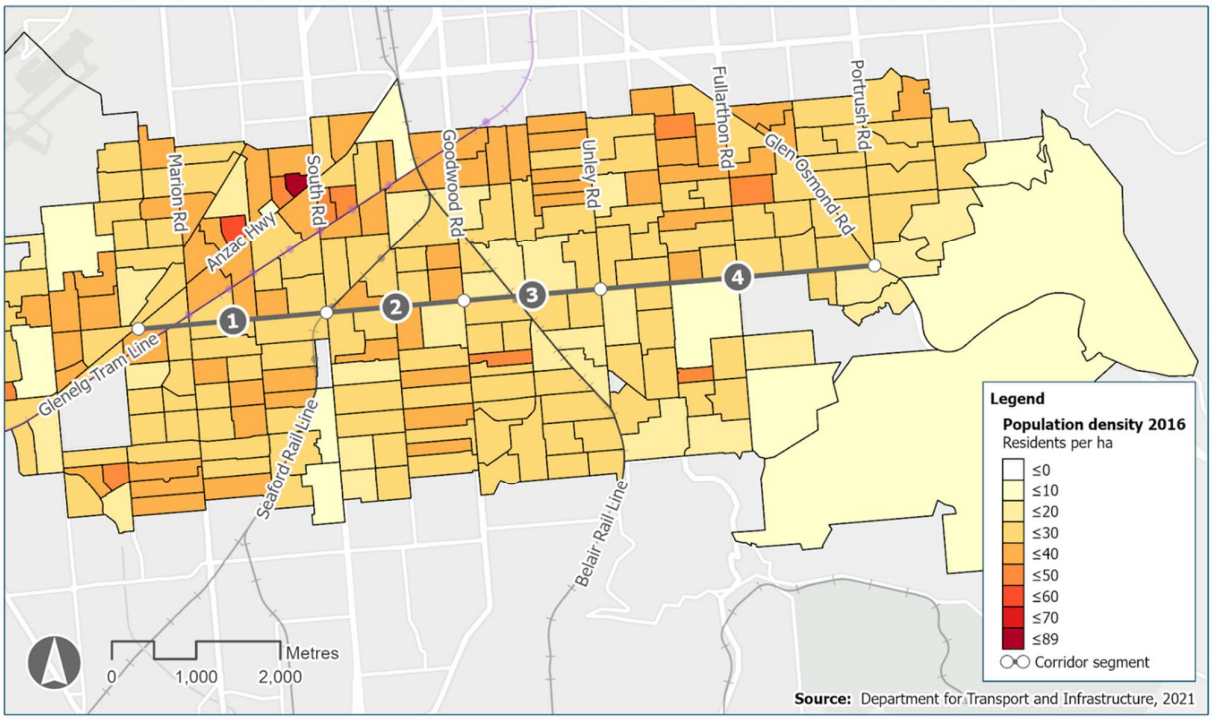


Figure 72: 2016 Population Density

[40] Data used to calculate current population and households within the defined study catchment is based on the May 2019 Population Projections for South Australia and Regions

[41] Population within SA1 areas that intersect with 2km study area

By 2036, the study area is projected to contain approximately 120,400 people with a population density of 18 persons per hectare. Refer to **Figure 73** for a map of 2036 population density (residents per hectare). Density is seen to be relatively consistent along the corridor. However, high density is seen around Anzac highway and around the Glenelg tram line. Density also starts to increase on the north side of the corridor towards the city.

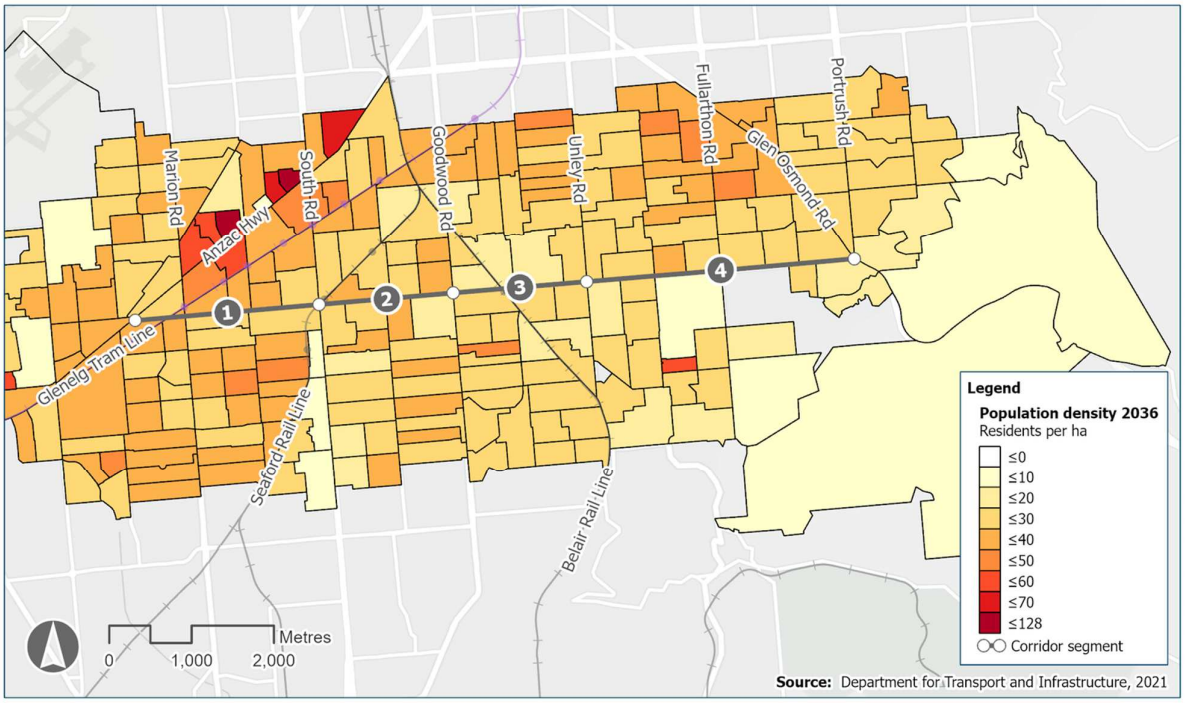


Figure 73: 2036 Projected Population Density

Employment

In 2016 total employment within the study area was approximately 46,700 jobs[42]. Refer to **Figure 74** for a map of 2016 employment density (jobs per hectare). Along the Corridor, higher employment areas are near key intersections of Unley Road, Goodwood Road, South Road and Marion Road. Outside of this, Mitcham Shopping Centre, areas closer to inner city and commercial areas along South Road and the area to the south of Adelaide Airport have higher employment density.

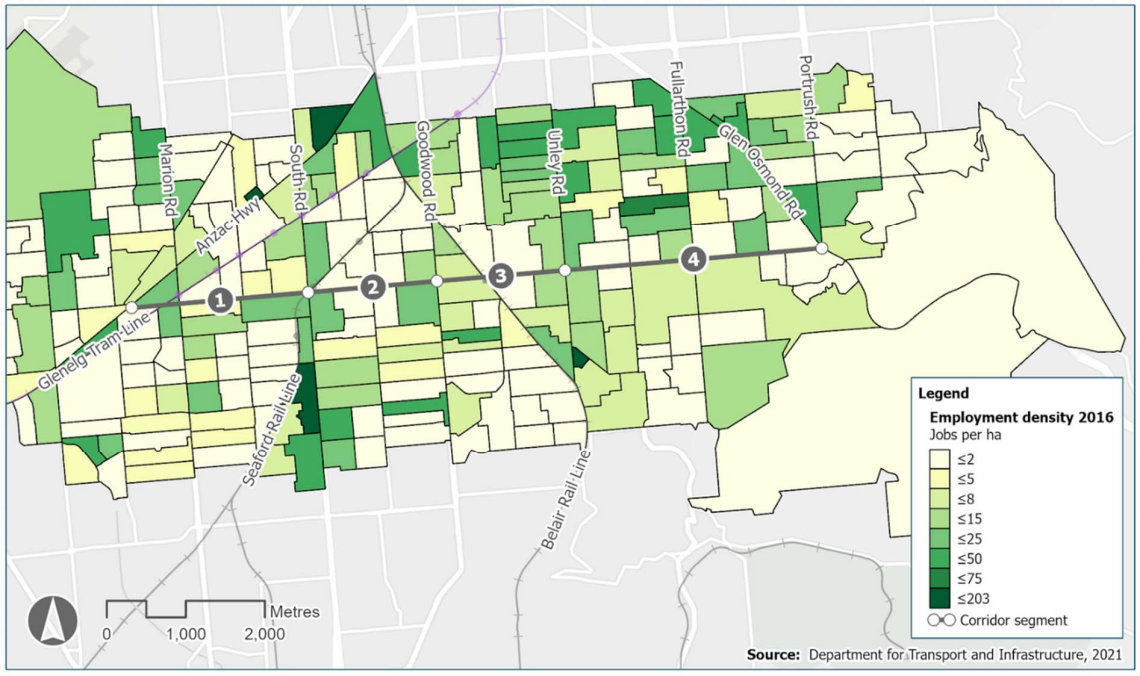


Figure 74: 2016 Employment Density

[42] Employment within SA1 areas that intersect with 2 km study area

By 2036 total employment within the 2km study area is projected to 52,300 jobs. Refer **Figure 75** for a map of 2016 employment density (jobs per hectare). Along the Corridor, higher employment areas are near key intersections of South Road, Goodwood Road and Unley Road. Higher employment density can be seen around Adelaide Airport, areas closer to the inner city and areas around South road.

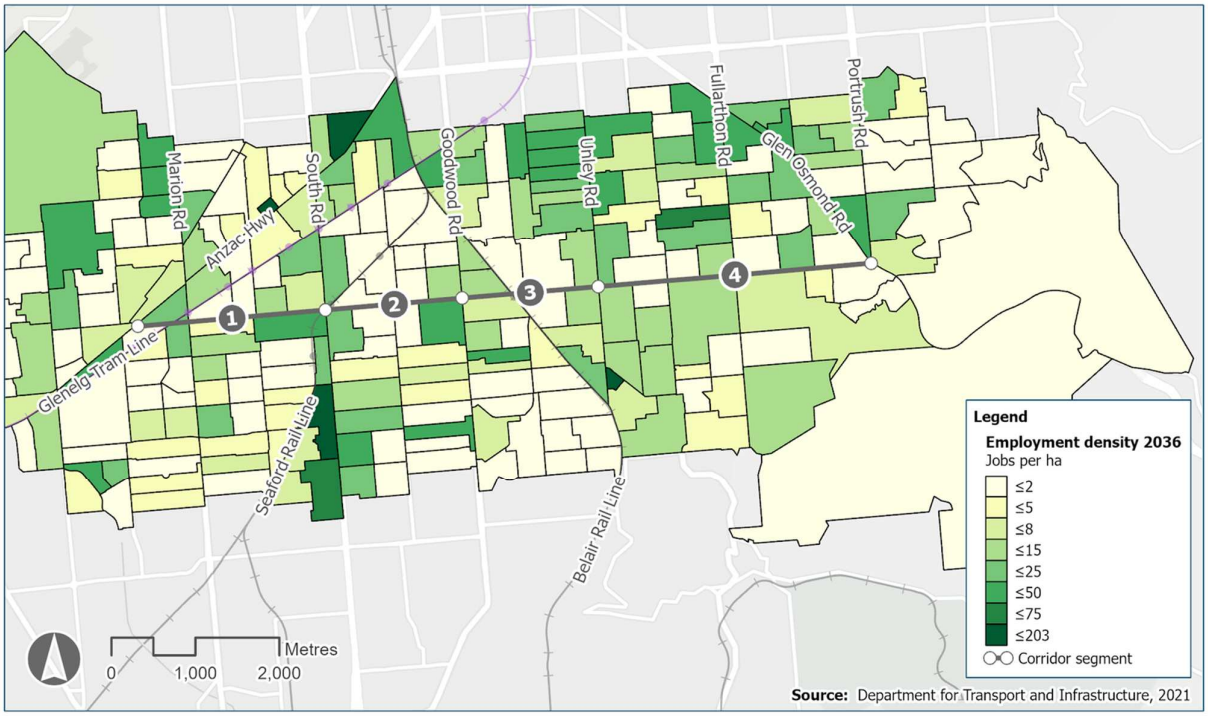


Figure 75: 2036 Projected Employment Density

Mode share

Journey to work (JTW) mode share for private vehicles, public transport and active transport is provided in, **Figure 76**, **Figure 77** and **Figure 78** respectively.

Overall, the dominant mode for transport to work is private vehicle with most zones showing 70% or greater.

There is higher public transport use around the Glenelg tram line and Seaford railway line and the high frequency / priority bus corridor of Anzac Highway.

No specific trends are observable within the active travel mapping with only zones near Unley Road and the Airport (which are located well off corridor) showing greater than 8% demand. This is despite the catchment of the Cross Road corridor being within a 20-minute cycle ride from the CBD.

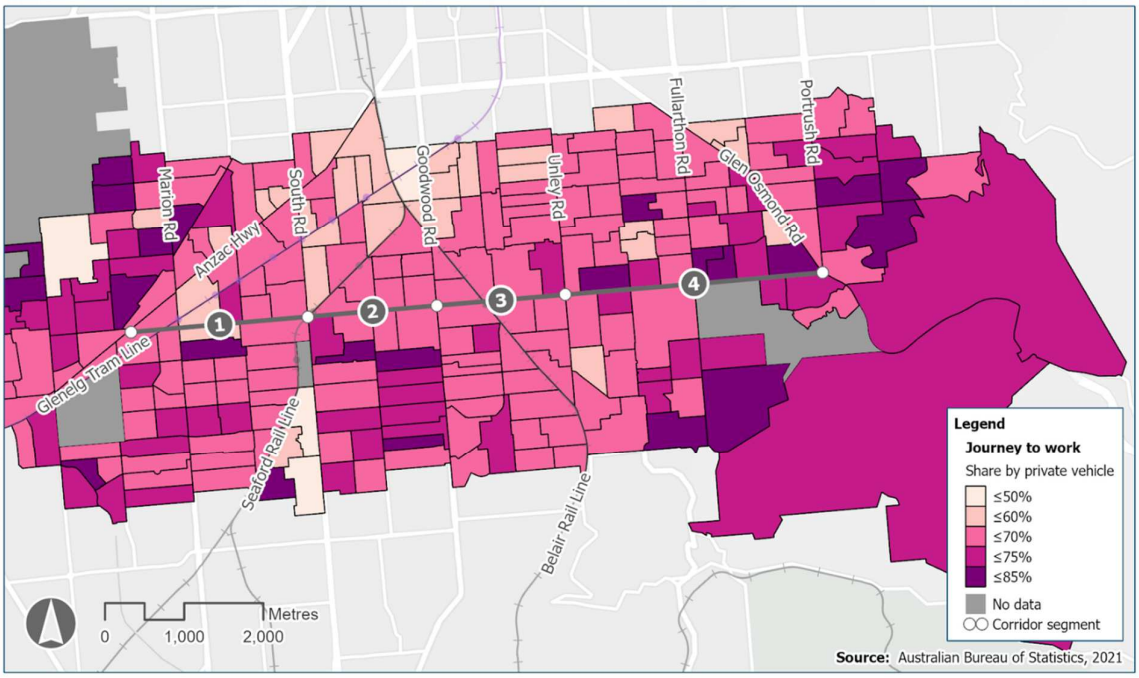


Figure 76: 2016 JTW Private Vehicles

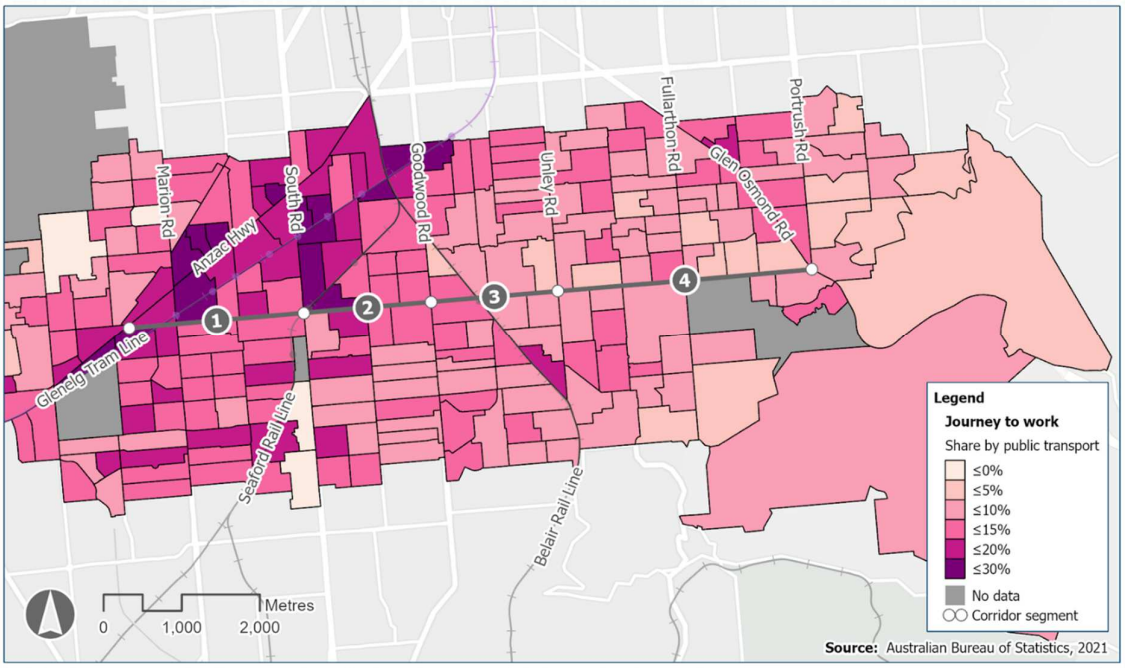


Figure 77: 2016 JTW Public Transport

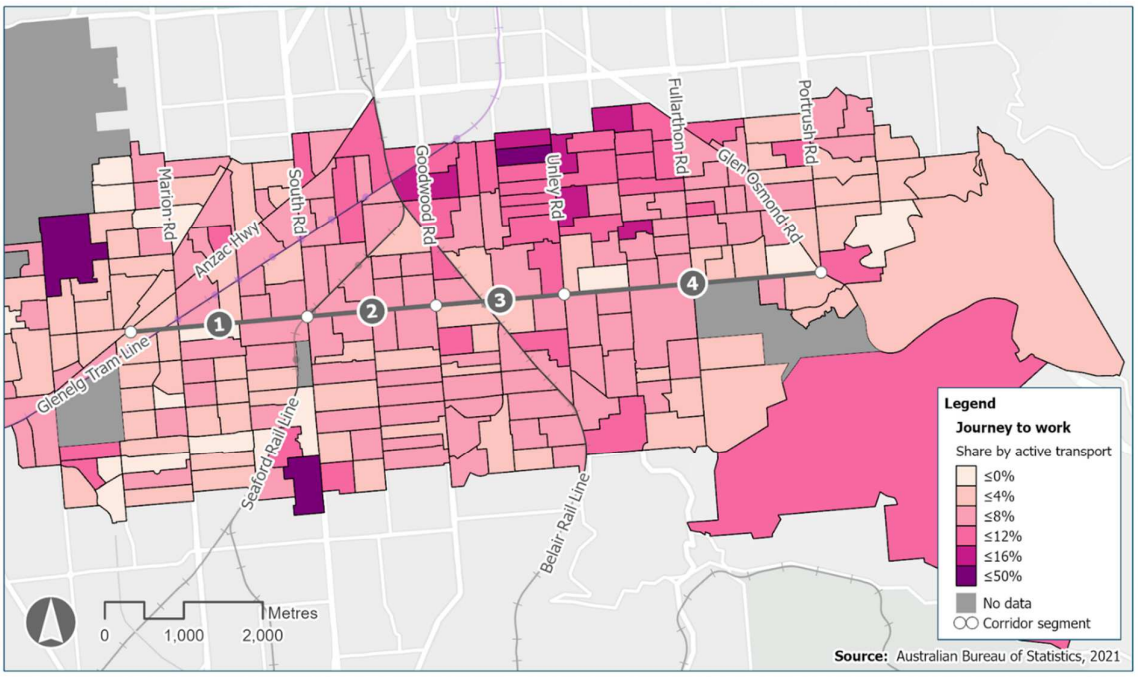


Figure 78: 2016 JTW Active Transport

Appendix C – Travel Time, Speed and Trip Patterns Technical Note

IPP-AMJV-410-001-TN-KR-DO-0041

Appendix D – Crash Analysis

A review of crashes which have occurred along the corridor has been undertaken to assess road safety along the corridor. Refer to **Section 3.3.8** for an overview of this assessment.

Crash overview

A benchmark performance analysis was undertaken to compare the FSI rate (Fatal and Serious injury crashes per km per year), casualty crash rate (number of crashes per km per year) and casualty crash rate per 100 million vehicle km travelled (MVKT) per year, as summarised in **Table 45**.

Table 45: Average crash rates by segment

	Segment	Length (km)	AADT	FSI crash rate		Casualty crash rate		Casualty crash rate per 100 MVKT	
1	Anzac Hwy to South Rd	2.3	16,867	0.61	⬆	7.50	⬆	121.76	⬆
2	South Rd to Goodwood Rd	1.6	25,750	0.49	⬆	4.08	⬆	43.38	⬆
3	Goodwood Rd to Unley Rd	1.7	28,496	0.25	⬆	4.78	⬆	45.99	⬆
4	Unley Rd to South Eastern Fwy	3.2	31,800	0.25	⬆	5.29	⬆	45.54	⬆
All Segments		**8.8**	**25,728**	**0.40**	⬆	**5.41**	⬆	**64.17**	⬆
Average SA Crash Rates				**0.0070**[43]		**0.0520**[44]		**28.4**	

⬆ Above SA Average

⬇ Below SA Average

Source: Department for Infrastructure and Transport (2015-2019)

The total number of crashes occurring along the corridor decreased over the five-year period for each individual corridor segment – refer **Figure 79**.

[43] Black Length Rate = Sum of casualty crashes (fatal + serious injury + minor injury) / number of years of crash data / road section length (km)

[44] Black Length Rate = Sum of casualty crashes (fatal + serious injury + minor injury) / number of years of crash data / road section length (km)

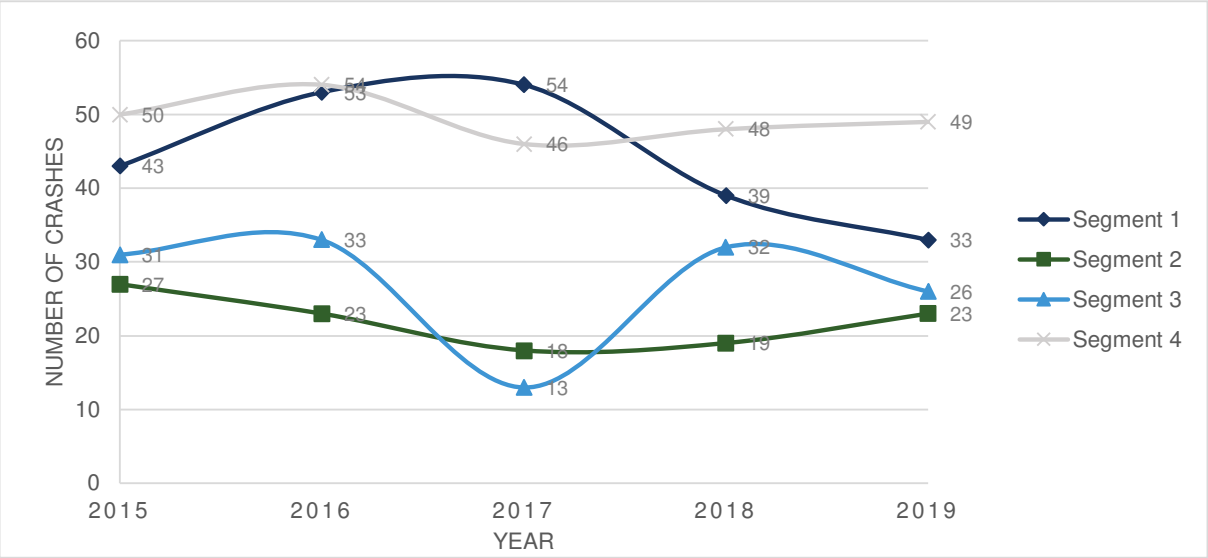


Figure 79: Crash trend summary per segment over a five-year period

Source: Department for Infrastructure and Transport (2015-2019)

Key crash movement types

Table 46 shows that for all the crashes that occurred in the five-year analysis period, the four most common crash types were rear end (45%), and right angle, side swipe, and right turn (each with 14%). It highlights for example, that a large proportion of right turn crashes happened in Segment 1 and a large proportion of side swipes occurred in Segment 4. Meanwhile, all crash types along the corridor at 200m intervals can be seen in **Figure 80**. It highlights the fact that a large proportion of crashes occur at intersections.

Table 46: Crash types per segment

	Segments	Crash types											
		Head On	Hit Fixed Object	Hit Parked Vehicle	Hit Pedestrian	Rear End	Right Angle	Right Turn	Roll Over	Side Swipe	Hit Object On Road	Left Road - Out of Control	Other
1	Anzac Hwy to South Rd	2	11	4	1	93	38	44	7	19	1	0	2
2	South Rd to Goodwood Rd	0	6	4	3	41	17	20	0	18	1	0	0
3	Goodwood Rd to Unley Rd	0	4	0	1	69	17	21	3	20	0	0	0
4	Unley Rd to South Eastern Fwy	1	16	15	3	116	30	15	4	44	3	0	0
	All segments total	**3**	**37**	**23**	**8**	**319**	**102**	**100**	**14**	**101**	**5**	**0**	**2**

Source: Department for Infrastructure and Transport (2015-2019)

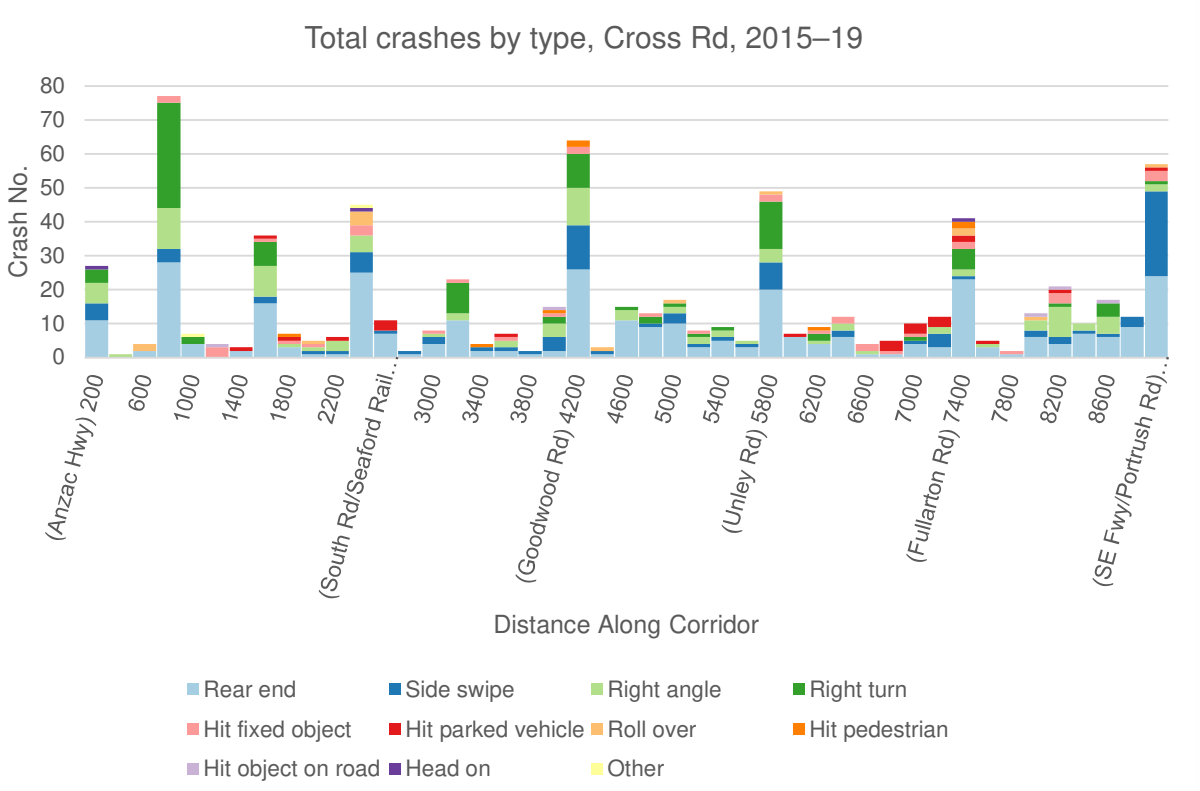


Figure 80: Total crash types along corridor

Heavy vehicle crashes

A summary of crashes involving freight vehicles is shown in **Table 47**. The proportions depicted are that between number of crashes per freight vehicle type per segment and the total number of crashes of the respective segment.

Table 47: Freight vehicles involved in crashes

Segment		Length (km)	Total number of crashes per freight vehicle types and proportion of total crashes involving freight							
			Light truck		Rigid truck		Articulated truck		Heavy truck	
1	Anzac Hwy to South Rd	2.3	0	0.00%	8	3.60%	0	3.60%	3	1.35%
2	South Rd to Goodwood Rd	1.6	0	0.00%	8	7.27%	2	1.82%	1	0.91%
3	Goodwood Rd to Unley Rd	1.7	0	0.00%	11	8.15%	2	1.48%	0	0.00%
4	Unley Rd to South Eastern Fwy	3.2	3	1.21%	26	10.53%	21	8.50%	6	2.43%
All segments		**8.8**	**3**	**0.42%**	**53**	**7.42%**	**25**	**%3.50**	**10**	**1.40%**

Segment 4 has the highest number of trucks involved crashes for all four types of trucks.

Appendix E – Movement Performance Indicators

Appendix E1 – Speed Efficiency

E1.1 – Scoring Methodology

This indicator measures the traffic performance for all traffic (including general traffic, public transport (bus) and freight) by considering the vehicle speed ratio. The average travel speed is in this case the 'space mean speed' to align with the Level of Service (LoS) reporting method defined in *Austroads Guide to Traffic Management Part 3: Transport Studies and Analysis Methods*[45]. The 'space mean speed' is calculated using the average travel time and length for each segment as extracted from AddInsight.

LoS parameters are provided in Section 6.2.2 of the *Austroads Guide to Traffic Management Part 3: Transport Studies and Analysis Methods* for Urban Arterial Roads with Interrupted Flow. **Table 48** details the Level of Service parameters and associated speed efficiencies, along with a 7-point scoring used specifically for this project.

Table 48: Speed Efficiency Level of Service

Level of Service		Speed efficiency (Average speed as % of base free flow speed)
A	7	90% to 100%
	6	80% to 90%
B	5	67% to 80%
C	4	50% to 67%
D	3	40% to 50%
E	2	30% to 40%
F	1	0% to 30%

Source: Based on Austroads Guide to Traffic Management Part 3: Transport Studies and Analysis Methods

Due to data availability from AddInsight Bluetooth data, the performance metrics for traffic movement has been combined for general freight and bus given there are no dedicated public transport priority facilities (i.e. bus lanes, bus jumps etc.) along the corridor.

E1.2 – Scoring Assessment

LOS Comparison Plots

Figure 81, **Figure 82**, **Figure 83** and **Figure 84** compare the performance indicator scores (as a percentage) to the equivalent Level of Service per peak hour and period, corridor segment, and direction of travel.

[45] The speed efficiency as defined by Austroads is an output derived by dividing the average travel speed (i.e. space-mean speed) by base free flow speed (BFFS) in percentage terms. BFFS for the purpose of this corridor study is assumed to be the posted speed limit

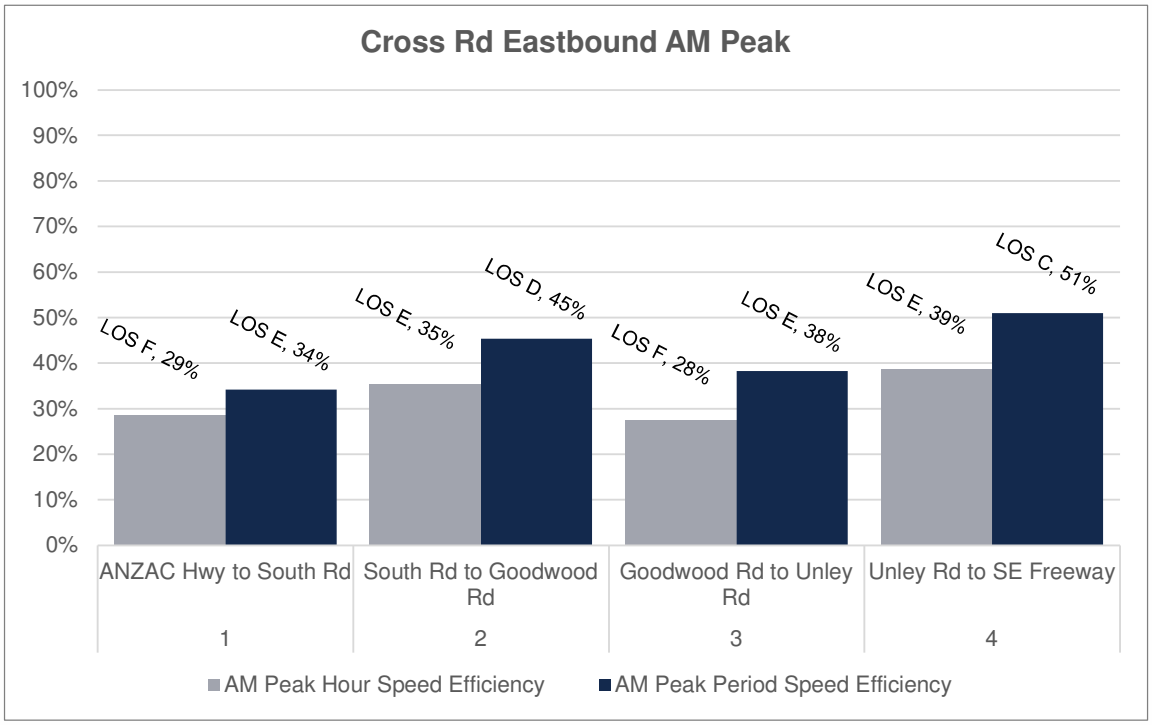


Figure 81: Cross Road eastbound AM speed efficiency level of service

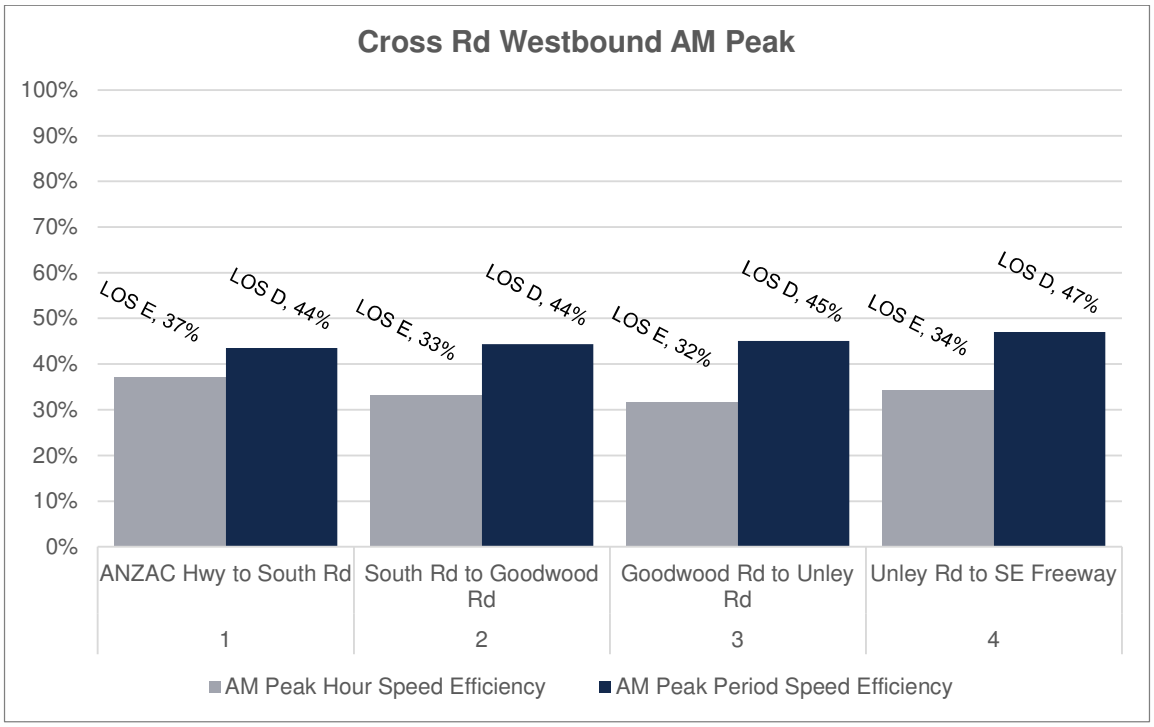


Figure 82: Cross Road westbound AM speed efficiency level of service

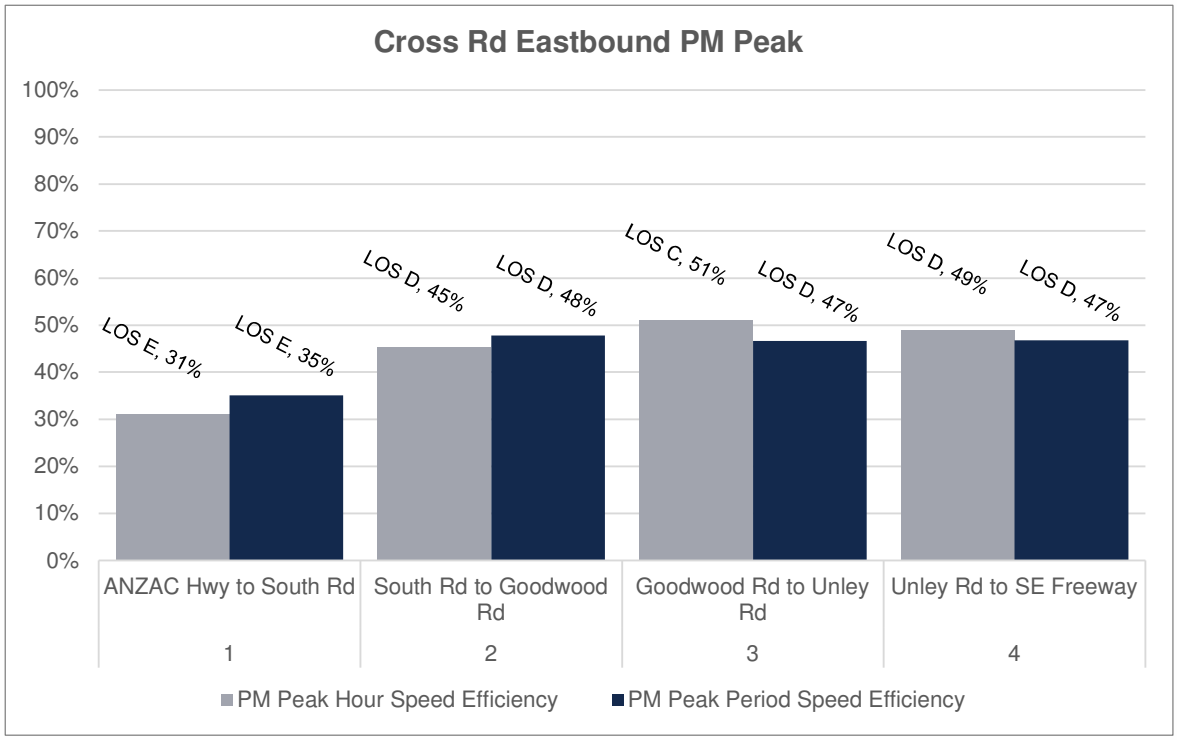


Figure 83: Cross Road eastbound PM speed efficiency level of service

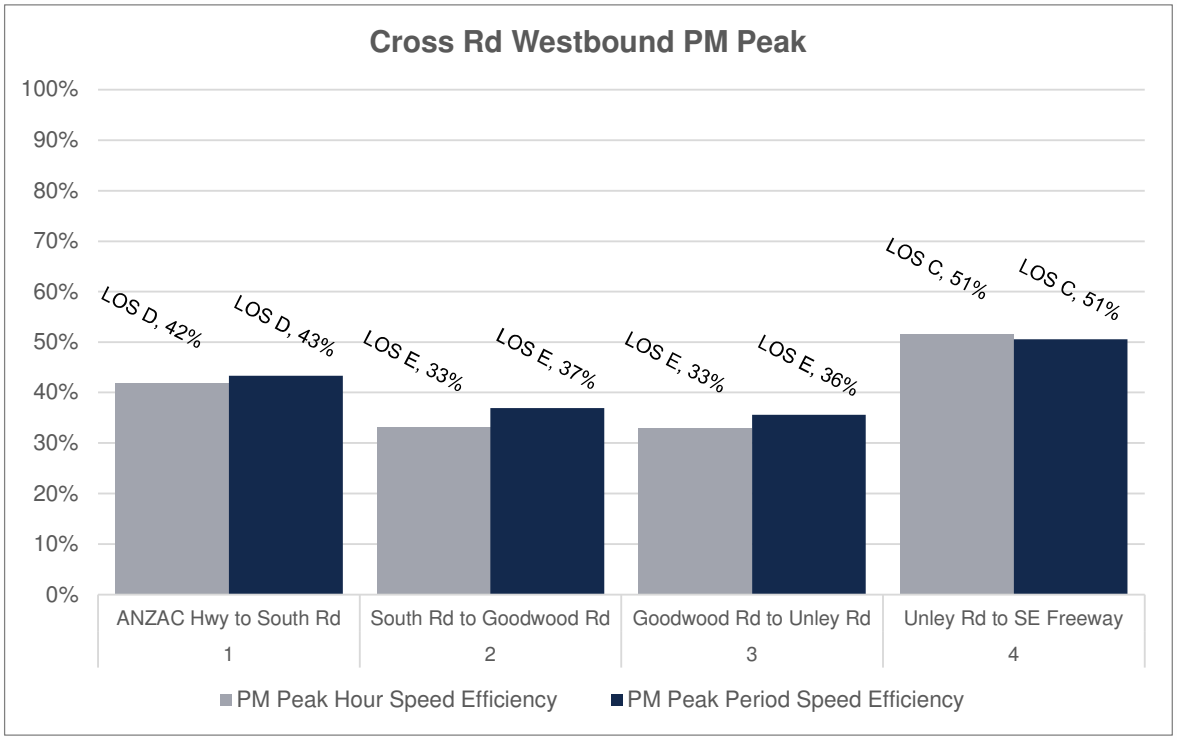


Figure 84: Cross Road westbound PM speed efficiency level of service

Appendix E2 – Journey Time Reliability

E2.1 – Scoring Methodology

Journey time reliability (JTR) measures the daily travel time consistency in different time periods, such as AM, PM, and inter-peak time periods over a certain period. It determines the percentage of 'on-time running', i.e., on-time expected arrival, for all modes along road corridors during AM, PM, and inter-peak durations over a certain time period. For the purpose of these corridor studies, the ***buffer index*** will be used as a measurement of JTR which is based upon guidance provided by the US Department of Transport[46] on assessment of travel time reliability.

The buffer index represents the extra buffer time (or time cushion) that most travellers add to their average travel time when planning trips to ensure on-time arrival. This extra time is added to account for any unexpected delay. The buffer index is expressed as a percentage and its value increases as reliability gets worse. For example, a buffer index of 40 percent means that, for a 20-minute average travel time, a traveller should budget an additional 8 minutes (20 minutes × 40 percent = 8 minutes) to ensure on-time arrival most of the time. In this example, the 8 extra minutes is called the buffer time.

This uses a 95th percentile travel time to represent a near-worst case travel time. Whether expressed as a percentage or in minutes, it represents the extra time a traveller should allow to arrive on time for 95 percent of all trips. A simple analogy is that a commuter or driver who uses a 95 percent reliability indicator would be late only one weekday per month.

The buffer index percentage has been converted into a performance indicator score between 1 – 7, as shown in **Table 49.**

Table 49: Journey Time Reliability Performance Indicator Scoring

Score	Buffer Index (%)
1	65% to 100%
2	55% to 65%
3	45% to 55%
4	35% to 45%
5	25% to 35%
6	15% to 25%
7	0% to 15%

E2.2 – Scoring Assessment

LoS Comparison Plots

Figure 85, **Figure 86**, **Figure 87** and **Figure 88** compare the performance indicator scores (as a percentage) per peak hour and period, corridor segment, and direction of travel.

[46] https://ops.fhwa.dot.gov/publications/tt_reliability/ttr_report.htm. The buffer index is calculated as the difference between the 95th percentile travel time and average travel time, divided by the average travel time

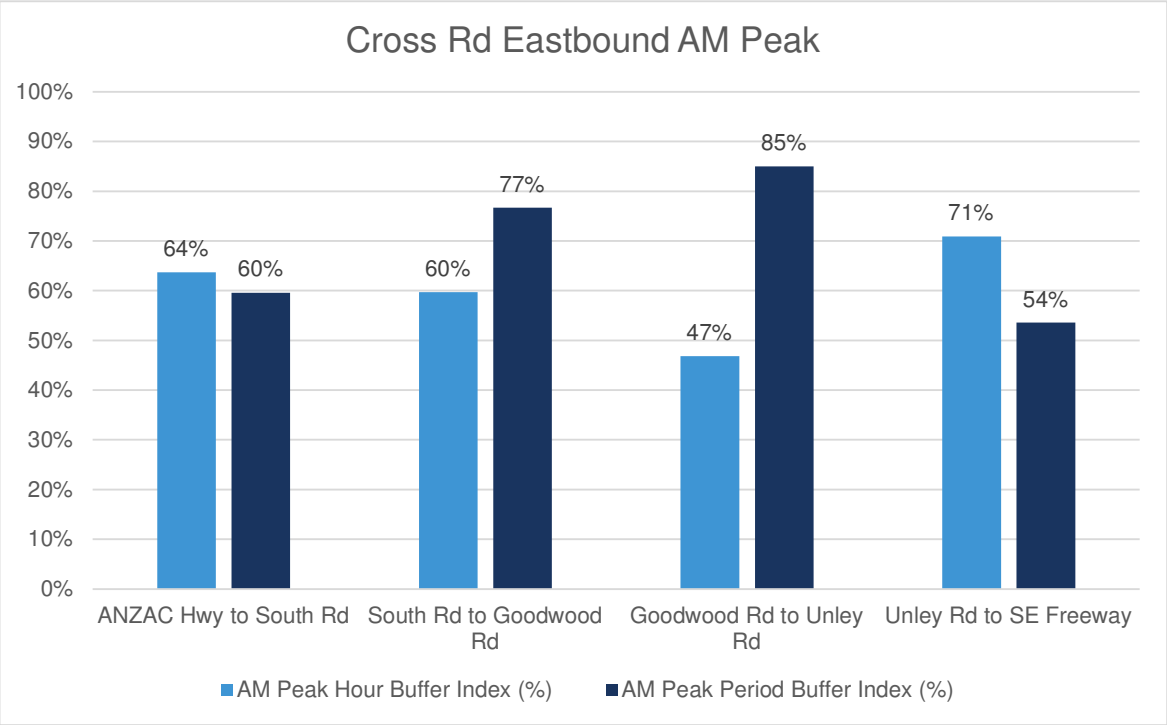


Figure 85: Journey time reliability - eastbound AM peak

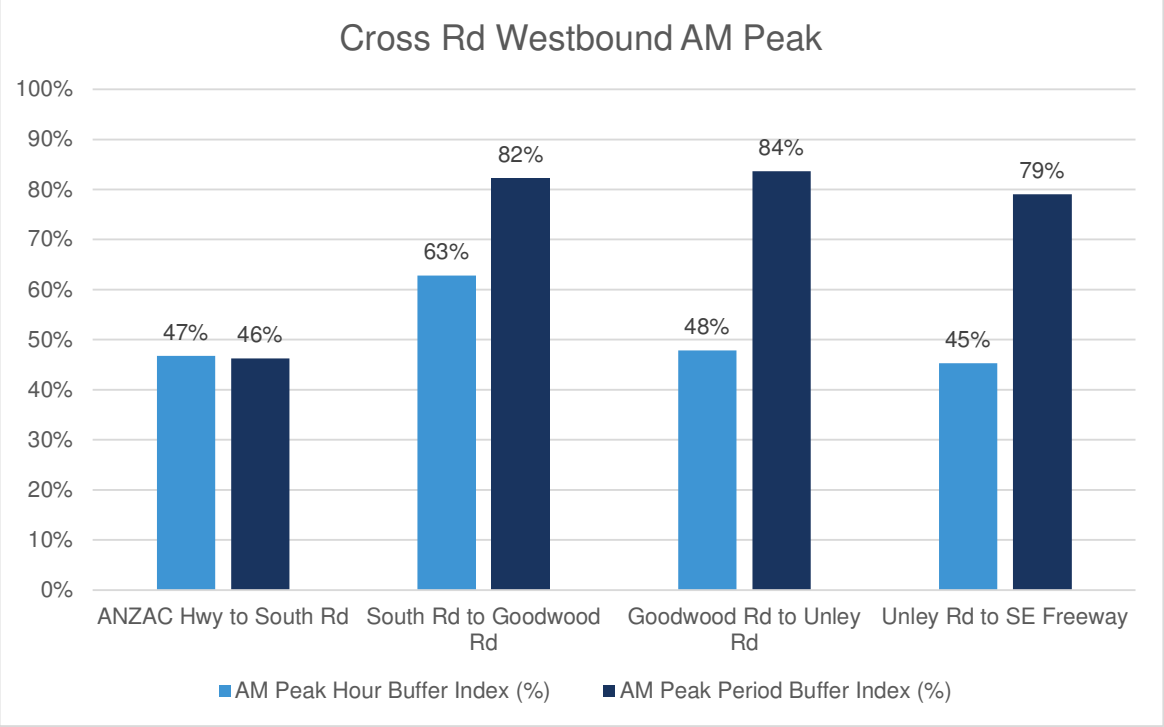


Figure 86: Journey time reliability - westbound AM peak

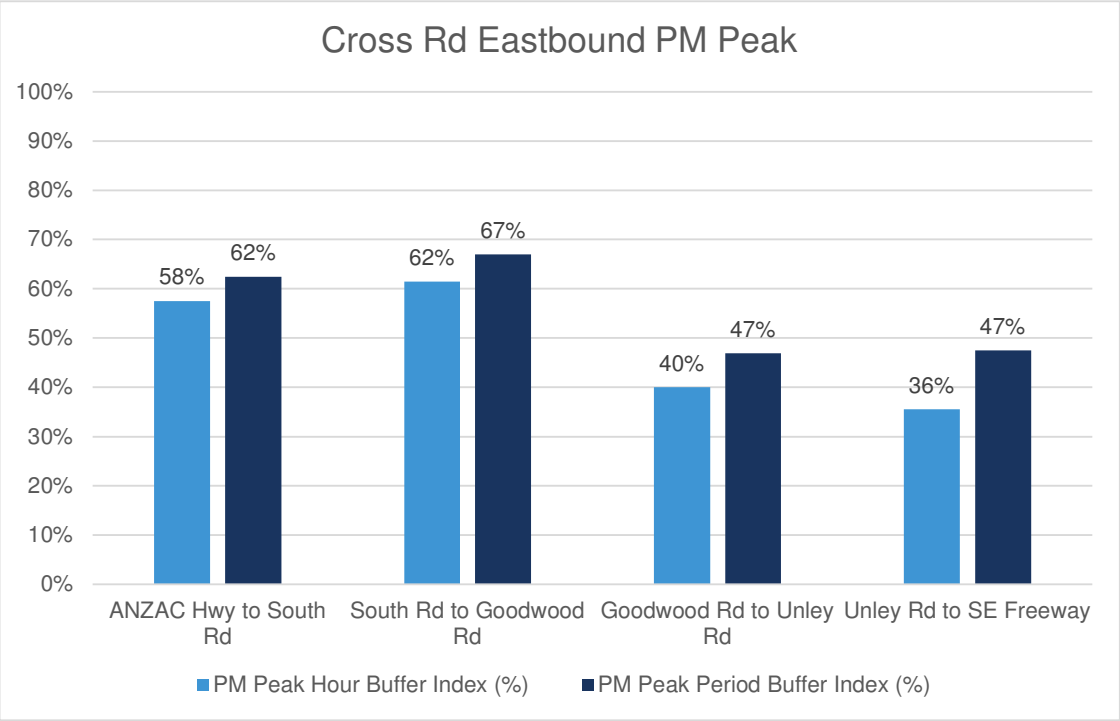


Figure 87: Journey time reliability - eastbound PM peak

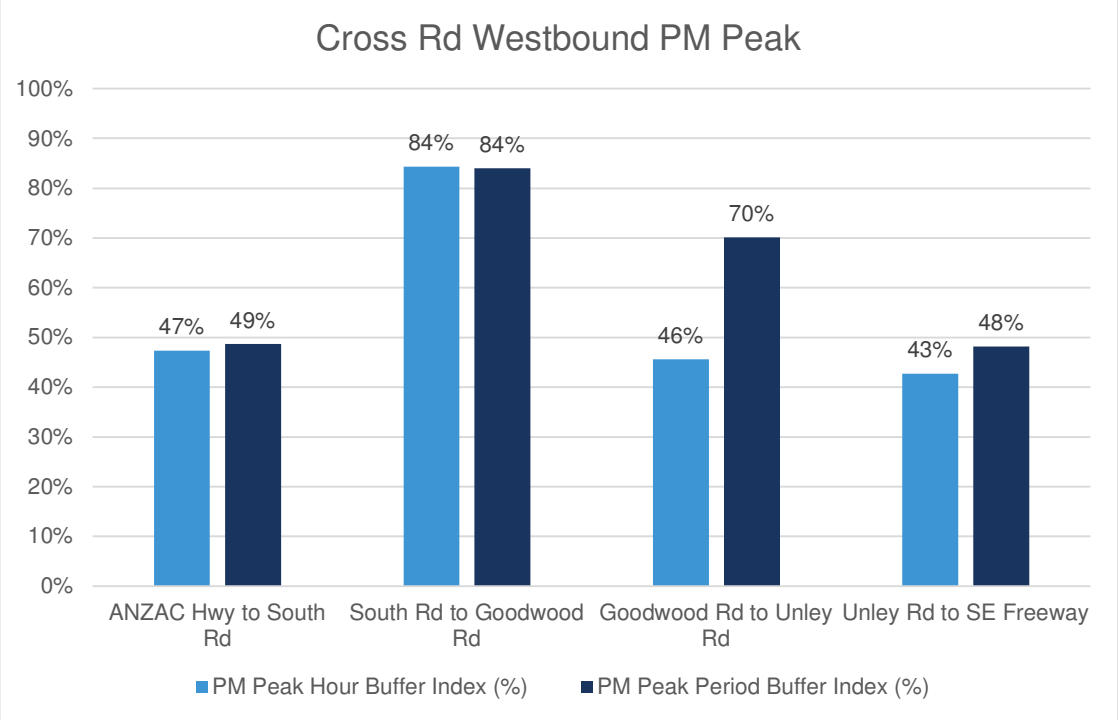


Figure 88: Journey time reliability - westbound PM peak

Appendix E3 – Bus Schedule Adherence

E3.1 – Scoring Methodology

Bus schedule adherence has been assessed as bus speed efficiency (i.e. as a percentage of the posted speed limit) utilizing Swiftly data in blocks of 100m along the corridor length. Note that it is not possible to analyse by direction of travel due to limitations of the sourced data. Three time periods were considered – an AM Peak Period from 6:30am-9:30am, a PM Peak Period from 3pm-7pm, and an Interpeak Period from 11am-12pm. Bus dwell time has been excluded from this analysis. Areas where no bus speed data was available on account that no bus routes are occurring along the section of corridor have also been excluded.

The average bus travel speeds have then been converted to a 7-point score. The performance indicator scoring break down is shown in **Table 50.**

Table 50: Average Bus Travel Speed Attribute Scoring

Score	Average Bus Travel Speed Attributes
7	Over 85% of the posted speed limit
6	68% to 85% of the posted speed limit
5	59% to 67% of the posted speed limit
4	50% to 58% of the posted speed limit
3	41% to 49% of the posted speed limit
2	32% to 40% of the posted speed limit
1	Up to 31% of the posted speed limit

E3.2 – Scoring Assessment

Figure 89 and **Figure 90** compare the average bus speeds (as a percentage of the posted speed limit) and the resulting performance indicator scores per time period and corridor segment.

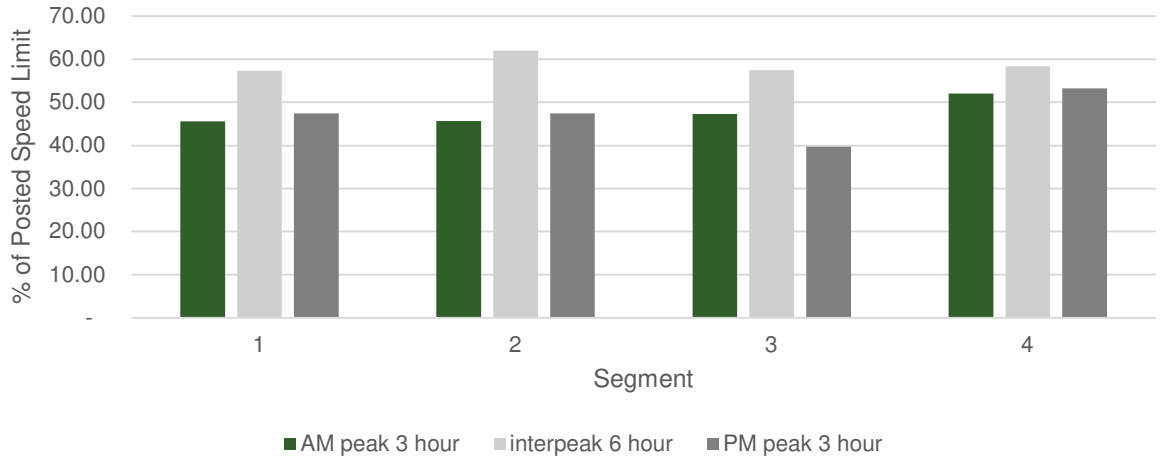


Figure 89: Average bus speeds (as a percentage of posted speed limit) per segment along the corridor

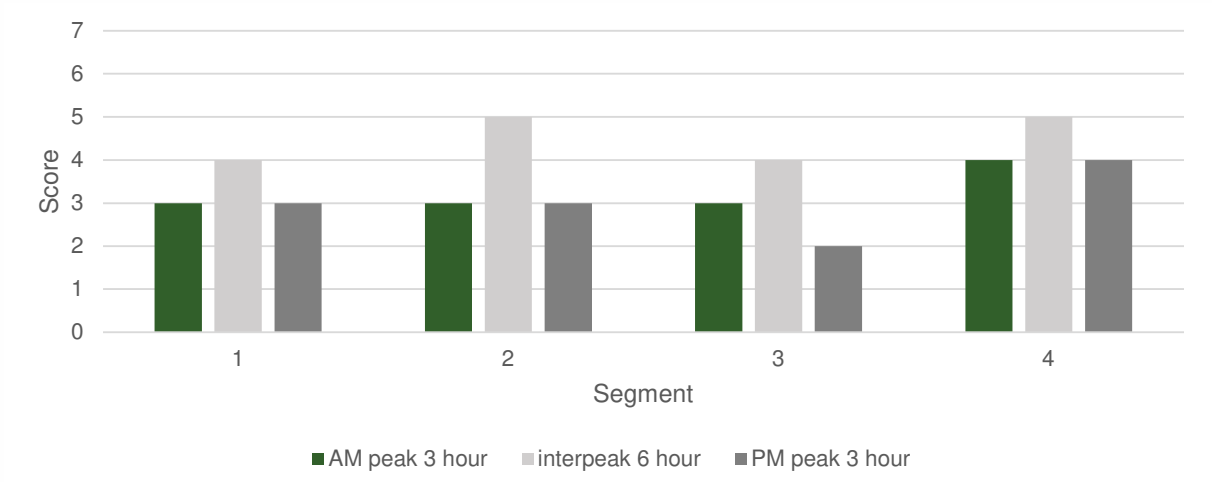


Figure 90: Average Bus Travel Speed Attribute Score per segment along the corridor

Appendix E4 – Cycling Facilities along the corridor

E4.1 – Scoring Methodology

A performance indicator assessing the "cycling facilities along the corridor" has been based upon the following weighted assessment parameters:

- Connectivity (10% weighting)
- Facility type – mid-block (50% weighting)
- Facility type – intersection or crossing approach (20% weighting)
- Wayfinding (5% weighting)
- Buses (10% weighting)
- Freight (5% weighting).

Further details of the individual assessment criteria components which make up this performance indicator, including the scoring basis for each component, are detailed in the sub-sections following.

Connectivity

The road corridor forms part of an integrated cycling network that provides access to the key place and destinations within the corridor as well as forming a link within the defined BikeDirect network. A road corridor that has safe and convenient facilities for cyclists to cross the corridor and to enter and leave the corridor can be considered as integral to the cycling network and not a barrier.

The methodology identifies and counts the key destinations within 400m either side of the segment being considered. The most likely cycling route from the key destination to the corridor is traced and crossing facilities are counted if they lie within 50m of the connection. For BikeDirect routes, crossing facilities are counted if they lie within 50m of its intersection with the road corridor. The percentage of crossings that are signalised are counted. If there are no signalised crossings the percentage of refuge islands are calculated.

The highest score is achieved for a grade separated crossing as this type of crossing is considered the safest type and results in no delays for cyclists. Not all connections need to have a grade separated crossing to achieve the highest score, as cyclists will divert from other routes to use this type of facility if lengthy delays are experienced at signalised alternatives. Scores ranging from 4 to 6 are achieved for signalised crossings to represent their improved safety over refuge island facilities, although their use is often at the expense of delays.

A 10% weighting has been applied as connectivity is considered as an important indicator.

Table 51 below provides the scoring system for crossing attributes.

Table 51: Cycle Cross Attribute Scoring

Score	Crossing Attributes
7	50% or more are connected by a grade separated crossing
6	76% or more have a signalised crossing
5	51% to 75% have a signalised crossing
4	Up to 50% have a signalised crossing
3	76% or more have a refuge island
2	51% to 75% have a refuge island
1	Up to 50% have a refuge island

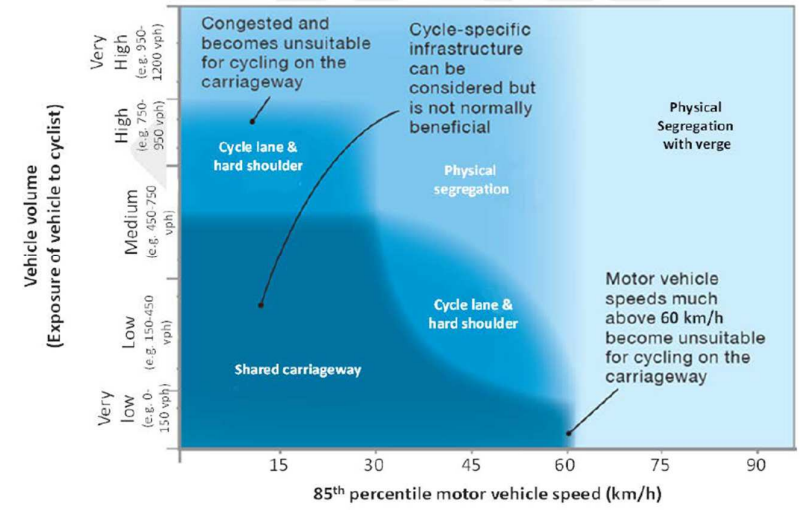
Facility type – mid-block

The type of cycling facility provided along the length of the road corridor is of critical importance for the safe and efficient movement of cyclists and to encourage people to consider cycling instead of using the private motor vehicle.

Posted speed limits, peak motor traffic volumes, aerial imagery/field survey/streetview are collected to identify bicycle lane types and hours of operation.

The cycling facility type score is based upon the Sustrans/Austroads Cycling Aspects Figure 2.2 (provided as **Figure 91**) to assess the appropriateness of the facility with consideration to peak hour traffic volumes and the posted speed limit. The type of facility is identified as the most prevalent type, covering at least 75% of the kerb length within the segment being considered.

Figure 2.2: Guidance on the separation of cyclists and motor vehicles for the preferred bicycle route



Source: Sustrans (2014).

Figure 91: Cycling Facility Type Score Basis

The highest score is achieved for separated bicycle lanes as they provide the highest level of protection when compared to painted lanes. The width of the separated bicycle lanes needs to be a minimum of 2m to reduce delays associated with passing slower riders and also needs to have a safety strip (dooring) of at least 0.8m. Wider bicycle lanes score higher than narrow lanes as they provide greater clearance from passing motor traffic. Full-time bicycle lanes are scored higher than part-time lanes, with no bicycle lanes scoring 0. The difference between a separated bicycle lane and a painted bicycle lane is significant; this is represented by a jump in scoring from 4 to 6.

A 50% weighting has been applied as Facility Type – mid-block is considered the most import indicator, refer **Table 52**.

Table 52: Cycling Score and Attributes

Score	Speed limit 50kph or lower	Speed limit 60kph or 70kph	Speed limit 80kph or 90kph	Speed limit 100kph or 110kph
7	Physically separated bicycle lanes / off-road path	Physically separated bicycle lanes / off-road path	Physically (e.g. wire rope or w-beam) separated bicycle lanes / off-road path	Physically separated bicycle lanes / off-road path
	Greater than 2m wide	Greater than 2m wide	Greater than 2m wide	Greater than 2m wide
	More than 25% of side road intersections have bent-out or straight treatments	More than 50% of side road intersections have bent-out or straight treatments		
	A minimum 0.8m wide safety strip where parking or loading occurs	A minimum 0.8m wide safety strip where parking or loading occurs		

Score	Speed limit 50kph or lower	Speed limit 60kph or 70kph	Speed limit 80kph or 90kph	Speed limit 100kph or 110kph
6	Physically separated bicycle lanes	Physically separated bicycle lanes	Physically (e.g. wire rope or w-beam) separated bicycle lanes	Physically (e.g. wire rope or w-beam) separated bicycle lanes
	From 1.5 to 2m wide	From 1.5 to 2m wide	1m – 2m wide	1m – 2m wide
	More than 25% of side road intersections have bent-out or straight treatments	More than 50% of side road intersections have bent-out or straight treatments		
	A minimum 0.8m wide safety strip where parking or loading occurs	A minimum 0.8m wide safety strip where parking or loading occurs		
5	On-road full-time bicycle lanes greater than 1.2m wide	On-road full-time bicycle lanes greater than 1.5m wide	N/A	N/A
4	On-road full-time bicycle lanes 1.2m wide or less	On-road full-time bicycle lanes 1.5m wide or less	No physical separation and sealed shoulders greater than 1.5m wide	No physical separation and sealed shoulders greater than 2.0m wide
3	On-road peak hours bicycle lanes greater than 1.2m wide	On-road peak hours bicycle lanes greater than 1.5m wide		
2	On-road peak hours bicycle lanes greater than 1.2m wide	On-road peak hours bicycle lanes greater than 1.5m wide or less	Sealed shoulder 1 – 1.5m wide	Sealed shoulder 1 – 2m wide
1	No bicycle lane	No bicycle lane	No bicycle lane or sealed shoulder 1.0m or less	No bicycle lane or sealed shoulder 1.0m or less

Facility type – intersection or crossing approach

A discontinued cycle lane on the approach to signal-controlled intersections, crossings and roundabouts requires cyclists to mix with faster moving motor vehicles, representing an increase in risk for cyclists.

SA Location Viewer aerial imagery and Google street view were used for this.

The method involves identifying whether the mid-block cycling facility continues up to all holding lines, such as stop lines at intersections and crossings as well as roundabouts.

A score of 7 is achieved if the mid-block cycling facility is continued to all holding lines within the segment. If not all, then a score of 0 is applied.

A 20% weighting has been applied as Facility Type – intersection or crossing approach is considered as the second most import indicator, refer **Table 53**.

Table 53: Facility Type Approach Score and Attributes

Score	Does the mid-block cycle lane treatment extend to the holding lines of signal-controlled intersections, crossings or roundabouts?
7	Yes – all approaches continue the bicycle lane treatment up to the stop or give-way marking
1	No – none or some approaches do not continue the mid-block treatment

Wayfinding

The efficiency of moving through the bicycle network is affected by the ease of navigation. The provision of wayfinding directed at cyclists to and from the road corridors is generally low and improvements would reduce trip time, rider frustration and encourage people to consider cycling if the signing communicates unexpectedly short cycle journey times to key destinations.

The SA Location Viewer aerial imagery with bikedirect layer on and Google streetview have been used.

The method involves assessing the percentage of bikedirect routes that are signed within the segment.

Scores increase relative to the increase in percentage of bikedirect routes that are signed.

A 5% weighting has been applied as Wayfinding is considered as a minor indicator, refer **Table 54**.

Table 54: Wayfinding Score and Attributes

Score	Percentage of intersection BikeDirect routes that are signed
7	91% and over
6	76% - 90%
5	61% - 75%
4	46% - 60%
3	31% - 45%
2	16% - 30%
1	Up to 15%

Environmental Impact- Buses

The objective is to assess the impact of buses on the cycling environment. Buses stopping for passengers often block bicycle lanes, resulting in delays for cyclists or risky overtaking manoeuvres to continue their journey.

DIT-SAPTA data has been used for the total number of times a bus stops within a 12 hour period (7am to 7pm) for an average weekday.

The methodology involves assessing the number of times a bus stops at all bus stops within the segment.

The highest score is achieved if no buses stop at bus stops within the segment. Scores decrease as the number of times a bus stops increases. A benchmark of 160 times a bus stops within a segment was considered as having a very high impact on cycling and was set as the lowest score. A score of 7 is achieved where there are zero occasions a bus stops within a segment.

A 10% weighting has been applied as stopping buses are considered as an important indicator, refer **Table 55**.

Table 55: Buses Stopping Scores

Score	Number of times a bus stops at all stops within the segment
7	No buses stopping
6	1 – 29
5	30 – 59
4	60 – 89
3	90 – 119
2	120 – 159
1	More than 160

Environmental Impact – Freight routes

The objective is to assess the impact of commercial vehicles on the cycling environment. Commercial vehicles are often large vehicles whose presence alongside a cyclist can be intimidating, with greater noise and wind blast generated when compared with smaller vehicles.

SA Location Viewer aerial imagery with traffic volume layer on has been used.

The daily number of commercial vehicles recorded within the segment is used. If more than one traffic volume is available for the segment, then the highest number is used.

Scores increase relative to the decrease in the volume of commercial vehicles. The range of scores were established by assessing the perceived effect of varying volumes of commercial vehicles and the riding experience for six arterial roads of the DIT network.

A 5% weighting has been applied as commercial vehicle impact is considered as a minor indicator, **Table 56**.

Table 56: Freight Scores

Score	Daily commercial vehicle volumes
7	Less than 500 (as per SA Viewer data / definition – daily CV volumes
6	500 – 999
5	1,000 – 1,249
4	1,250 – 1,499
3	1,500 – 1,749
2	1,750 – 1,999
1	2,000 or more commercial vehicles a day

E4.2 – Scoring Assessment

Table 57 summarises the cyclist facilities along the corridor performance indicator scores by each individual criteria per corridor segment.

Table 57: Cyclist facilities along the corridor performance indicator scores by individual criteria per segment

Segment		Connectivity (10%)	Wayfinding (5%)	Facility Type (70%)		Environmental Impact (15%)	
				Mid-block (50%)	Intersection or crossing approach (20%)	Buses (10%)	Freight (5%)
1	Anzac Highway to South Road	1	3	2	1	3	6
2	South Road to Goodwood Road	5	7	4	7	2	6
3	Goodwood Road to Unley Road	4	1	4	1	2	5
4	Unley Road to South Eastern Freeway	6	1	1	1	1	4

Appendix E5 – Pedestrian facilities along the corridor

E5.1 – Scoring Methodology

A performance score for each segment is calculated based on the summation of the weighted criteria scores per segment. Both sides of the corridor were considered individually per segment, and the maximums criteria scores per segment contributed to the combined Performance Indicator Score per segment. The individual criterion included footpath width, number of driveway interruptions, and number of side street interruptions along the segment per side of the corridor to give the following weighted criteria scores:

- Footpath Width Score (60%) – footpath widths were measured every 100m for the length of the corridor, as a distance between frontage and kerb, including the buffer, then average for each side of the corridor separately.
- Driveway Score (15%) – only wide driveways interruptions were counted that lead into commercial properties or residential properties with multiple units/apartments (i.e. large or commercial driveways), and converted to a rate per km.
- Side Street Score (25%) – side street interruptions were counted only if they had no at-grade path for pedestrians, and converted to a rate per km.

$$Pedestrian\ Facilities\ Score = Maximum\ of\ (Footpath\ Width\ Score + Driveway\ Score + Side\ Street\ Score)$$

The weighted 1 -7 scoring system is shown in **Table 58**.

Table 58: Pedestrian facilities along the corridor criteria and corresponding performance scores

Criteria	Weighting	Place Status	Minimum	Maximum	Minimum Score	Maximum Score
Average Footpath Width (m)	60%	P3	1.2	4.5	1	7
		P4	1.2	4	1	7
		P5	1.2	3	1	7
Rate of Driveway Interruptions (per km)	15%	-	12	0	1	7
Rate of Side Street Interruptions (per km)	25%	-	6	1	1	7

The Driveway and Side Street criteria scores give consideration of the segment lengths in their weighted scores for each side of the corridor, whereas the Footpath Width Score gives consideration of the Place Status.

E5.2 – Scoring Assessment

Table 59 shows the scores for pedestrian facilities along the corridor segments.

Table 59: Performance Indicator Score for pedestrian facilities along corridor

	Segment	Width Score	Driveway Score	Side Street Score	Combined score
1	Anzac Highway to South Road	2.0	1.3	3.0	2.2
2	South Road to Goodwood Road	1.7	2.0	2.2	1.9
3	Goodwood Road to Unley Road	2.0	3.2	1.8	2.1
4	Unley Road to South Eastern Freeway	2.7	2.8	4.1	3.1

The data is based on the inputs developed from desktop review, refer **Table 61.**

Table 60: Pedestrian facilities score inputs

Segment	Place Status	Segment Length (km)	Average footpath width		No. of driveway interruptions		No. of side street interruptions	
			North side	South Side	North side	South Side	North Side	South Side
1	P5	2.3	1.51	1.54	22	26	10	10
2	P4	1.6	1.51	1.60	16	12	8	5
3	P4	1.7	1.79	1.66	13	13	8	9
4	P5	3.2	1.72	1.78	27	6	11	7

To achieve a higher score for the pedestrian movement along the corridor the following would be required:

- Widen footpaths to 3m in P5 place areas and 4m in P4 place areas
- Remove all existing driveway accesses
- Reduce the number of side streets to 1 per km.

The verge space is currently occupied by the following elements which constrain the widths of footpaths

- High density of residential driveways
- Off-street parking with roll over kerb access within the verge with no separation to footpaths
- Street trees, lighting poles, service pillars and other utility infrastructure.

Therefore, improving the performance score would require either the verge to be widened through property acquisition, reducing the width of the road carriageway or removal of all street trees and other utility infrastructure. All options to improve the performance score conflict with either the movement purpose of the corridor or tree canopy goals. Removing driveway interruptions would require land acquisition as properties would be landlocked.

Appendix E6 – Pedestrian ability to cross corridor

E6.1 – Scoring Methodology

A performance score for each segment is calculated based on the summation of the weighted average of the section scores. A section is determined based on a change in the road configuration that's affect pedestrian ability to cross the corridor. These configurations include: road width; presence of median; presence of crossing; and speed along the segment. The section score has been based upon the following weighted assessment parameters:

- Speed score (20%)
- Crossing facility score (80%)

$$Crossing\ Facility\ Score\ =\ Maximum\ of\ (Road\ Width\ Score\ +\ Median\ Score, Crossing\ Type\ Score\ )$$

Refer to **Table 61**, **Table 62** and **Table 63** for the relevant criteria.

Table 61: Pedestrian ability to cross the corridor criteria

Criteria	Minimum	Maximum	Minimum Score	Maximum Score
Road Width	6.5m	20m	7	1
Median	Not Present	Present	0	1

Table 62: Pedestrian ability to cross the corridor performance score

Crossing Type	Staggered Unsignalised	Refuge	Pedestrian Activated Crossing	Traffic Signals	None
Performance Score	5	2.5	7	7	1

Table 63: Pedestrian ability to cross the corridor performance score

Speed Score	70	60	50	40	30
Performance Score	1	2.5	3.5	5	7

The segment score is based on a 1 to 7-point scoring system that has been utilised to assess overall level of service of pedestrian ability to cross the corridor and is based on:

$$Segment\ Score\ =\ Sum\ of\ (Length\ of\ Section\ x\ Section\ Score)\ /\ Total\ Length$$

E6.2 – Supporting Assessment Information

The existing intersection locations have been identified in the corridor and have been reproduced in **Table 64**.

Table 64: Existing intersection locations

Segment	Intersection No.	Location / Intersection	Intersection Type	Approx. distance from previous crossing
1	1	Anzac Highway	Traffic Signals (ATS)	
		Wattle Terrace / east of tram line	Signalised Pedestrian Crossing (SPC)	440
	7	Marion Road	ATS	159
		West of Scott Street	Refuge Island	105
		West of Brinkworth Street / Ryan Avenue	Refuge Island	407
	16	Chitral Terrace	ATS	230
	17	Winifred Avenue	ATS	60
	26	South Road	GSI/ATS/Railway Level Crossing	789
2	36	East Avenue	ATS	762
		East of Churchill Avenue / Teresa Moore Drive	SPC	470
	43	Goodwood Road	ATS	324
3		West of Jellicoe Avenue	Refuge Island / Bicycle turning lane	
		West of Railway Line	Refuge Island / Bicycle turning lane	
	50	Victoria Avenue	ATS	713
	51	Hilda Terrace	ATS	80
		West of View Street	Refuge Island	604
	60	Unley Road/Belair Road	ATS	200
4		Rugby Street	SPC	190
	63	Duthy Street/Harrow Terrace	ATS	393
		West of West Terrace	SPC	166
	67	Fullarton Road	ATS	816
		West of Waite Road	Refuge Island	743
		East of Waite Road	Refuge Island	92
		Between Pitcairn Avenue and Strathmore Grove	Refuge Island	345
	80	Princes/Glen Osmond Road/Portrush Road/South Eastern Freeway	ATS	391

A desktop assessment was undertaken to understand the ability for pedestrians to cross the corridor in order to access bus stops. **Table 65** summarises the bus stops and related pedestrian crossing opportunities to reach destinations within the bus stop catchment per corridor segment. Where there is no crossing between the bus stop and the next adjacent bus stop, this has been recorded as Nil.

Table 65: Bus stops with crossing opportunities and destinations by corridor segments

Segment number and name		Bus stops	Distance to nearest pedestrian crossing	Type of pedestrian crossing	Proximity to other modes and key locations serviced
1	Anzac Highway to South Road	183 N/S	28m/39m	Refuge island	Tram Stop 10 – Marion Road; Bus stops 12 and 13 Marion Road East Side; Commercial destinations including Sunrise Indian and Nepalese Restaurant, Hair 598, Hair By Amber and MPG Tax Accountant.
		182 N/S	35m/2m	Refuge island	Vermont Uniting Church; Plympton South Kindergarten; Yapinga Street Reserve; Commercial destinations including Snazzy Hair Designs and MPG Tax Accountant.
		181 N/S	32m/40m	Signalised	Bus stops Stop 11 Chitral Tce – East and West Side.
		180 N/S	Nil	Nil	Commercial destinations, including Fresh Chulo Restaurant, All in One Asian Grocery and Stokes Legal - Lawyers and Solicitors – Edwardstown.
		179 N/S	84m/99m	Signalised	Emerson Railway Station; Stop 10 South Rd - West Side; St Anthonys School; Tennyson Centre Hotel; CircoBats - Community Circus; Arruda Team Martial Arts School; X-Road Fitness; Foodbank South Australia; Commercial destinations, including Stokes Legal - Lawyers and Solicitors – Edwardstown.
2	South Road to Goodwood Road	Informal temp/school stop close to 438/357 Cross Road	110m/65m	Signalised	Emerson Railway Station; Stop 10 South Rd - East Side; CircoBats - Community Circus; St Anthonys School; Tennyson Centre Hotel; HITsa Training & Employment Centre; Commercial destinations.
		178 N/S	Nil	Nil	Clarence Park - Holiday Accommodation; Bracegirdle's Chocolate Shop.
		177 N/S	40m/110m	Signalised	Bus Stops 12 East/Winston Ave – East/West Side; Fairmont Tennis Club; C F Page Memorial Park; Rise & Grind Café; Physiocare 360 Physiotherapist; Bracegirdle's Chocolate Shop.
		176 N/S and Cabra Dominican College	52m/39m and 60m	Signalised	Cabra Dominican College; Gratia Church; Sophia Community Centre; Cumberland Park Shopping Centre.
		175 N	80m	Signalised	Bus Stops 9 Goodwood Rd – East/West Side; Subway Restaurant; Church of the Trinity; Gratia Church; Learning Keys Speech Pathologist; Cumberland Park Shopping Centre.
3	Goodwood Road to Unley Road	175 S	87m	Signalised	Bus Stops 9 Goodwood Rd – East/West Side; McDonald's; Auscare at Unley Retirement Community; Precious Cargo Education Montessori Early Learning; Zone Bowling; Goodlife Health Club.
		174 N/S	Nil	Nil	McDonald's; Auscare at Unley Retirement Community; Precious Cargo Education Montessori Early Learning; Zone Bowling; Goodlife Health Club.
		173 N/S	Nil	Nil	Unley Park Railway Station; Stop 11 Victoria Ave - East side; MyKitchen Café.
		172 N/S	43m/61m	Signalised	Stop 11 Victoria Ave - East side; Stop 12 Hilda Tce – West/East side; Mindi Indoor lodging; Sugar Daddy Desserts ADL.
		171 N/S	Nil	Nil	St Columba's Anglican Church; Hawthorn Uniting Church; Walford Parks Playing Fields.
4	Unley Road to South Eastern Freeway	170 N/S	62m/70m	Signalised	Walford Parks Playing Fields; Wanslea Child Care Centre; Viet Shack Take Away Restaurant; Vogue Theatre - Revival Fellowship; Commercial destinations.

Segment number and name	Bus stops	Distance to nearest pedestrian crossing	Type of pedestrian crossing	Proximity to other modes and key locations serviced
	169 N/S	Nil	Nil	Wanslea Child Care Centre; Supported Independent Living: Brairholm House (SACARE) Disability services & support organisation;
	168 N/S	37m/31m	Signalised	Bus Stop 10 Harrow Tce – East/West side; Brairholm House (SACARE) Disability services & support organisation;
	167 N/S	50m/46m	Signalised	Urrbrae Wetland
	166 N/S	Nil	Nil	Urrbrae Wetland; Highgate School
	165A and Urrbrae High School stops	188m and 127m/74m	Signalised	Bus Stops 12 Fullarton Rd – West/East side; Bus Stops 13 Fullarton Rd – West/East side; Bus Stop School Urrbrae High (632); Urrbrae Agricultural High School
	165 N/S	50m/53m	Signalised	Bus Stops 12 Fullarton Rd – West/East side; Bus Stops 13 Fullarton Rd – West/East side; Bus Stop School Urrbrae High (632); Urrbrae Agricultural High School; The University of Adelaide - Waite Campus
	164 N/S	Nil	Nil	The University of Adelaide - Waite Campus
	163 N/S	10m/40m	Refuge island	Bus Stops 21 Waite Rd – West/East side; The University of Adelaide - Waite Campus; The Carlyle on Cross Aged Care Service
	20 N/S	21m/65m	Refuge island	Southern Cross Care Retirement Community; The Monastery Memorial Garden and Function room.

Given the constrained environment, the arrangement is generally fit for purpose as the corridor is to provide for movement, and pedestrians are concentrated around significant locations where signalised crossings are generally provided.

Appendix F – Place Performance Indicators

Appendix F1 – Tree canopy

F1.1 – Scoring Methodology

Tree canopy coverage is scored through two performance indicators:

- Place tree canopy coverage – typical 4m **footpath and verge** width to measure proportion of vegetation shade for pedestrian along the corridor. This will be considered as a percentage of total footpath and verge width, refer **Table 66**.
- Urban realm tree canopy coverage – **50m buffer** to measure proportion of tree canopy cover along the corridor. Tree canopy coverage within the corridor has also been considered as a percentage with a 50m total buffer width (25m from the centreline), refer **Table 67**.

Table 66: Tree canopy cover performance indicator- footpath and verge widths

Level of Service	Tree Canopy cover over footpath (%)	Performance Score
A	80 - 100%	7
B	60 - 80%	7
C	50 - 60%	6
C	40 – 50%	5
D	30 - 40%	4
D	20 – 30%	3
E	10 - 20%	2
F	<10%	1

Table 67: Tree canopy cover performance indicator – 50 m buffer zone

Level of Service	Tree Canopy Cover 50 m buffer (%)
7	> 25.7%
6	21.6 – 25.7%
5	16.7 – 21.6%
4	12.7 – 16.7%
3	8.6 – 12.7%
2	4.6 – 8.6%
1	<4.6%

F1.2 – Scoring Assessment

Tree Canopy Mapping

Figure 92, **Figure 93** and **Figure 94** show the tree canopy cover over the footpath and verges, and within the 50-metre corridor buffer, for Segments 2, 3 and 4. Refer **Section 5.3.1** for the Segment 1 (see **Figure 66)**.

Figure 92: Tree Canopy Cover along Segment 2 – South Road to Goodwood Road

Figure 93: Tree Canopy Cover along Segment 3 – Goodwood Road to Unley Road

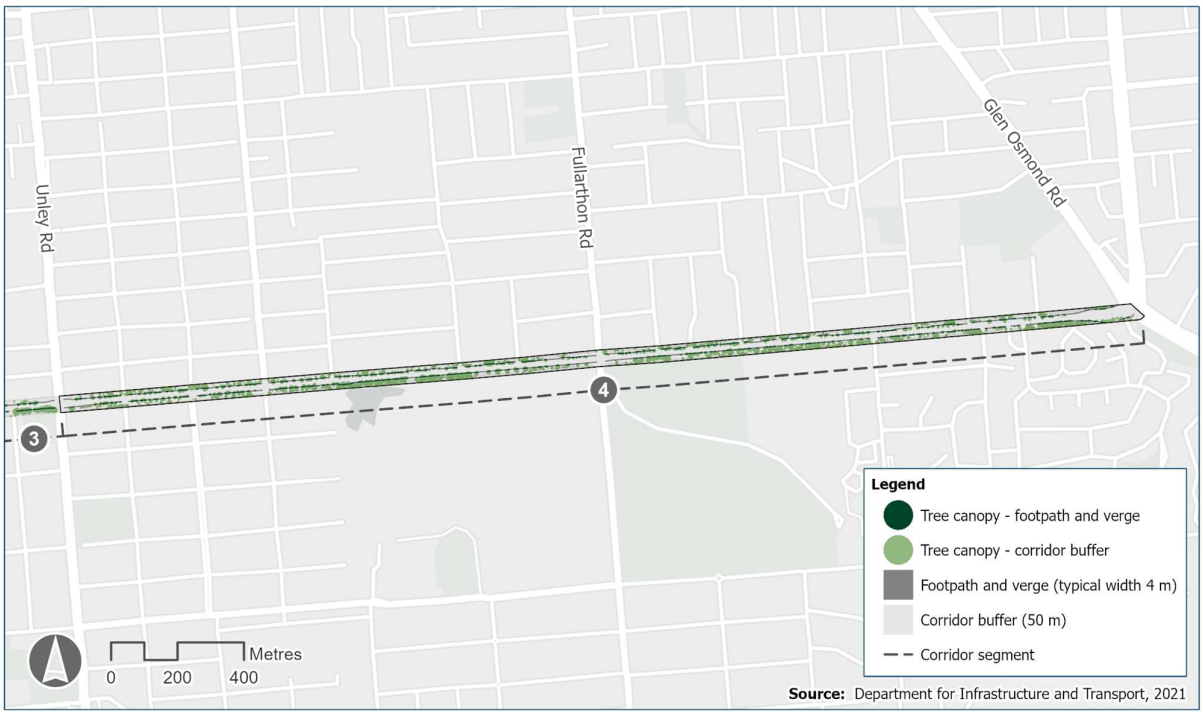


Figure 94: Tree Canopy Cover along Segment 4 – Unley Road to South Eastern Freeway

LoS Comparison Plots

Figure 95 and **Figure 96** compares the performance indicator scores (as a percentage) to the equivalent Level of Service per corridor segment, if consider the footbath and verge only.

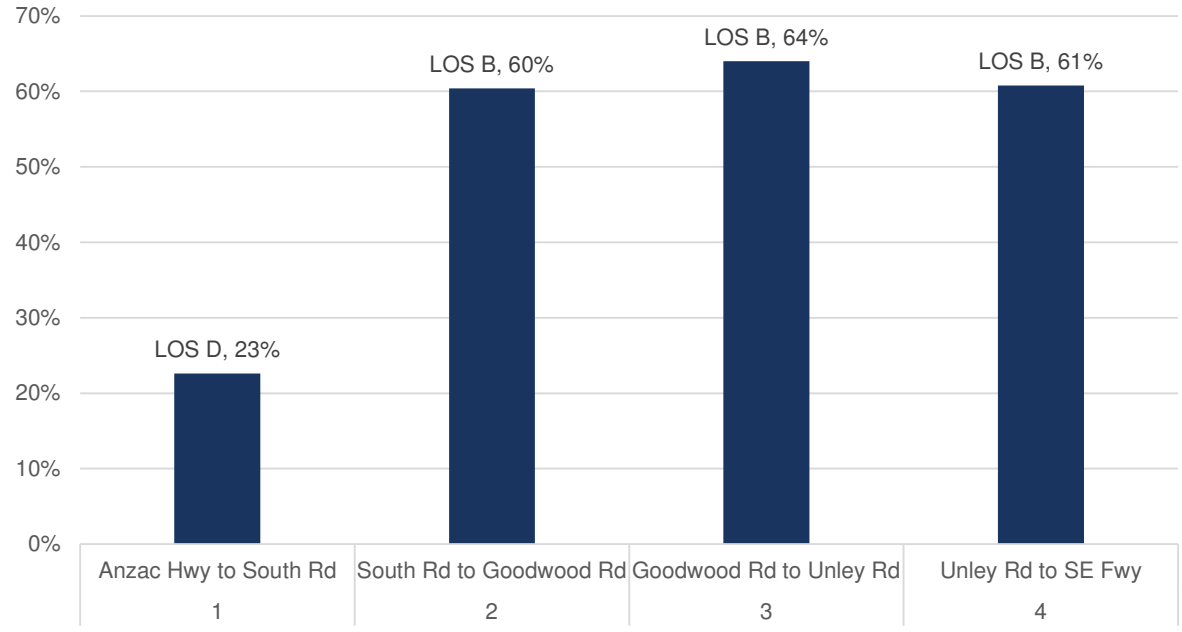


Figure 95: Place tree canopy cover scoring – Footpath and verge

The graph following compares the performance indicator scores per corridor segment, if consider the 50-metre buffer width.

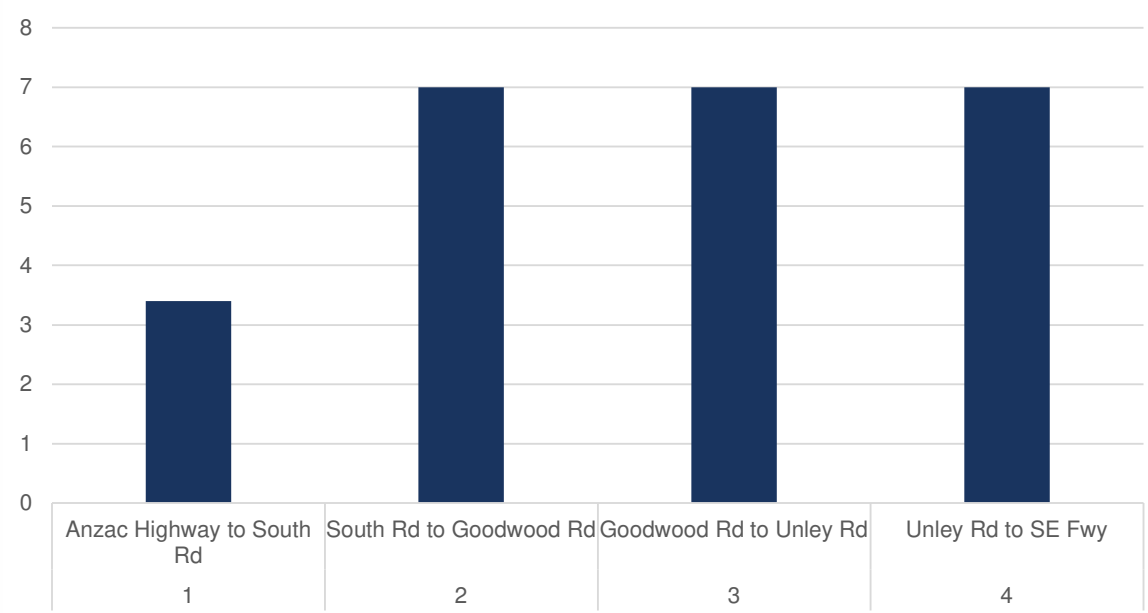


Figure 96: Urban realm tree canopy cover scoring- buffer widths

Appendix F2 – Bus stop conditions

F2.1 – Scoring Methodology

The bus stop performance indicator has been broken down to consider two criteria which have been weighted as follows:

- Bus stop facilities (60% weighting)
- Ease of crossing at a bus stop (40% weighting).

Each bus stop along the corridor was assessed against the bus stop facilities criteria, which gave consideration of each of the facilities noted in **Table 68**. A score was computed for each bus stop, based on a 1 point to 7 point scoring system, with weightings applied to each sub-criteria for the presence of each individual facility, also noted in the table.

Table 68: Bus stop facilities performance indicator scoring for individual criterion

Criteria		Weighting	Score
Bus stop facilities (60% weighting)	Bus stop pole and sign	13%	0.875
	Tactile markers	13%	0.875
	Timetable	13%	1.3125
	Seating	19%	2.1875
	Bus shelter	31%	0.875
	Rubbish bin	13%	0.875
	TOTAL	**100%**	**7**

The ease of crossing the corridor was determined based on the road configuration at bus stop locations that affect pedestrian ability to cross the corridor. These configurations include road width, presence of median, presence of crossing, and speed along the segment, which were considered in the weighted criteria calculations as follows:

$$Ease\ of\ Crossing\ at\ a\ Bus\ Stop\ Score\ =\ 80\%\ [\ Crossing\ Facility\ Score\ ]\ +\ 20\%\ [\ Vehicle\ Speed\ Score\ ],$$

where

$$Crossing\ Facility\ Score\ =\ Maximum\ of\ (Road\ Width\ Score\ +\ Median\ Score, Crossing\ Type\ Score\ )$$

Table 69, **Table 70** and **Table 71** provide details of the individual criterion scoring considered for each sub-criteria noted in the formulas above.

For bus stops with crossing facilities over 200 meters away, it was assumed that there was no nearby crossing facility for pedestrians to cross the corridor to access the bus stop, and a performance score of 1 was applied to the crossing facility sub-criteria.

Table 69: Performance score for road width and median

Criteria	Minimum	Maximum	Minimum Score	Maximum Score
Road Width	6.5m	20m	7	1
Median	Not Present	Present	0	1

Table 70: Performance score per crossing type

Crossing Type	Staggered Unsignalised	Refuge	Pedestrian Activated Crossing	Traffic Signals	None
Performance Score	5	2.5	7	7	1

Table 71: Speed performance score

Speed Score	70	60	50	40	30
Performance Score	1	2.5	3.5	5	7

The segment score is calculated as the average of all the bus stop conditions performance indicator scores for the segment.

F2.2 – Scoring Assessment

Observations per Segment

Table 72 provides the scoring assessment observations at each bus stop along the corridor.

Table 72: Performance indicator scoring assessment observations at each bus stop along the corridor

				Bus stop facilities criteria							Ease of crossing at bus stops criteria												
Stop ID	Location	Segment Location	Overall Score	Bus stop pole and sign	Tactile Markers	Timetable	Seating	Shelter	Rubbish bin	Overall Weighted Facility Score	Distance to bus stop from nearest crossing point (m)	Type of crossing	Width of road to cross	Median Presence (>1m Width)	Crossing Type (Refined)	Vehicle Speed	Width Score	Median Score	Width + Median Score	Crossing Type Score	Overall Crossing Facility Score	Speed Score	Overall ease of crossing score	Comments
14170	before scott	1	4.7	1	1	1	1	1	0	6.1	25	Refuge	19	1	REFUGE	60	1.4	1.0	2.4	2.5	2.5	2.5	2.5	
14171	after scott	1	4.7	1	1	1	1	1	0	6.1	34	Refuge	19	1	REFUGE	60	1.4	1.0	2.4	2.5	2.5	2.5	2.5	
14162	after new st	1	4.7	1	1	1	1	1	0	6.1	32	Refuge	19	1	REFUGE	60	1.4	1.0	2.4	2.5	2.5	2.5	2.5	
14167	before ryan ave	1	4.2	1	1	0	1	1	0	5.3	5	Refuge	19	1	REFUGE	60	1.4	1.0	2.4	2.5	2.5	2.5	2.5	
14156	before hammersmith ave	1	6.1	1	1	1	1	1	0	6.1	22	Signalised	20	0	TRAFFIC	60	1.0	0.0	1.0	7.0	7.0	2.5	6.1	
14158	before hammersmith ave	1	6.1	1	1	1	1	1	0	6.1	40	Signalised	20	0	TRAFFIC	60	1.0	0.0	1.0	7.0	7.0	2.5	6.1	
14154	after Narkunda St	1	3.7	1	1	0	1	1	0	5.3	390	Signalised			N/A	60				1.0	1.0	2.5	1.3	

				Bus stop facilities criteria							Ease of crossing at bus stops criteria														
Stop ID	Location	Segment Location	Overall Score	Bus stop pole and sign	Tactile Markers	Timetable	Seating	Shelter	Rubbish bin	Overall Weighted Facility Score	Distance to bus stop from nearest crossing point (m)	Type of crossing	Width of road to cross	Median Presence (>1m Width)	Crossing Type (Refined)	Vehicle Speed	Width Score	Median Score	Width + Median Score	Crossing Type Score	Overall Crossing Facility Score	Speed Score	Overall ease of crossing score	Comments
14155	before pine st	1	4.2	1	1	0	1	1	1	6.1	380	Signalised			N/A	60				1.0	1.0	2.5	1.3	
14151	before railway terrace	1	5.6	1	1	0	1	1	0	5.3	84	Signalised	34	0	TRAFFIC	60	1.0	0.0	1.0	7.0	7.0	2.5	6.1	
14152	before railway terrace	1	6.1	1	1	1	1	1	0	6.1	93	Signalised	34	0	TRAFFIC	60	1.0	0.0	1.0	7.0	7.0	2.5	6.1	
18426	after south rd (north)	2	3.5	1	0	1	0	0	0	1.8	112	Signalised	31	0	TRAFFIC	60	1.0	0.0	1.0	7.0	7.0	2.5	6.1	
18829	after south rd	2	2.4	0	0	0	0	0	0	0.0	66	Signalised	31	0	TRAFFIC	60	1.0	0.0	1.0	7.0	7.0	2.5	6.1	
14148	after Arthur St	2	1.6	1	1	0	0	0	0	1.8	305	Signalised			N/A	60				1.0	1.0	2.5	1.3	
14147	before Homer Rd	2	1.6	1	1	0	0	0	0	1.8	351	Signalised			N/A	60				1.0	1.0	2.5	1.3	

				Bus stop facilities criteria							Ease of crossing at bus stops criteria													
Stop ID	Location	Segment Location	Overall Score	Bus stop pole and sign	Tactile Markers	Timetable	Seating	Shelter	Rubbish bin	Overall Weighted Facility Score	Distance to bus stop from nearest crossing point (m)	Type of crossing	Width of road to cross	Median Presence (>1m Width)	Crossing Type (Refined)	Vehicle Speed	Width Score	Median Score	Width + Median Score	Crossing Type Score	Overall Crossing Facility Score	Speed Score	Overall ease of crossing score	Comments
14146	after Ackland Ave	2	5.3	1	1	1	1	0	1	4.8	110	Signalised	19	0	TRAFFIC	60	1.4	0.0	1.4	7.0	7.0	2.5	6.1	
14144	before East Ave	2	6.6	1	1	1	1	1	1	7.0	36	Signalised	19	0	TRAFFIC	60	1.4	0.0	1.4	7.0	7.0	2.5	6.1	
14142	after Teresa Moore Dr	2	6.6	1	1	1	1	1	1	7.0	38	Signalised	17	1	PAC	60	2.3	1.0	3.3	7.0	7.0	2.5	6.1	
14136	after Churchchill Ave	2	6.6	1	1	1	1	1	1	7.0	50	Signalised	17	1	PAC	60	2.3	1.0	3.3	7.0	7.0	2.5	6.1	
18905	after Churchchill Ave	2	3.5	1	1	0	0	0	0	1.8	58	Signalised	17	1	PAC	60	2.3	1.0	3.3	7.0	7.0	2.5	6.1	
14132	after Eaton St	2	6.6	1	1	1	1	1	1	7.0	83	Signalised	33	0	TRAFFIC	60	1.0	0.0	1.0	7.0	7.0	2.5	6.1	

				Bus stop facilities criteria							Ease of crossing at bus stops criteria													
Stop ID	Location	Segment Location	Overall Score	Bus stop pole and sign	Tactile Markers	Timetable	Seating	Shelter	Rubbish bin	Overall Weighted Facility Score	Distance to bus stop from nearest crossing point (m)	Type of crossing	Width of road to cross	Median Presence (>1m Width)	Crossing Type (Refined)	Vehicle Speed	Width Score	Median Score	Width + Median Score	Crossing Type Score	Overall Crossing Facility Score	Speed Score	Overall ease of crossing score	Comments
14135	after Goodwood Rd	3	5.3	1	1	1	1	0	1	4.8	89	Signalised	35	0	TRAFFIC	60	1.0	0.0	1.0	7.0	7.0	2.5	6.1	
14124	before Seymour Ave	3	4.7	1	1	1	1	1	1	7.0	241	Signalised			N/A	60				1.0	1.0	2.5	1.3	
14129	At Seymour Ave	3	1.6	1	1	0	0	0	0	1.8	245	Refuge			N/A	60				1.0	1.0	2.5	1.3	
14122	before Jellicoe Ave	3	3.1	1	1	1	0	0	1	3.5	20	Refuge	20	1	REFUGE	60	1.0	1.0	2.0	2.5	2.5	2.5	2.5	
14123	After Wurilba Ave	3	4.8	1	1	1	1	0	0	3.9	39	Signalised	23	0	TRAFFIC	60	1.0	0.0	1.0	7.0	7.0	2.5	6.1	
14119	before Whistler Ave	3	6.1	1	1	1	1	1	0	6.1	42	Signalised	20	0	TRAFFIC	60	1.0	0.0	1.0	7.0	7.0	2.5	6.1	

				Bus stop facilities criteria							Ease of crossing at bus stops criteria													
Stop ID	Location	Segment Location	Overall Score	Bus stop pole and sign	Tactile Markers	Timetable	Seating	Shelter	Rubbish bin	Overall Weighted Facility Score	Distance to bus stop from nearest crossing point (m)	Type of crossing	Width of road to cross	Median Presence (>1m Width)	Crossing Type (Refined)	Vehicle Speed	Width Score	Median Score	Width + Median Score	Crossing Type Score	Overall Crossing Facility Score	Speed Score	Overall ease of crossing score	Comments
14121	before Whistler Ave	3	4.0	1	1	1	0	0	0	2.6	63	Signalised	20	0	TRAFFIC	60	1.0	0.0	1.0	7.0	7.0	2.5	6.1	
14113	before George St	3	4.2	1	1	1	1	0	1	4.8	137	Refuge	17	1	REFUGE	60	2.3	1.0	3.3	2.5	3.3	2.5	3.2	
14112	before George St	3	4.4	1	1	0	1	1	0	5.3	106	Refuge	17	1	REFUGE	60	2.3	1.0	3.3	2.5	3.3	2.5	3.2	
14104	after Malvern Ave	4	6.6	1	1	1	1	1	1	7.0	68	Signalised	35	0	TRAFFIC	60	1.0	0.0	1.0	7.0	7.0	2.5	6.1	
14110	after Malvern Ave	4	4.8	1	1	0	0	1	0	3.9	71	Signalised	35	0	TRAFFIC	60	1.0	0.0	1.0	7.0	7.0	2.5	6.1	
14105	Before Cambridge Terrace (S)	4	4.0	1	1	1	0	0	0	2.6	146	Signalised	18	1	PAC	60	1.9	1.0	2.9	7.0	7.0	2.5	6.1	

				Bus stop facilities criteria							Ease of crossing at bus stops criteria														
Stop ID	Location	Segment Location	Overall Score	Bus stop pole and sign	Tactile Markers	Timetable	Seating	Shelter	Rubbish bin	Overall Weighted Facility Score	Distance to bus stop from nearest crossing point (m)	Type of crossing	Width of road to cross	Median Presence (>1m Width)	Crossing Type (Refined)	Vehicle Speed	Width Score	Median Score	Width + Median Score	Crossing Type Score	Overall Crossing Facility Score	Speed Score	Overall ease of crossing score	Comments
14101	Before Cambridge Terrace	4	5.6	1	1	0	1	1	0	5.3	177	Signalised	18	1	PAC	60	1.9	1.0	2.9	7.0	7.0	2.5	6.1	
14099	Before Duthy St	4	6.1	1	1	0	1	1	1	6.1	35	Signalised	19	0	TRAFFIC	60	1.4	0.0	1.4	7.0	7.0	2.5	6.1	
14102	Before Duthy St	4	3.5	1	1	0	0	0	0	1.8	29	Signalised	19	0	TRAFFIC	60	1.4	0.0	1.4	7.0	7.0	2.5	6.1	
14097	After West Terrace	4	5.6	1	1	0	1	1	0	5.3	45	Signalised	17	1	PAC	60	2.3	1.0	3.3	7.0	7.0	2.5	6.1	
14098	After West Terrace (S)	4	6.1	1	1	1	1	1	0	6.1	44	Signalised	17	1	PAC	60	2.3	1.0	3.3	7.0	7.0	2.5	6.1	
14089	Before Highgate St	4	4.7	1	1	1	1	1	1	7.0	366	Signalised			N/A	60				1.0	1.0	2.5	1.3	
14095	Before Highgate St (S)	4	3.7	1	1	0	1	1	0	5.3	360	Signalised			N/A	60				1.0	1.0	2.5	1.3	

				Bus stop facilities criteria							Ease of crossing at bus stops criteria													
Stop ID	Location	Segment Location	Overall Score	Bus stop pole and sign	Tactile Markers	Timetable	Seating	Shelter	Rubbish bin	Overall Weighted Facility Score	Distance to bus stop from nearest crossing point (m)	Type of crossing	Width of road to cross	Median Presence (>1m Width)	Crossing Type (Refined)	Vehicle Speed	Width Score	Median Score	Width + Median Score	Crossing Type Score	Overall Crossing Facility Score	Speed Score	Overall ease of crossing score	Comments
17881	After Hampstead Ave	4	5.6	1	1	0	1	1	0	5.3	189	Signalised	25	0	TRAFFIC	60	1.0	0.0	1.0	7.0	7.0	2.5	6.1	
18072	School	4	5.6	1	1	0	1	1	0	5.3	153	Signalised	25	0	TRAFFIC	60	1.0	0.0	1.0	7.0	7.0	2.5	6.1	
18076	School	4	3.5	1	1	0	0	0	0	1.8	73	Signalised	25	0	TRAFFIC	60	1.0	0.0	1.0	7.0	7.0	2.5	6.1	
14081	Before Fullarton Rd	4	5.3	1	1	1	1	0	1	4.8	50	Signalised	25	0	TRAFFIC	60	1.0	0.0	1.0	7.0	7.0	2.5	6.1	
14083	After Fullarton Rd	4	6.1	1	1	1	1	1	0	6.1	58	Signalised	26	0	TRAFFIC	60	1.0	0.0	1.0	7.0	7.0	2.5	6.1	
14074	After Myrtle Ave	4	2.1	1	1	1	0	0	0	2.6	284	Refuge			N/A	60				1.0	1.0	2.5	1.3	
14076	After Myrtle Ave (S)	4	1.6	1	1	0	0	0	0	1.8	291	Refuge			N/A	60				1.0	1.0	2.5	1.3	

				Bus stop facilities criteria							Ease of crossing at bus stops criteria													
Stop ID	Location	Segment Location	Overall Score	Bus stop pole and sign	Tactile Markers	Timetable	Seating	Shelter	Rubbish bin	Overall Weighted Facility Score	Distance to bus stop from nearest crossing point (m)	Type of crossing	Width of road to cross	Median Presence (>1m Width)	Crossing Type (Refined)	Vehicle Speed	Width Score	Median Score	Width + Median Score	Crossing Type Score	Overall Crossing Facility Score	Speed Score	Overall ease of crossing score	Comments
14067	After Urrbrae Ave	4	4.4	1	1	0	1	1	0	5.3	10	Refuge	17	1	REFUGE	60	2.3	1.0	3.3	2.5	3.3	2.5	3.2	
14071	After Urrbrae Ave (south)	4	4.9	1	1	1	1	1	0	6.1	42	Refuge	17	1	REFUGE	60	2.3	1.0	3.3	2.5	3.3	2.5	3.2	
14062	Before Strathmore Grove	4	4.2	1	1	1	1	1	0	6.1	367	Signalised			N/A	60				1.0	1.0	2.5	1.3	
14064	Before Birksgate Dr	4	4.7	1	1	1	1	1	1	7.0	345	Signalised			N/A	60				1.0	1.0	2.5	1.3	

Appendix F3 – Urban Realm

F3.1 – Scoring Methodology

The performance of each block-to block segment of the road corridor has been assessed based on the scoring system in **Table 73.**

Table 73: Urban realm quality considerations

Consideration		1 Critically poor	7 Outstanding
Urban scale	• Scale of signage, lighting and public realm elements (human scale or scaled to car movement) • Places to congregate and socialise	Overbearing	Responsive
Materiality and street furniture	• Ground surfaces and paving • Street furniture • Condition and design • Quality	Basic	High quality
Cultural animation and public art	• Murals, artworks and sculptures • Cultural narratives • Paving patterns and designs	None or limited	Extensive
Landscape, greening and WSUD	• Trees, shrubs and understorey planting • Maturity and condition/level of maintenance of landscape • Diversity of species • Presence of WSUD initiatives	None or limited	Established, mature or diverse
Legibility and wayfinding	• Presence of directional signage for pedestrians • Amount of signage (too little or too much) • Understandable and legible	None or illegible	Legible and consistent
Human comfort	• Physical experience of the space • Sensory experiences: sounds, smells, noise • Exposure to radiant heat from surfaces • Shade and shelter, protection from the weather	Impacted	Protected
Safety and security	• Perception of safety within the space • CPTED principles • Sightlines through the space • Pedestrian separation from the road carriageway	Unsafe	Safe and secure

F3.2 – Scoring Assessment

Observations per Segment

Table 74 through to **Table 81** provide the scoring assessment observations per segment and side of the corridor.

Table 74: Urban Realm - Segment 1 - North Side

	South Road to Homer Road	Homer Road to East Avenue	East Avenue to Churchill Avenue	Churchill Avenue to Goodwood Road	Average per segment	Observations
Urban scale	2	2	2	2	**2**	Signage & lighting are not scaled for pedestrians. No places to congregate, socialise or rest. Not engaging for pedestrians. Cycle lane provided on Cross Rd. Dedicated pedestrian/cycle crossing and median refuge provided at Michael Turtur Bikeway at the tram intersection.
Materiality and street furniture	2	2	2	2	**2**	Narrow, broom finish concrete and interlocking masonry paver paths in serviceable condition with low aesthetic quality. Several bus shelters with bench provided. Hard paved surfaces from boundary to kerb with small cut-outs for trees. Medians have gravel surface treatment.
Cultural animation and public art	1	1	1	1	**1**	No cultural animation or public art present within this segment.
Landscape, greening and WSUD	2	1	1	1	**1.25**	Predominantly mature ornamental pear trees (Pyrus calleryana) and four native trees in narrow verge form Anzac Hwy to Marion Rd. Large number of street trees missing from northern verge. Juvenile flowering plum trees (Prunus sp.) planted sparsely from Marion to South Road; very small tree species selected despite the absence of overhead powerlines. Long stretches of road without street trees. No understorey planting or WSUD due to narrow verge width.
Legibility and wayfinding	1	1	2	2	**1.5**	No wayfinding signage for cyclists/pedestrians to Michael Turtur Bikeway. Basic directional street sign for Glandore Community Centre. Standard street signage elsewhere. Low legibility for pedestrians navigating the space.
Human comfort	2	2	2	2	**2**	No shade from sparsely planted juvenile street trees. Narrow verges put pedestrians close to vehicular traffic. Noise and vehicle exhaust pollution is prominent. No places to stop and rest in shade for pedestrians.
Safety and security	3	3	3	2	**2.75**	Predominantly residential homes fronting Cross Rd with generally open frontages, promoting passive surveillance of public realm. Generally clear sightlines, although some hidden areas exist behind side fences. Paths are well lit by street lighting at night which increases the perception of safety. Areas closest to South Road open up to carparks for commercial properties which has a perception of being less safe and secure.
Average	**1.86**	**1.71**	**1.86**	**1.71**	**1.79**	

Table 75: Urban Realm - Segment 1 - South Side

	Anzac Highway to Marion Road	Marion Road to Chitral Terrace	Chitral Terrace to Wooton Road	Wooton Road to South Road	Average per segment	Observations
Urban scale	2	2	2	2	**2**	Signage & lighting are not scaled for pedestrians. No places to congregate, socialise or rest, except for one bench at ECH Independent Aged Care Centre entry along the entire segment. Not engaging for pedestrians. Cycle lane provided on Cross Rd. One signalised pedestrian crossing and median refuge provided at Michael Turtur Bikeway at the tram intersection.
Materiality and street furniture	2	2	2	2	**2**	Narrow, broom finish concrete and interlocking masonry paver paths in serviceable condition with low aesthetic quality. Several bus shelters with bench provided. Hard paved surfaces from boundary to kerb with small cut-outs for trees. Medians have gravel surface treatment.
Cultural animation and public art	3	1	1	1	**1.5**	Small artwork installation at Michael Turtur Bikeway at tram intersection.
Landscape, greening and WSUD	3	2	2	3	**2.5**	Mature ornamental pear and bottlebrush trees on verge beneath powerlines and mature lemon scented gum trees in median from Marion to South Road. Several trees missing in median and verge. No understorey planting or WSUD due to narrow verge width.
Legibility and wayfinding	3	1	1	3	**2**	Small wayfinding signage for cyclists/pedestrians at Michael Turtur Bikeway. Does not show where you are on the overall plan. Hard to see if not standing nearby. Small sign for South Rd intersection which is out of scale with major arterial road. Low quality Merino Rocks Greenway signage. Low legibility for pedestrians navigating the space.
Human comfort	2	2	3	3	**2.5**	Some shade from street trees. Narrow verges put pedestrians close to vehicular traffic. Noise and vehicle exhaust pollution is prominent.
Safety and security	3	3	3	2	**2.75**	Predominantly residential homes fronting Cross Rd with generally open frontages, promoting passive surveillance of public realm. Generally clear sightlines, although some hidden areas exist behind side fences. Paths are well lit by street lighting at night which increases the perception of safety. Areas closest to South Road open up to carparks for commercial properties which has a perception of being less safe and secure.
Average	**2.57**	**1.86**	**2.00**	**2.29**	**2.18**	

Table 76: Urban Realm - Segment 2 - North Side

	South Road to Homer Road	Homer Road to East Avenue	East Avenue to Churchill Avenue	Churchill Avenue to Goodwood Road	Average per segment	Observations
Urban scale	2	2	2	2	**2**	Signage & lighting are not scaled for pedestrians. No places to congregate, socialise or rest. Not engaging for pedestrians. Cycle lanes provided on Cross Rd. One signalised DDA compliant pedestrian crossing at Cabra Dominican College.
Materiality and street furniture	3	3	3	3	**3**	Ageing interlocking masonry paver paths in serviceable condition. Low aesthetic quality. Basic bus stop shelters with benches at Cabra Dominican College. Medians are paved with interlocking masonry pavers. Large trees causing damage to paved surfaces.
Cultural animation and public art	1	1	1	1	**1**	No cultural animation or public art.
Landscape, greening and WSUD	5	5	5	5	**5**	Mature avenue of plane trees provide high quality visual amenity and shade. No understorey planting or WSUD due to narrow verge. Some trees are missing from verge.
Legibility and wayfinding	1	1	1	1	**1**	No signage for potential rail commuters to highlight Emerson Railway Station. No legibility for pedestrians navigating the space. Standard street signage elsewhere.
Human comfort	5	5	5	5	**5**	Good shade from mature street trees. Narrow verges put pedestrians close to vehicular traffic and parked cars. Car parks have been designed into the verge zone; in some cases parked cars obstruct pedestrian movement along footpath. Noise and vehicle exhaust pollution is prominent.
Safety and security	3	3	3	3	**3**	Predominantly residential homes fronting Cross Rd, generally solid fenced frontages, reducing passive surveillance of public realm. Generally clear sightlines. Footpaths incorporate car parking bays, which makes the footpaths feel like they are part of the road.
Average	**2.86**	**2.86**	**2.86**	**2.86**	**2.86**	

Table 77: Urban Realm - Segment 2 - South Side

	South Road to Arthur Street	Arthur Street to Winston Avenue	Winston Avenue to Hill Avenue	Hill Avenue to Goodwood Road	Average per segment	Observations
Urban scale	2	2	2	2	**2**	Signage & lighting are not scaled for pedestrians. No places to congregate, socialise or rest. Not engaging for pedestrians. Cycle lanes provided on Cross Rd. One signalised DDA compliant pedestrian crossing at Cabra Dominican College.
Materiality and street furniture	3	3	3	4	**3.25**	Ageing interlocking masonry paver paths in serviceable condition. Low aesthetic quality. Basic bus stop shelters with benches at Cabra Dominican College. No seating provided at entry to Cabra Dominican College. Medians are paved with interlocking masonry pavers. Large trees causing damage to paved surfaces.
Cultural animation and public art	1	1	1	1	**1**	No cultural animation or public art. Attempt at *trompe l'oiel* to disguise the power sub-station fronting Cross Rd at the corner of Arthur Street is not a good example of what could have been achieved.
Landscape, greening and WSUD	4	5	5	5	**4.75**	Mature avenue of plane trees provide high quality visual amenity. No understorey planting or WSUD. Street trees between Ilford Rd and Arthur St have been compromised by pruning due to high voltage powerlines overhead.
Legibility and wayfinding	1	1	1	1	**1**	No legibility for pedestrians navigating the space. Standard street signage.
Human comfort	5	5	5	5	**5**	Good shade from mature street trees. Narrow verges put pedestrians close to vehicular traffic and parked cars. Car parks have been designed into the verge zone; in some cases parked cars obstruct pedestrian movement along footpath. Noise and vehicle exhaust pollution is prominent.
Safety and security	3	3	3	3	**3**	Predominantly residential homes fronting Cross Rd, generally solid fenced frontages, reducing passive surveillance of public realm. Generally clear sightlines. Footpaths incorporate car parking bays, which makes the footpaths feel like they are part of the road.
Average	**2.71**	**2.86**	**2.86**	**3.00**	**2.86**	

Table 78: Urban Realm - Segment 3 - North Side

	Goodwood Road to Jellicoe Avenue	Jellicoe Avenue to Grove Street	Grove Street to George Street	George Street to Unley Road	Average per segment	Observations
Urban scale	2	2	2	2	**2**	Signage & lighting are not scaled for pedestrians. No places to congregate, socialise or rest. Not engaging for pedestrians. Cycle lanes provided on Cross Rd.
Materiality and street furniture	2	4	2	2	**2.5**	Ageing interlocking masonry paver paths in serviceable condition. Low aesthetic quality. Contemporary bus stop shelters with benches. Medians are paved with interlocking masonry pavers. Large trees causing damage to paved surfaces.
Cultural animation and public art	1	1	1	1	**1**	No cultural animation or public art.
Landscape, greening and WSUD	4	5	4	5	**4.5**	Mature avenue of plane trees provide high quality visual amenity and shade. No understorey planting or WSUD due to narrow verge. Some large gaps in street trees are noticeable. No overhead powerlines.
Legibility and wayfinding	1	1	1	1	**1**	Standard street signage. No signage for Brown Hill Creek or Unley Park Railway Station. No legibility for pedestrians navigating the space.
Human comfort	5	5	5	5	**5**	Good shade from mature street trees. Narrow verges put pedestrians close to vehicular traffic and parked cars. Car parks have been designed into the verge zone; in some cases parked cars obstruct pedestrian movement along footpath. Noise and vehicle exhaust pollution is prominent.
Safety and security	3	3	3	3	**3**	Predominantly residential homes fronting Cross Rd with predominantly solid fenced frontages, reducing passive surveillance of public realm. Generally clear sightlines. Footpaths incorporate car parking bays, which makes the footpaths feel like they are part of the road.
Average	**2.57**	**3.00**	**2.57**	**2.71**	**2.71**	

Table 79: Urban Realm - Segment 3 - South Side

	Goodwood Road to Llanfair Terrace	Llanfair Terrace to Hilda Terrace	Hilda Terrace to Kent Street	Kent Street to Unley Road	Average per segment	Observations
Urban scale	2	2	2	2	**2**	Signage & lighting are not scaled for pedestrians. No places to congregate, socialise or rest. Not engaging for pedestrians. Cycle lanes provided on Cross Rd. There are no DDA compliant pedestrian crossings.
Materiality and street furniture	2	2	2	2	**2**	Interlocking masonry paver paths in serviceable condition. Low aesthetic quality. Some bus stops have basic benches. Medians are paved with interlocking masonry pavers. Large trees causing damage to paved surfaces. One very old bench provided at Walford Playing fields.
Cultural animation and public art	1	1	1	1	**1**	No cultural animation or public art.
Landscape, greening and WSUD	4	5	4	5	**4.5**	Mature avenue of plane trees provide high quality visual amenity and shade, with no overhead powerlines. No understorey planting or WSUD due to narrow verge. Some trees are missing from verge between Goodwood Rd and Llanfair Tce, however mature trees in large private garden contribute positively to the streetscape. Mature gums at Goodlife Health Club and private gardens adds some species diversity. Mature stand of lemon scented gums and grassed ovals at Walford Playing Fields contribute positively to the streetscape.
Legibility and wayfinding	1	1	2	1	**1.25**	Aged City of Unley bike route signage near Hilda Tce. No signage for Brown Hill Creek or Unley Park Railway Station. No legibility for pedestrians navigating the space. Standard street signage elsewhere.
Human comfort	5	5	5	5	**5**	Good shade from mature street trees. Narrow verges put pedestrians close to vehicular traffic and parked cars. Car parks have been designed into the verge zone; in some cases parked cars obstruct pedestrian movement along footpath. Noise and vehicle exhaust pollution is prominent.
Safety and security	3	3	3	3	**3**	Predominantly residential homes fronting Cross Rd with predominantly solid fenced frontages, reducing passive surveillance of public realm. Generally clear sightlines. Footpaths incorporate car parking bays, which makes the footpaths feel like they are part of the road.
Average	**2.57**	**2.71**	**2.71**	**2.71**	**2.68**	

Table 80: Urban Realm - Segment 4 - North Side

	Unley Road to Duthy Street	Duthy Street to Highgate Street	Highgate Street to Fullarton Road	Fullarton Road to Urrbrae Avenue	Urrbrae Avenue to Portrush Road	Average per segment	Observations
Urban scale	3	3	2	2	2	2.4	Signage & lighting are not scaled for pedestrians. No places to congregate, socialise or rest. Not engaging for pedestrians. Cycle lanes provided on Cross Rd, however it terminates suddenly opposite Urrbrae Wetland. At Rugby St there is a signalised dedicated bikeway crossing, as well as a dedicated pedestrian crossing, with dated aluminium tube fencing, and red light camera. Another pedestrian crossing signalised pedestrian crossing exists at West Tce.
Materiality and street furniture	4	4	2	2	6	3.6	Interlocking masonry paver paths in serviceable condition. Good quality bus stop shelters with benches, and litter bins with bin enclosures. Birksgate Dr to Portrush Rd has high quality paving and fencing in association with the gateway treatment at the Glen Osmond Rd/South Eastern Freeway intersection.
Cultural animation and public art	1	1	1	1	6	2	Glen Osmond Rd/South Eastern Freeway intersection has high profile water feature/art installation.
Landscape, greening and WSUD	4	4	4	3	3	3.6	Plane trees give way to a variety of species opposite Urrbrae Wetland, including mature Jacaranda, Desert Ash, senescent Melaleuca, and Gum (Eucalyptus sideroxylon) trees, coinciding with the resumption of overhead powerlines. The gateway treatment at the Glen Osmond Rd/South Eastern Freeway intersection has a tree missing due to lack of maintenance.
Legibility and wayfinding	1	1	1	1	2	1.2	Standard street signage for Concordia College and Lady George Kindergarten & City of Unley Bike Route at Highgate Street. Patawalonga catchment board signage for Glen Osmond Creek. Signage is small and hard to read. No legibility for pedestrians navigating the space. Standard street signage elsewhere.
Human comfort	4	4	3	3	3	3.4	Smaller street trees toward Portrush Rd provide little shade, and are sparsely planted. Narrow verges put pedestrians close to vehicular traffic. Noise and vehicle exhaust pollution is prominent. On-street parking provides more space for pedestrians in some areas.
Safety and security	4	4	3	3	2	3.2	Predominantly residential homes fronting Cross Rd with generally fenced frontages, reducing passive surveillance of public realm. Generally clear sightlines.
Average	**3.00**	**3.00**	**2.29**	**2.14**	**3.43**	**2.77**	

Table 81: Urban Realm - Segment 4 - South Side

	Belair Road to Harrow Terrace	Harrow Terrace to Fullarton Road	Fullarton Road to Waite Road	Waite Road to Portrush Road	Average per segment	Observations
Urban scale	3	2	2	2	2.25	Signage & lighting are not scaled for pedestrians. No places to congregate, socialise or rest. Not engaging for pedestrians. Cycle lanes provided on Cross Rd, however they terminate suddenly at Urrbrae Wetland. At Rugby St there is a signalised dedicated bikeway crossing, as well as a dedicated pedestrian crossing, with dated aluminium tube fencing, and a red light camera.
Materiality and street furniture	2	4	3	3	3	Interlocking masonry paver paths in serviceable condition. Basic bus stop shelters with benches. Old chainwire fencing along Urrbrae Wetland with barbed wire, and old chainwire fencing along Waite Arboretum and Urrbrae High School give an impression of neglect/lack of maintenance.
Cultural animation and public art	1	1	1	1	1	No cultural animation or public art.
Landscape, greening and WSUD	5	5	4	3	4.25	Generally no street trees in front of Urrbrae Wetland and High School (two Pine trees are within the road verge). Large mature pines and gums on the private side of the boundary dominate the streetscape almost up to Fullarton Road. Diverse understorey planting of native shrubs at wetland, and grassed playing fields at school. Diverse planting of trees and shrubs at corner of Fullarton associated with Urrbrae High School. Diverse tree planting at Waite Arboretum does not relate to Cross Road, but serves as a pleasant backdrop.
Legibility and wayfinding	2	1	1	3	1.75	Basic signs; hard to read Rugby St to Porter St bicycle route near Hilda Tce. Basic Waite Campus diectional signage. Dated 'Birksgate' historic interpretive sign. Two large signs at Urrbrae Wetland, but no interpretive information or wayfinding plans. Standard street signage elswhere.
Human comfort	3	3	3	3	3	Good shade from mature street trees. Narrow verges put pedestrians close to vehicular traffic. Noise and vehicle exhaust pollution is prominent. On street parking provides more space for pedestrians. Barbed wire atop chainwire fence at Urrbrae Wetland is not welcoming.
Safety and security	4	4	3	2	3.25	Predominantly schools, Urrbrae Wetland and The Monastery fronting Cross Rd with fenced frontages, reducing passive surveillance of public realm. Generally clear sightlines, especially through visually permeable fences along Urrbrae wetland and School.
Average	**2.86**	**2.86**	**2.43**	**2.43**	**2.64**	

Appendix F4 – Bicycle parking

F4.1 – Scoring Methodology

The performance indicator scores for bicycle parking is based upon Austroads Bicycle Parking Facilities Guide, adapted for place designation based upon land use and public transport stop types, refer **Table 82** and **Table 83**.

Table 82: Bicycle parking rates adapted from Austroads for specific Place classifications

Place score	Bicycle parking rates	Adapted from Austroads rates for
P1	7 per km	-
P2	5 per km	Shops - supermarket
P3	4 per km	Shops
P4	3 per km	Bulky goods retail
P5	0 per km	Residential

Table 83: Bicycle parking rates considered for public transport stop types

Public transport	Additional bicycle parking rates for PT stops
Bus stop	2 spaces per stop
Tram Stop	15 spaces per stop
Train station	40 spaces per station

As such, different place classifications along corridor segments result in different performance scoring metrics. Along the Cross Road corridor, it should be noted that only P4 and P5 place classifications are observed.

However, corridor segments that have a public transport stop consider additional bicycle parking rate requirements as outlined above on top of the rates outlined for specific place classifications in **Figure 54**: Movement and Place road classification matrix. These additional bicycle parking rates for public transport are considered an additional multiple of the number of public transport stops for each corridor segment. Therefore, the number of public transport stops along a particular corridor segment increases the target score that equates to a seven (7).

To reflect the differing target bicycle parking rates per km per segment, this performance indicator considers a scaled 7-point scoring system based on the percentage of target, where a score of seven (7) equates to 100% or more, and a score of one (1) equates to 0%, and scores between divided equally, refer **Table 84**.

Table 84: Bicycle parking performance scoring

Performance Score	Percentage of Target
1	0%
2	17%
3	33%
4	50%
5	67%
6	83%
7	100% or more

F4.2 – Scoring Assessment

Table 85 summarises the bicycle parking facilities observed along the corridor.

Table 85: Bicycle parking facilities along the corridor

Item ID	Segment	Place Classification	Location	Cycling Parking Facilities			Impact of public transport facility		Comments	Total parking
				U-rail	Circular Hoop	Bike lockers	Nearby public transport stop	Distance		
1	1	P5	Plympton Park	2	0	0	1	153.06m	2x U-rails infront of Glandore Supermarket	2
2	1	P5	Plympton Park	1	0	0	1	118.35m	1x U-rail infront of Dinner King / Adelaide Food Services	1

Table 86 summaries the bicycle parking performance indicator scoring per segment along the corridor, noting the scoring methodology outlined in the section above, and the number of public transport stop facilities along the corridor (refer Section 2.3.4 for details of the number of bus stops located along the corridor).

Table 86: Bicycle parking performance indicator scoring

Segment	Place Score	L (km)	Bike parking spaces	Spaces/ km	No. of Bus Stops	No. of Tram Stops	No. of Train Stations	Target	% of Target	Score
1	P5	2.3	3	1.3	10	1	0	35	9%	1.5
2	P4	1.6	0	0.0	10	0	1	65	0%	1
3	P4	1.7	0	0.0	9	0	1	63	0%	1
4	P5	3.2	0	0.0	21	0	0	42	0%	1

Appendix F5 – Pedestrian seating

F5.1 – Scoring Methodology

Pedestrian seating performance scores are calculated on a seat per km basis and benchmarked against a target of 1 bench (2 individual seats) per 100 metres. This target is based upon work undertaken by Gehl Architects. Seating at bus stops has been excluded from the assessment.

The scoring of pedestrian seating excludes non-bus stop seating. Scoring is based on the average number of seats over the segment within the ranges shown in **Table 87**.

Table 87: Pedestrian Seating Scoring System

Score	Average Spacing of Seats (max)	Average Spacing of Seats Distance (min)
1.0	>600	600
2.0	600	300
3.0	300	200
4.0	200	150
5.0	150	120
6.0	120	100
7.0	100	<100

F5.2 – Scoring Assessment

Pedestrian seating data has been compiled based on desktop review, refer **Table 88** .

Table 88: Existing pedestrian seating

	Segment	L	All Seating (Including Bus Stops)				Non-bus stop seating			
			# of Seats			Seats per km	# of Seats			Seats per km
			N	S	Total		W	E	Total	
1	Anzac Hwy to South Rd	2.30	12	15	27	11	0	0	0	0
2	South Rd to Goodwood Rd	1.60	6	6	12	7	0	0	0	0
3	Goodwood Rd to Unley Rd	1.70	9	8	17	10	0	2	2	0
4	Unley Rd to South Eastern Freeway	3.20	23	17	40	12	0	0	0	0

The overall scores achieved have been computed in **Table 89**.

Table 89 : Pedestrian seating performance scoring results

	Segment	Target	Achieved	Score
1	Anzac Hwy to South Rd	23	0	1
2	South Rd to Goodwood Rd	16	0	1
3	Goodwood Rd to Unley Rd	17	11.76%	1.7
4	Unley Rd to South Eastern Freeway	32	0	1

Appendix F6 – Frontage activation

F6.1 – Scoring Methodology

The level of activation for Cross Road frontages has been assessed using a scale of five activation levels (i.e. active, pleasant, in-between, dull, inactive). Specific examples for activations levels have been provided in **Figure 97**. Side streets have been excluded from this activation assessment.

Figure 97: Activation Level Scale Description

Each level of activation has been given a score out of 5, with A – Active being the highest (5) and E – Inactive being the lowest (1). The length of each segment of activation has been considered, to provide a weighted aggregated score per corridor segment. This has then been converted into a 7-point score.

F6.2 – Scoring Assessment

Figure 98 provides a breakdown of the differing levels of activations along each corridor segment.

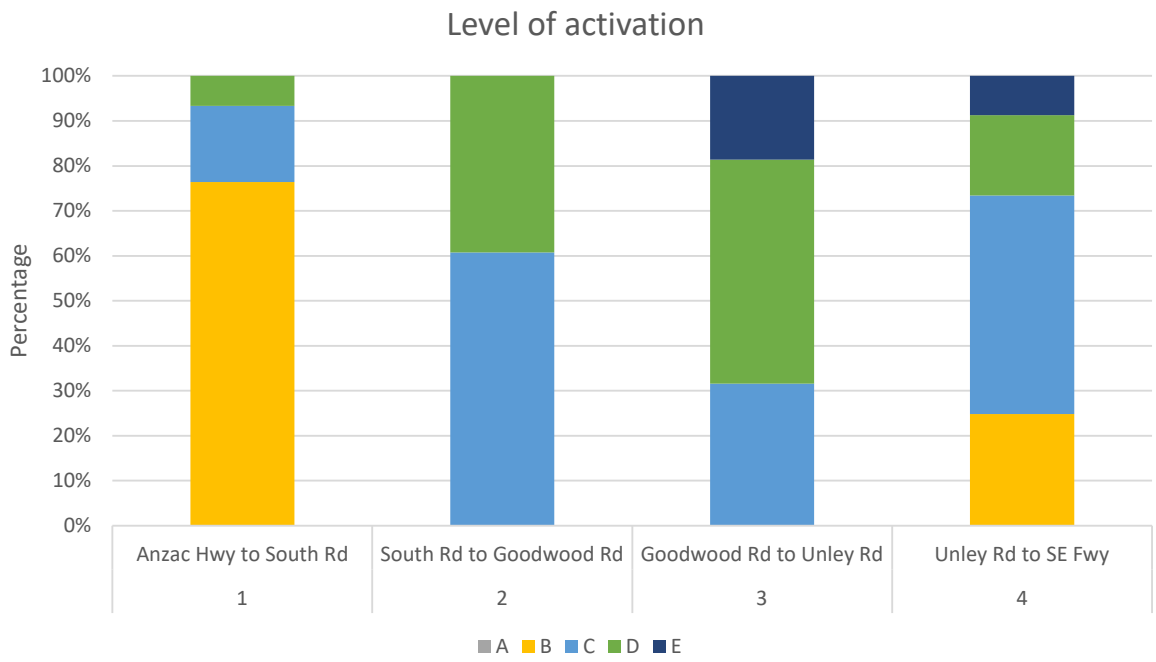


Figure 98: percentage splits of level of activation per segment

Figure 99 provides the resulting performance indicator scores for each corridor segment, as and average and for each side of the corridor.

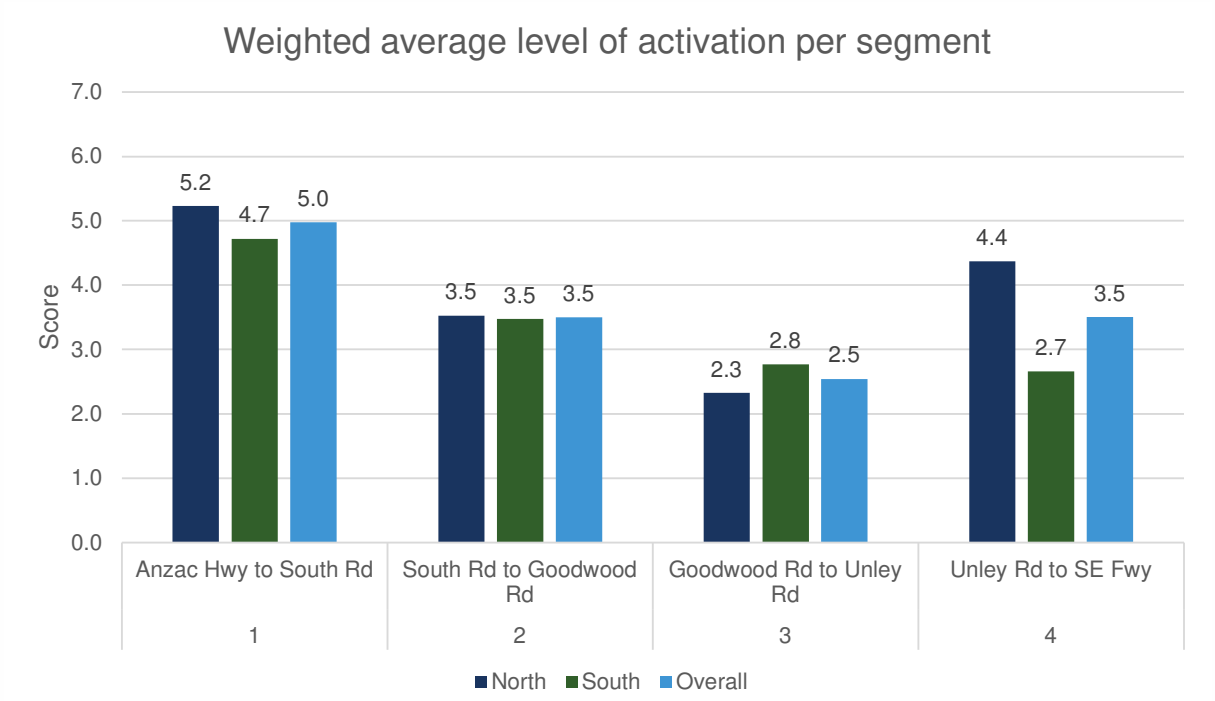


Figure 99: Weighted average level of activation scores per segment

The weighted levels of activation, per activation category are summarised in the **Table 90**.

Table 90: Level of frontage activation per segment

Segment		Level of Activation				
		A	B	C	D	E
		Active	Pleasant	In-between	Dull	Inactive
1	Anzac Highway to South Road	0.0	10852.0	2529.0	950.0	0.0:
2	South Road to Goodwood Road	0.0	0.0	4395.0	2924.0	0.0
3	Goodwood Road to Unley Road	0.0	0.0	1548.0	2656.0	1042.0
4	Unley Road to South Eastern Freeway	0.0	3800.0	7452.0	2784.0	1299.0

Note: Level of activation considers the length along each side of the corridor (excluding side streets), and is calculated using a five-level scale, where A through to E equates to 5 to 1 respectively. The values in the **Table** were derived by multiplying the length of activation in metres by this 1 to 5 scale.

Table 91 provides a summary of the corridor observations.

Table 91: Frontage activation observations

Segment	Side	Sub-segment	Description	Length (m) (minus intersections)	A – E score	Level of frontage activation score	Observations
1	North	a	Anzac Highway to Marion Road	528	B	2112	Residential homes with low or open fencing
1	North	b	Marion Road to Winifred Avenue	734	B	1468	Residential homes with low or open fencing
1	North	c	Winifred Avenue to Churchill Avenue	528	C	1584	Residential homes with low or open fencing
1	North	d	Churchill Avenue to South Road	219	B	657	Residential homes with low or open fencing
1	South	a	Anzac Highway to Marion Road	514	B	2056	Residential homes with low or open fencing
1	South	b	Marion Road to Chitral Terrace	718	B	2154	Residential homes with low or open fencing
1	South	c	Chitral Terrace to Wooton Road	315	C	1260	Residential homes with low or open fencing
1	South	d	Wooton Road to South Road	475	D	475	Residential homes with low or open fencing
2	North	a	South Road to Homer Road	361	C	1444	High fences to character homes.
2	North	b	Homer Road to East Avenue	325	D	650	High fences to character homes.
2	North	c	East Avenue to Churchill Avenue	392	C	1176	High fences to character homes.
2	North	d	Churchill Avenue to Goodwood Road	378	D	1512	High fences to character homes.
2	South	a	South Road to Arthur Street	264	C	1056	High fences to character homes.
2	South	b	Arthur Street to Winston Avenue	448	C	1344	High fences to character homes.
2	South	c	Winston Avenue to Hill Avenue	270	D	540	High fences to character homes.
2	South	d	Hill Avenue to Goodwood Road	489	D	978	High fences to character homes.
3	North	a	Goodwood Road to Jellicoe Avenue	492	E	1476	High fences to character homes.
3	North	b	Jellicoe Avenue to Grove Street	441	D	441	High fences to character homes.
3	North	c	Grove Street to George Street	269	D	538	High fences to character homes.

Segment	Side	Sub-segment	Description	Length (m) (minus intersections)	A – E score	Level of frontage activation score	Observations
3	North	d	George Street to Unley Road	253	D	506	High fences to character homes.
3	South	a	Goodwood Road to Llanfair Terrace	550	E	1650	High fences to character homes.
3	South	b	Llanfair Terrace to Hilda Terrace	160	C	320	High fences to character homes.
3	South	c	Hilda Terrace to Kent Street	365	D	730	High fences to character homes.
3	South	d	Kent Street to Unley Road	356	C	1068	High fences to character homes. Walford playing fields provides only activation
4	North	a	Unley Road to Duthy Street	583	D	1749	High fences to character homes. Some low fencing to character homes
4	North	b	Duthy Street to Highgate Street	555	B	1110	Character homes with low fencing.
4	North	c	Highgate Street to Fullarton Road	395	B	395	Character homes with low fencing.
4	North	d	Fullarton Road to Urrbrae Avenue	580	C	1160	Mix of high and low fencing to character homes
4	North	e	Urrbrae Avenue to Portrush Road	912	C	2736	Mix of high and low fencing to character homes and large apartments
4	South	a	Belair Road to Harrow Terrace	575	E	2300	High fences to character homes.
4	South	b	Harrow Terrace to Fullarton Road	992	C	1984	Character homes with low fencing. Long stretch of reserve at Urrbrae wetland & high school with open fences
4	South	c	Fullarton Road to Waite Road	809	D	2427	Waite Arboretum and University of Adelaide Campus with low open fencing offer little activation to Cross Rd
4	South	d	Waite Road to Portrush Road	724	E	724	Predominantly high fences to residential homes

Appendix G – Data

Strava

The below maps (refer **Figure 100** and **Figure 101** respectively) show the routes used by cyclists and walker/runners who are logged into the Strava app. This app allows users to track and upload their rides and walks/runs through Global Positioning System (GPS). The brighter the colour, the higher the levels of activity. The maps below show the last two years of data.

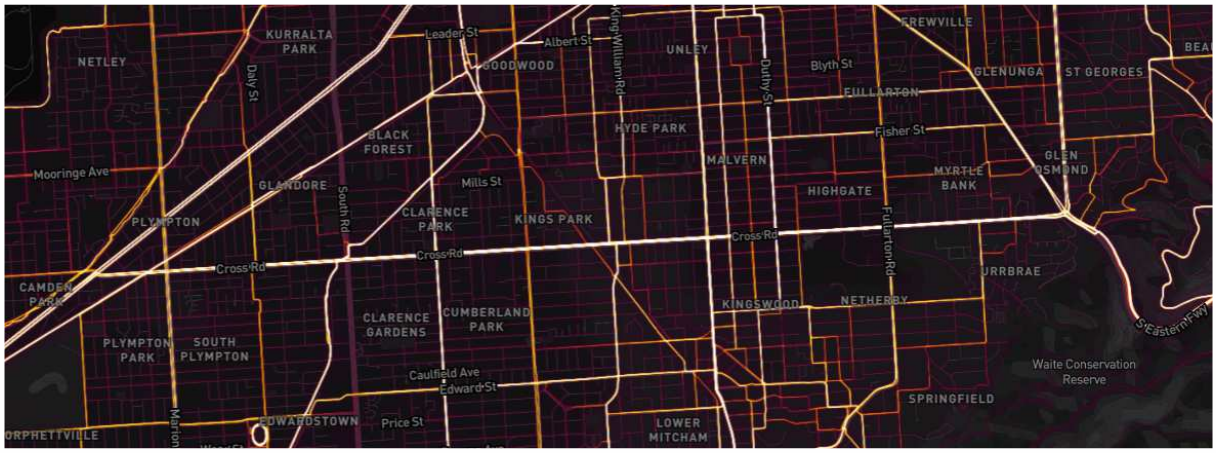


Figure 100: Strava Heatmap for cycling activity surrounding the Cross Road corridor

Figure 101: Strava Heatmap for walking and running activity surrounding the Cross Road corridor

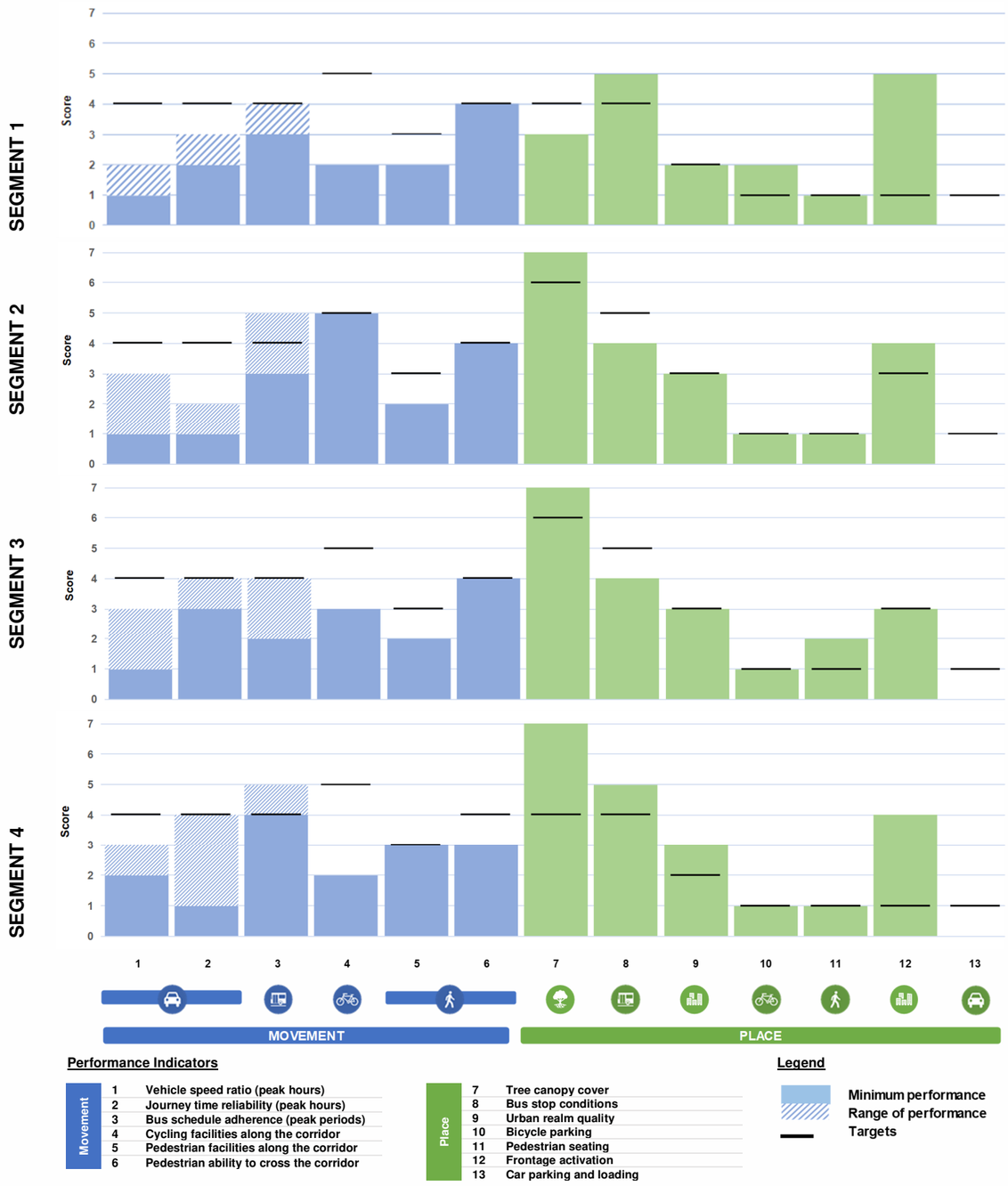
It should be noted that the Strava data provides a representation only and may not be reflective of all types of users (i.e. it only captures the journeys of those logging activity in the application).

The cycle routes shown along the Cross Road Corridor are expected to reflect those made by more confident cyclists. Confident cyclists are more likely to use routes where there is no separation or no dedicated on-road cycle lane provision adjacent to high volumes of vehicles and/or roads with high vehicle speed. The walking/running routes shown surrounding the Cross Road corridor are expected to reflect those made predominantly by runners, who are more likely than walkers to be using Strava.

Appendix H – Cross Road Corridor Traffic Modelling Report

IPP-AMJV-420-001-RP-KR-DO-0213

Appendix I – Performance Indicator Targets



Performance Indicator	Performance Score Target Minimum				
	Classification				
Movement	**M1**	**M2**	**M3**	**M4**	**M5**
Vehicle Speed Ratio (Speed Efficiency)	5	4	3	2	1
Journey Time Reliability	5	4	3	2	1
Bus Schedule Adherence	5	4	3	3	3
Cycling Facilities along the corridor	6	5	4	2	2
Pedestrian Facilities along the corridor	3	3	4	5	5
Pedestrian ability to cross the corridor	4	4	5	5	5
Place	**P5**	**P4**	**P3**	**P2**	**P1**
Tree canopy cover	4	6	7	7	7
Bus stop conditions	4	5	6	6	6
Urban realm quality	2	3	4	5	6
Cycling parking	1	1	2	3	4
Pedestrian seating	1	1	2	3	4
Frontage activation	1	3	5	6	7
Car parking and loading	1	1	3	4	5

The figures opposite chart the performance indicator scores per segment against a target. The target scores differ, depending on the movement and place categorisation of the segment as noted in the table above. Note that these targets (scored out of seven) are theoretical and have been developed based on professional judgement, with the intention of being applied to future corridor studies. Once additional corridor data sets are available, it is recommended that these targets be reviewed and revised as appropriate. ***Where the 'gaps' between performance indicator scores and the targets are three or more, it is recommended that infrastructure investment(s) be investigated to reduce the gap (whilst minimising any adverse impact to other indicators), as appropriate to the movement and or place corridor functions. Gaps have not been considered in isolation as a trigger for infrastructure investment(s).***

When comparing the corridor segments against the ***movement performance indicators*** and their targets for an M2 movement corridor, it can be seen that no segment achieves the performance indicator target for ***speed efficiency***. The figures opposite show the variability in this performance indicator during the peak hour and dependent on direction of travel. Segment 1 shows the worst performing speeds for all motor vehicles, scoring 2-3 below the target – this correlates to the segment with the highest density of signalised intersections and level crossings and the highest density of crashes along the corridor, which can impact on vehicle speeds, even though there is no evidence of mid-block congestion along the section (noting the segment has significantly lower traffic volumes when compared to the other corridor segments). The other segments also show a gap range between 1-3, indicating that this is not a localised issue.

Segment 4, which shows the highest minimum score for speed efficiency (gap range of 1-2, depending on the peak hour and direction of travel), also shows the greatest variability in ***journey reliability*** (with scores ranging from the target and up to 3 below). This section carries the highest traffic volumes along the corridor, although, it also has the lowest density of signalised intersections, suggesting variability in congestion along this segment. Segment 2, sees the worst average score for this indicator, with a gap of 2-3. It should be noted that this segment, although carrying approximately 20% less vehicles per day (than Segment 4), has a significantly higher concentration of signalised intersections and level crossings. It should be noted that all segments contain signalised intersections with north-south priorities crossing the corridor during peak periods, as opposed to east-west along the corridor.

The other movement performance indicator with a gap of up to three below the target (in Segments 1 and 4 only) is ***cycling facilities along the corridor***. However, noting the corridor is identified as both a national key freight route (for most of the corridor) and major cycling route, and there is a history of crashes along the corridor for cyclists, it is recommended that the functional hierarchy by mode and road safety be reviewed, along with the modal utilisations, to determine the future modal priorities and thus appropriate infrastructure investments to consider further.

Noting that Segments 1 and 4 are classified as P5 (local) place corridors, the ***place performance indicators*** for these segments have lower targets than compared to Segments 2 and 3 which are classified as P4 place corridors.

Only two indicators in any given segment along the corridor do not achieve the target for the place classification, however they only fall short by a score of one. As such, it is not considered appropriate to make infrastructure investments to reduce these gap (noting the place indicators considers facilities located directly along the corridor only and does not incorporate facilities considered part of adjacent land uses).

The gaps identified are reflective of the movement focused function on this corridor.