City of Charles Sturt

North-West Corridor Transport Study

Final

GTAconsultants Intermethod WAX URS

City of Charles Sturt

North-West Corridor

Transport Study

Client: City of Charles Sturt
Reference: 13A1168000
GTA Consultants Office: Adelaide

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By
Final	19/9/14	14 August 2014 City of Charles Sturt Asset Management Services Committee Item 3.77 Approved 21 August 2013 City of Charles Sturt Council Item 2.2 Endorsed	Paul Morris	Paul Morris	

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1. Introduction

Transport connects people to places. People travel daily to access jobs, health services, education and social activities. Travel and access are a vital component of our quality-of-life. Effective transport networks contribute to the sustainability and amenity of our communities.

The *North West Corridor Transport Study* (NWCTS) updates the two previous city-wide traffic and transport strategies prepared by the City of Charles Sturt in 2005 and 2006 for the North-West Corridor area. Both of these strategies were prepared using a more traditional approach to traffic planning, emphasising road network priority and efficiency for motor vehicles. Since 2006, the *Greater Adelaide 30 Year Plan* recommended urban in-fill along the North West Corridor including Transit Oriented Development (TOD) at rail stations on the Outer Harbor and Grange railway lines.

The NWCTS responds to future population growth and associated travel demand for the corridor between the Bowden and Woodville stations and surrounded by Port Road, Woodville Road, Torrens Road and Park Terrace. This study recognises that a 'business as usual' approach, relying on private motor vehicles, could not adequately, sustainably or equitably respond to the travel task without significant impacts to quality of life. This study proposes to make better provision for future travel through walking, cycling and public transport modes. This is a transformational use and transport policy for the North West Corridor.

The structure of this report is:

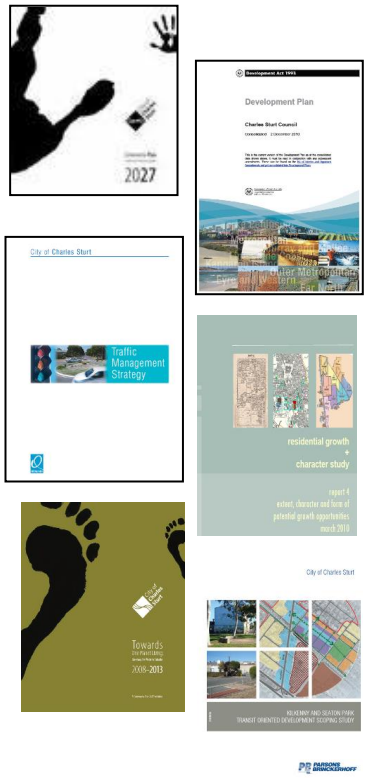
- Section 2: overview of the transport and land use policy context for the City of Charles Sturt.
- Section 3: investigate the existing transport network and operations within the corridor.
- Section 4: summary of best practice and application through strategy actions.
- Section 5: background for the consideration of strategic role of streets.
- Section 6: conclusions and summary of key recommendations from the study.
- Section 7: development and application of street typologies.

This study aims to provide for and respond to the challenges by identifying best practice in transport planning for the growth corridor and best practice design for the local road network to support walking, cycling and public transport modes.

The NWCTS will assist the City of Charles Sturt to prepare for the increase in population in the growth corridor. The NWCTS demonstrates how to apply best practice for walkable and bikeable communities on the existing street networks in the growth corridor. Key to the study is all of the small things that make walking and cycling a safe and comfortable experience through applying best practice. Following this best practice framework would deliver a walking and cycling network that provides a genuine choice for people to be able to walk and cycle within their local area.

2. Policy Context

2.1 Introduction



The City of Charles Sturt is responsible for the provision and planning for good transport networks within the municipality area. The City of Charles Sturt also manages land use planning policies in the municipality, although under direction of State Government policy directions, such as the 30 Year Plan. The State Government operates the arterial road network and public transport through the Department of Planning, Transport and Infrastructure (DPTI). Council controls the local road network and manages most of the pedestrian and bicycle networks. These responsibilities are outlined in various policies and strategies that contribute to the delivery of transport in the City of Charles Sturt.

2.2 Framework reference review

As part of the background assessment for the Study, a detailed review of existing transport, master planning and planning policy documents was undertaken by the project team.

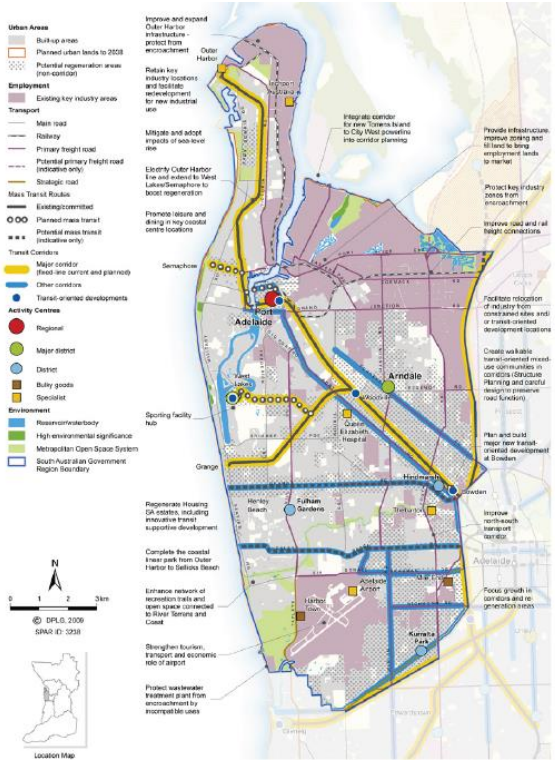
The review included the following documents:

- The 30 Year Plan for Greater Adelaide
- The Community Plan: Shaping the Western Suburbs
- The Corporate Plan: Shaping the Western Suburbs
- The draft Residential Growth & Character Study
- Towards One Planet Living: Greening the Western Suburbs
- City of Charles Sturt Development Plan
- City of Charles Sturt Transport Strategy 2005-2025 (The Transport Strategy)
- Open Space Strategy – Directions and Strategic Actions
- Traffic Management Strategy – Charles Sturt Council
- Residential Waste and Recycling Guidelines
- The Bowden Urban Village Masterplan (Draft)
- Woodville Village Masterplan
- Kilkenny and Seaton Park TOD Scoping Study
- Croydon/West Croydon/Kilkenny Local Area Traffic Management
- Bowden, Brompton, Ridleyton & Ovingham Local Area Traffic Management Plan
- Woodville Growth Areas Traffic Study
- City of Charles Sturt Industrial Land Study 2008

These framework documents provide a palette for the Study to examine new ideas, initiatives and solutions for the City of Charles Sturt. The following documents are considered to be most relevant to the Study.

2.3 Regional Policy

2.3.1 The 30 Year Plan for Greater Adelaide



The Plan was adopted in February 2010 and forms a volume of the SA Planning Strategy covering the Greater Adelaide region. The Plan sets a vision for Adelaide identifying areas for population and employment growth, new or enhanced infrastructure, community and services and adaptation to climate change. The Plan recognises that significant new development should be focussed within transit corridors, transit oriented development sites and activity centres so that only 20% of metropolitan Adelaide needs to change to accommodate growth targets. Character areas should generally be preserved and retained.

The City of Charles Sturt lies within the Western Region and key directions or targets include:

- Additional population within the region over the next 30 years, including 33,060 dwellings or 62,100 residents within transit corridors (and transit oriented developments).
- Increased densities along Woodville Road, Port Road, Grange Road and Torrens Road, and Outer Harbor & Grange rail corridors (North western growth corridor).
- Transit Oriented Development (TOD's) sites at Clipsal (Bowden Village), West Lakes and Woodville.
- Regeneration areas/infill or lower order TOD's adjacent to main railway stations including Kilkenny, Seaton and Grange.
- The Department of Planning, Transport Infrastructure Inner Metro Rim Structure Plan (incorporating Bowden and Hindmarsh environs) released in September 2012.

2.4 Local Policy

2.4.1 City of Charles Sturt Transport Management Strategy 2005-2025

This Strategy provides a framework to achieve better integration between the City's land use and transportation system. The Strategy recognises that the Outer Harbor/Grange rail lines serve an important function but are underutilised, there is a lack of an integrated bicycle network and that the pedestrian environment, which often falls below aspired quality and should be extended to link activity nodes. The Strategy further:

- Identifies key activity nodes within the City of Charles Sturt
- Reinforces a need for links to activity nodes for pedestrian and cycling routes in support of sustainable transport.
- Identifies a need to support existing transport corridors with appropriate levels of people density by infill residential and employment in under-utilised areas.

2.4.2 City of Charles Sturt Traffic Management Strategy

The Strategy provides guiding principles for managing traffic on the local street network, based on the development of a functional road hierarchy, and prioritisation of Local Area Traffic Management precincts across the City. The Strategy defines a "Classical Road Hierarchy" based on key typologies utilising traditional classifications, including arterial, distributor, collector and local street.

Of relevance, the Strategy:

- Recognises the need for a road hierarchy based on functional requirements, including pedestrian and cyclist needs.
- Prioritises areas for LATM identified based on systematic approach from traffic engineering oriented requirements.
- Sets out LATM Plans developed for some precincts within the study area (two subsequently completed).

2.4.3 City of Charles Sturt 'Community Plan' and 'Corporate Plan'

These two Plans are designed to work together to deliver a Charles Sturt that meets the community's aspiration for the City as a place to live, work and play. Both Plans recognise the challenges facing Charles Sturt including its ageing population, climate change and urban consolidation. The Plans:

- Recognise that the design and activation of streets is an important component of achieving the desired outcomes.
- Provide objectives and targets for street design, linkages, alternative travel options and mixed use communities.
- Unify asset management plans with major development sites to coordinate the upgrade of street infrastructure.
- Support the development of strong local communities through integration of land uses and transport options.

2.5 Future Directions

2.5.1 Section 30 Development Plan Review Recommendations (2008)

This Section 30 review pre-dates the adoption of the 30 Year Plan for Greater Adelaide which adds an additional layer of strategic guidance for future planning policy in the City of Charles Sturt. Of relevance to this Study, the review recommends:

- A review of Historic (Conservation) Zone boundaries.
- A review of areas adjacent to Port Road and the Outer Harbor rail line to support higher residential population and mixed used precincts.

2.5.2 Residential Growth and Character Study (2011)

This six part study was prepared for the City of Charles Sturt with the final summary report soon to be finalised. The study identifies key constraints and opportunities such as:

- Capacity issues at the intersection of Port Road/Cheltenham Parade/West Lakes Boulevard, Woodville Road, parts of West Lakes Boulevard and Kilkenny Road/David Terrace.
- Opportunity to provide improved cycle infrastructure including dedicated cycling and walking paths through the Greenways policy.
- Rezoning opportunities with the enhancement of rail services, plus enhanced relationships with adjoining land.
- Gaps in provision of open space including Cheltenham and Seaton.
- Balancing protection of heritage assets and opportunities for development.

The study recommends that:

- Future development areas should be integrated with alternative transport modes, including rail, light rail (tram), bus and cycling routes where available.
- Development sites should be designed and developed to encourage cycling and walking with connectivity to Council's overarching network.
- Develop specific dedicated cycling and walking routes through the Greenways policy initiative announced in the 30 Year Plan.
- Utilise the enhancement of the train and tram network to improve access and provide an opportunity to rezone land alongside the lines to higher density.
- Provide legible and permeable road and pedestrian networks within TOD's and activity centres to encourage the attractiveness of walking for short trips instead of driving.
- Accommodating vehicles is still important in the success of a vibrant mixed use TOD or activity centre, however, there is potential for relaxation of the provision for,and a strong need to minimise visual impact, of car parking.

2.6 Findings

The existing strategies, plans and studies provide an excellent evidence base on recent thinking and examples of local approaches to integrated transport planning within the Council area. Emerging development areas such as St Clair, Woodville West and Woodville Village, and areas in Bowden and Kilkenny, provide a starting point for re-thinking the consideration of street typology design and movement within localised growth areas.

The reviewed documents provide a precise analysis of issues relating to the implementation of, and emerging approaches to, matters such as waste disposal. There are many good ideas contained within the full suite of documents, however, there is also an underlying tenant that most of the reports are single issue based.

The transport studies in particular provide generic directions for the City of Charles Sturt with respect to development of transit oriented development areas and development of bicycle routes, however these documents do not consider the existing street network with forward planning to integrate walking and cycling within the street and network design.

In order to move forward, the lessons, omissions and ideas from these references need to be merged with fresh thinking and best practice to deliver outcomes currently sought by the City of Charles Sturt.

3. Movement Systems

This chapter presents an analysis of the existing conditions within the corridor across the local street network, walking and cycling networks and public transport services. This analysis will enable a comparison of the current movement systems to best practice discussed further in this report.

3.1 The City of Charles Sturt

The City of Charles Sturt is an inner metropolitan municipality located within 10km of the Adelaide Central Business District with a population of 110,000 (2012 ERP[1]). The City covers 5,563 hectares extending from the beaches of Gulf St Vincent to the west, Henley Beach and River Torrens to the south, Semaphore Park and Woodville to the north and to the edge of the city at Hindmarsh. The North West Corridor is located generally between Port Road and Torrens Road extending along the Outer Harbor railway line from Bowden to Woodville. The Corridor contains a high level of transport infrastructure including the railway with six stations, key arterial roads including Port Road, Torrens Road, South Road and Park Terrace, all served by regular bus routes.

The corridor comprises a mix of housing stock ranging from medium density in Bowden and Brompton, to low density to the west. The proximity of the corridor to existing rail public transport services and the Adelaide central business district reflects a higher than average use of public transport for journey to work. Car ownership is also slightly lower than the Adelaide metropolitan average.

The total value of City transport assets is $845 million and includes roads and footpaths. The City maintains 550 kilometres of local road network (Charles Sturt, 2010).

3.2 Growth Area Summary

The North West growth corridor (NW growth corridor) area is defined by:

- The land bounded by the twin arterial roads of Port Road and Torrens Road (including the Outer Harbor rail corridor as a central spine).
- The Grange Road transit corridor – longer term priority.
- Henley Beach and its environs – longer term priority.
- West Lakes Boulevard Corridor

The inner section of the NW growth corridor bound by Port Road/Torrens Road and environs is the focus of this study (referred to as 'The Study Area') as shown in Figure 3.1.

[1] Estimated Resident Population on 30 June 2012, Australian Bureau of Statistics

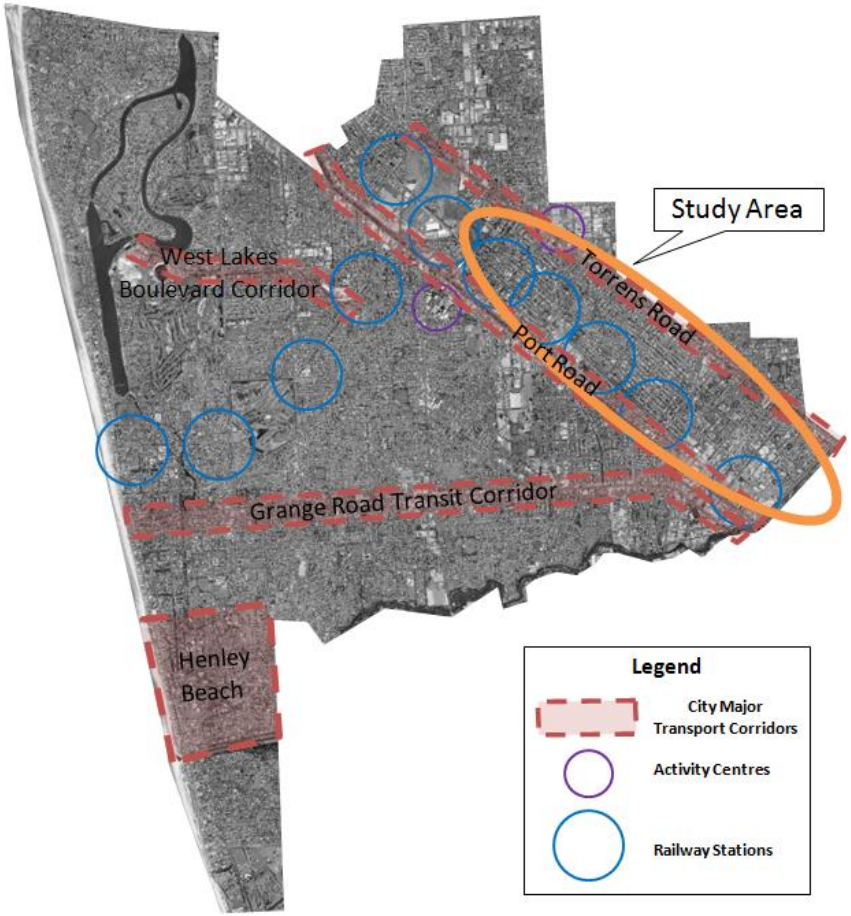


Figure 3.1: City of Charles Sturt Growth Corridor

3.3 Corridor characteristics

The Study Area comprises land stretching from the Adelaide Park Lands through the City of Charles Sturt to its border with the City of Port Adelaide Enfield. The NW growth corridor has a diverse range of uses and activities including regional attractors such as the Adelaide Entertainment Centre and Hindmarsh Stadium, industrial, commercial, education, medical, recreational and entertainment facilities. There is a mix of housing stock comprising a range of styles and densities representative of different eras in Adelaide's development.

The key elements of the NW growth corridor are discussed with respect to history and heritage, travel and movement and land use.

3.3.1 History and Heritage

The Corridor contains a rich heritage with a mix of original building stock within the City fringe dating from Adelaide's earliest settlement through to a mix of residential suburbs along the railway line that were first established when the Port Adelaide Rail Line was constructed in the 1850's. These suburbs, such as Bowden, Croydon, Woodville and Kilkenny, still contain large character areas with a high volume of housing dating from Victorian to Inter War periods and high quality commercial or civic buildings. As a consequence, there are numerous Contributory Items, State and Local Heritage Places within the Corridor.

3.4 Land Use Context for NW Corridor

Adelaide's Western Region, comprising the NW growth corridor, has experienced construction and renewal since earliest times, particularly the inner urban areas around Hindmarsh and further afield towards Port Adelaide. The existing urban environment is mixed, but generally low in density and scale.

According to the 30 Year Plan, the NW growth corridor offers significant opportunity to meet future growth targets enhanced by its strong rail connections. The Plan sets targets for residential and employment growth within the Western Region, namely a net additional residential population of 83,000 comprising 62,100 located within the corridors.

The corridor contains:

- Significant areas of residential activity ranging from higher density original housing and infill development within Bowden, Brompton and Ridleyton through to lower density suburbs further to the north west (Woodville and Croydon). The redevelopment of the Cheltenham Racecourse/Sheridan sites has commenced.
- Commercial activity along arterial roads such as Port Road, Torrens Road, David Terrace and Woodville Road. In addition, a cluster of commercial businesses within the City fringe suburbs of Bowden, Hindmarsh, Ridleyton and Brompton.
- Industrial activities primarily at Bowden, Brompton, Woodville and Kilkenny.
- Major retail centres at Arndale and Welland, along with smaller retail activity along Port Road, Woodville Road and Queen/Elizabeth Streets.
- The Queen Elizabeth Hospital located on Woodville Road.
- Primary and secondary schools including Kilkenny Primary School, Secondary School for English and Bowden Brompton Community School.
- Major public open space at St Clair with additional open space provision along the corridor.

3.4.1 Current infill projects

A number of development projects within the NW growth corridor are in the planning stage or underway, including:

- Bowden Village – a master plan for a higher density mixed use precinct.
- Cheltenham - St Clair – a master planned development on the former Sheridan/Actil and Cheltenham Racecourse site currently under construction. St Clair will comprise approximately 1200 new dwellings with a shopping centre next to a new station on the Outer Harbor line.
- Woodville Village – a master plan has been prepared for the long term vision for Woodville Road.
- Woodville Railway station TOD precinct.
- Woodville West - Todville Street redevelopment.
- AAMI Stadium precinct redevelopment.

3.4.2 Growth limitations

According to directions contained in the 30 Year Plan and recent work undertaken on behalf of the City of Charles Sturt (the Residential Growth Study), heritage and character areas are generally inappropriate for significant redevelopment or change to deliver higher residential densities.

The NW growth corridor contains a high provision of Historic (Conservation Zones) or Residential Character Areas mainly focussed in Brompton, Croydon and Woodville. The spatial extent of these existing character areas will limit development opportunities across the corridor.

In addition, other issues such as interface with existing uses, location of existing industry, transport accessibility, stormwater, water, waste, other infrastructure provision and open space must be considered when designing for growth.

3.4.3 Growth opportunities

Based on previous work undertaken by the City of Charles Sturt and the directions contained in the 30 Year Plan, the overall key growth opportunities (including projects listed above) within the NW growth corridor include:

- TOD sites at Bowden and Woodville offer high density land uses.
- Regeneration areas adjacent to main railway stations.
- Increased densities along road corridors (Woodville Road, Port Road, Torrens Road).

The industrial sector has also changed substantially within the last twenty years. The relocation or closure of many older industrial activities including Actil/Sheridan, Clipsal, Origin Energy and Shearer/Bianco offer an opportunity for 'brownfield' redevelopment sites within the corridor.

Transit Oriented Development Sites

Bowden Village is a major TOD measuring approximately 18ha in area and is intended to deliver at least 1800 new dwellings.

Woodville is a transit oriented development site formed as part of the Woodville Village Master Plan. A TOD would be oriented around Woodville Railway Station.

The Residential Growth and Character Study suggests densities for TODS within the order of:

- Up to 200m from rail station/centre: medium rise 5-10 storeys, high density.
- 200-400m from rail station/centre: low-medium rise 2-4 storeys, medium density.
- 400-800m from rail station/centre: low rise up to 2 storeys, low-medium density.

Railway stations

Key focus sites include Kilkenny, Cheltenham and Seaton.

The Residential Growth and Character Study suggests densities for transit corridor sites within the order of:

- Up to 100m of rail stations/transit stops: medium rise 4-5 storeys, high density
- 100-200m from rail stations/transit stops: low-medium rise 2-3 storeys, medium density
- 200-800m from rail stations/transit stops: low rise 2 storeys, low-medium density

Road corridors

- Land adjoining or within close proximity (400m) to other corridors identified in the 30 Year Plan and includes land either side of Port Road and Torrens Road, in addition to cross link corridors such as Kilkenny Road/David Terrace and Woodville Road.

The Residential Growth and Character Study suggest densities for TODS, within the order of:

- Up to 60m from road: medium rise 4-5 storeys, high density.
- 60-200m from road: low-medium rise 2-3 storeys, medium density.
- 200-400m from road: low rise 2 storey, low-medium density.

3.5 Destinations

All movements in a transport system are based around destinations. For people walking and cycling, the desirable destinations are typically within close proximity of the journey's origin. Typical average trip distances for pedestrians and cyclists are much shorter, especially compared to the distance travelled by motorists and public transport users. As discussed earlier, the corridor is primarily residential ranging from higher density original housing and infill development within Bowden, Brompton and Ridleyton through to lower density suburbs further to the northwest in the Woodville and Croydon area. Key destinations within the corridor are shown in Figure 3.2.

Commercial activity is typical along the arterial roads of Port Road, Torrens Road, David Terrace and Woodville Road, as well as clusters of industrial uses primarily in Bowden, Ridleyton and Brompton. Major retail centres outside of the corridor are at Arndale and Welland, along with smaller retail activity along Port Road, Woodville Road and Queen/Elizabeth Streets. The Queen Elizabeth Hospital is located to the south on Woodville Road.

Principal destinations for walking and cycling within the network include:

- the primary and secondary schools including Kilkenny Primary School, Secondary School for English and Bowden Brompton Community School;
- transit stops including railway stations and bus stops; and
- the local centres.

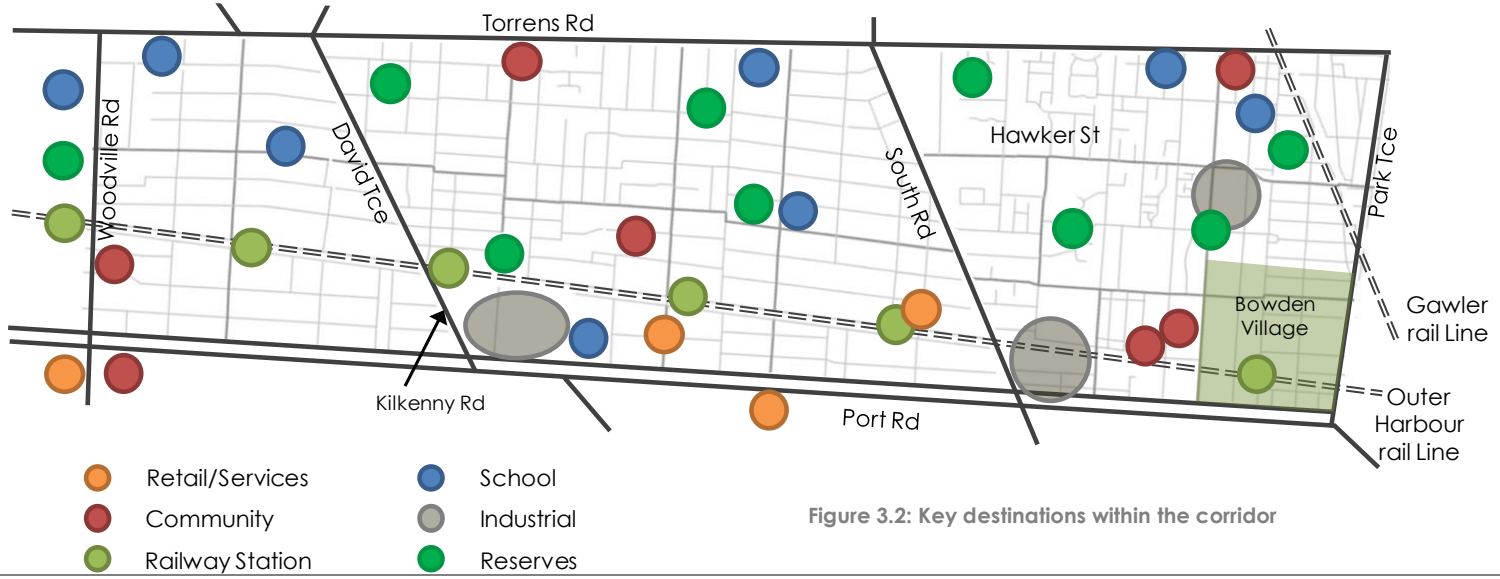


Figure 3.2: Key destinations within the corridor

3.6 Streets

The street network in the growth corridor has been developed from early days of South Australian settlement with traditional grid pattern networks oriented generally in parallel to the surrounding arterial roads. The streets are bisected by the railway line with limited access for motor vehicles across the railway line on local streets, with four local road crossings between Park Terrace and South Road and two local road crossings between South Road and Woodville Road. This does not include the arterial road crossings on Park Terrace, South Road, David Terrace and Woodville Road.

The grid pattern provides a high level of access to the surrounding arterial road network, with people able to choose many routes to exit most parts of the corridor. Given the limited access across the railway corridor there are few streets connecting the area to Park Terrace, which acts as a distributor or collector road playing an important role in providing access into the NW Corridor.

Hierarchy

Higher order roads were previously identified in the Traffic Management Strategy (Charles Sturt, 2005) for Rosetta Street, Hawker Street, Chief Street and Brown Street. All other streets were classified as local streets in the corridor. The road hierarchy as defined for the corridor is shown in Figure 3.3.

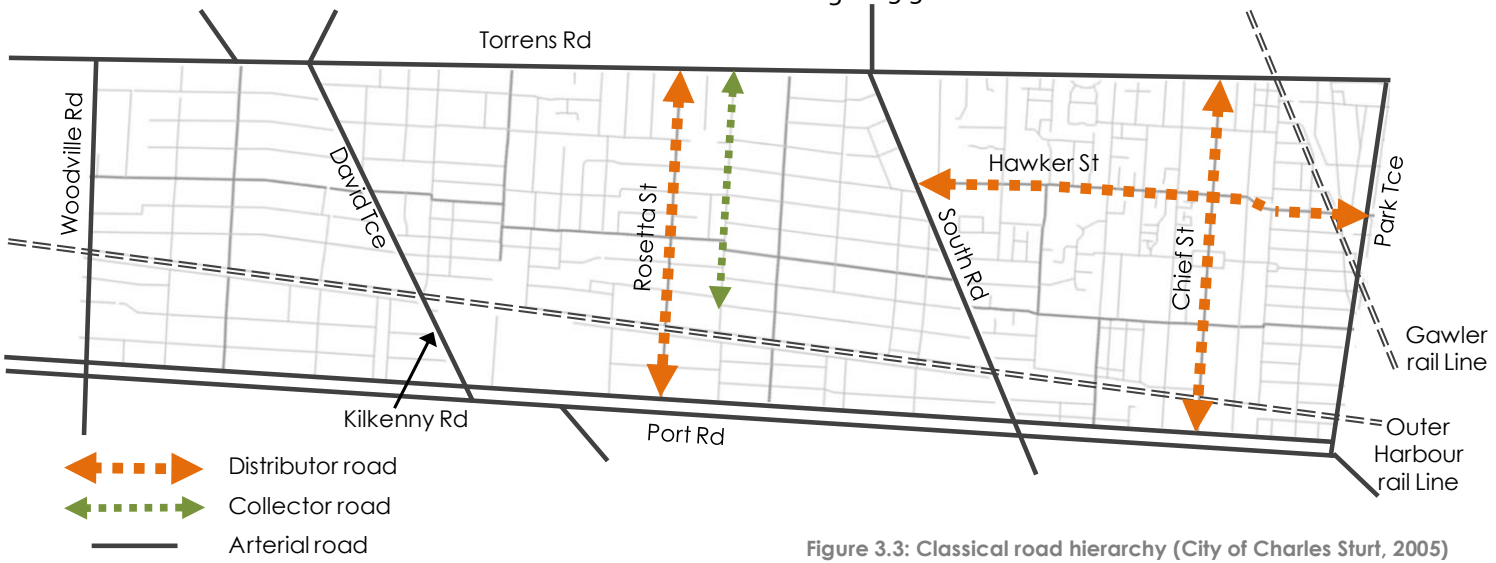


Figure 3.3: Classical road hierarchy (City of Charles Sturt, 2005)

The distributor roads provide access through the corridor typically with connections to the arterial roads with traffic signals at each end, which adds to the prominence of these streets in the network.

The configuration of each of these streets is as follows:

- Chief Street comprises a very wide two-lane carriageway over much of its length with indented parking and narrow footpaths.
- Hawker Street comprises a relatively narrower two-lane carriageway with parking lanes and narrow footpaths.
- Rosetta Street comprises a wide two-lane carriageway with parking lanes, and roundabouts at each intersection along its length.

Subsequent development of the Local Area Traffic Management Plan for Kilkenny, Croydon and West Croydon has identified Queen/Elizabeth Street as a collector road.

Chief Street and Hawker Street are shown in Figure 3.15 in section 3.13.

Speed

The speed limit on most streets is the general urban speed limit of 50km/h, with school zones at 25km/h when children present applying in relevant locations. A 40km/h speed limit applies to all streets in Bowden and Brompton, bounded by Port Road, South Road, Torrens Road and Park Terrace.

The historic grid layout of the streets is conducive to higher speeds, with many straight and wide sections of road as illustrated in Figure 3.16 in section 3.13. It is noted that some areas were subject to some of the earliest forms of local area traffic management in South Australia in the 1970's and 1980's, with the development of driveway links, roundabouts and road closures in some locations. More recently, a 40km/h area speed limit was applied to the Bowden, Brompton and Ridleyton area, whilst a 50km/h speed limit applies to all other streets in the corridor, except the bounding arterial road network which maintains a 60km/h speed limit.

The City of Charles Sturt has recorded traffic data including volume and speed of vehicles on many streets in the corridor. The 85th percentile speed, that is the speed at which 85 percent of drivers travel at or below has been plotted thematically on the street network in Figure 3.4 to indicate the spread of speed throughout the corridor.

Figure 3.4: Traffic 85th percentile speeds recorded in corridor

Many streets in the corridor have recorded 85th percentile speeds above 45 km/h, and some above 55km/h. These speeds are expected given:

- 50km/h general urban speed limit in most areas, except where 40km/h precinct speed limit applies;
- Wide carriageways being 7 metres or greater in width
- Minimal activity by people on streets;
- Minimal street scaping, in particular young or no trees on some streets;
- High entry speeds from arterial roads; and
- Overall lack of traffic controls across the corridor.

These typical features are shown on streets in Figure 3.17 in section 3.13.

Speeds are generally lower in Bowden and Brompton where a 40km/h speed limit applies and where streets are generally narrower in width due to the age of these suburbs with a higher perception of potential conflict for drivers.

Volume

Traffic volumes on most local streets are generally below 1,000 vehicles per day, with many below 500 vehicles per day. Only three local streets have recorded volumes above 3,000 vehicles per day, being the distributor roads of Rosetta Street (6,000 to 9,000 vpd), Hawker Street (4,000 to 5,000 vpd) and Chief Street (5,000 to 6,000 vpd).

These streets are the primary links through the corridor between the arterial road networks, and in some cases (Chief Street and Rosetta Street) are the only local streets to cross the railway corridor. Similarly, as a crossing over the railway corridor, Coglin Street in Bowden has recorded a volume of up to 1,800 vehicles per day.

The average daily traffic volumes recorded on streets in the corridor are shown in Figure 3.5.

Figure 3.5: Average daily traffic volumes in corridor

3.7 Safety

Crashes have been recorded by DPTI for the period 2006 to 2010. The predominant location for crashes is on arterial roads, as can be seen in

Figure 3.6, however there are also crashes occurring on the local street network in the corridor but they are reasonably distributed across the network, with slightly higher occurrence on the higher order streets including Rosetta Street and Hawker Street. Crashes on the local road network have generally resulted in property damage only although some resulted in injuries on the local road network.

Whilst the crash records indicate the incidence of crashes is similar to other local road networks, Hawker Street, Rosetta Street and Park Terrace North have recorded crashes at a higher rate than the surrounding streets.

Further detailed analysis is required to identify prevalent crash types and possible causes to inform any future street management plans. No fatalities were recorded on the local street network between 2006 and 2010.

Figure 3.6: Severity of crashes in corridor 2006-2010 (DPTI, 2011)

Analysis of the crash records has also identified locations where pedestrians and cyclists have been injured on the road network, although no fatalities have been recorded in the past five years in this area as shown in Figure 3.7.

The most common locations where pedestrians have been injured are on the arterial road network, with very few within the corridor's local road network. It is similar for cyclists with many of the crashes occurring on the arterial road network, in particular Port Road through Croydon and Bowden areas.

Further analysis of these crashes should be undertaken to determine the crash types and cause, in particular to determine if these crashes occurred in the relatively new bicycle lanes on these roads.

Figure 3.7: Pedestrian and cyclist crash locations with injuries

3.8 Walking

Walking is the most basic form of transport connecting people to places with all trips starting and ending with a walk, even motor vehicle-dominated journeys. Walking is an inclusive activity, undertaken by nearly everyone, regardless of age, income or ability. The health, environmental and social benefits of walking are well known.

The grid network of streets in the corridor provides a walking network with high permeability and density of walking routes through the area. Pedestrians do have choice of streets to use when walking in the area with access available on all streets in the corridor.

This enables people to use the shortest route available if desired in most instances when walking to their destination.

The City of Charles Sturt has an extensive footpath network in the corridor with footpaths provided on both sides of most streets. Many of these footpaths comprise a concrete surface of less than 1.4 metres wide. Various pavement types are used throughout the corridor, including interlocking pavers, concrete and bitumen. Kerb ramps are also provided at intersections throughout the area; although the standard of ramps varies with many not meeting current standards for Disability Discrimination Act (DDA) access (refer to Figure 3.8 and Figure 3.18 in section 3.13).

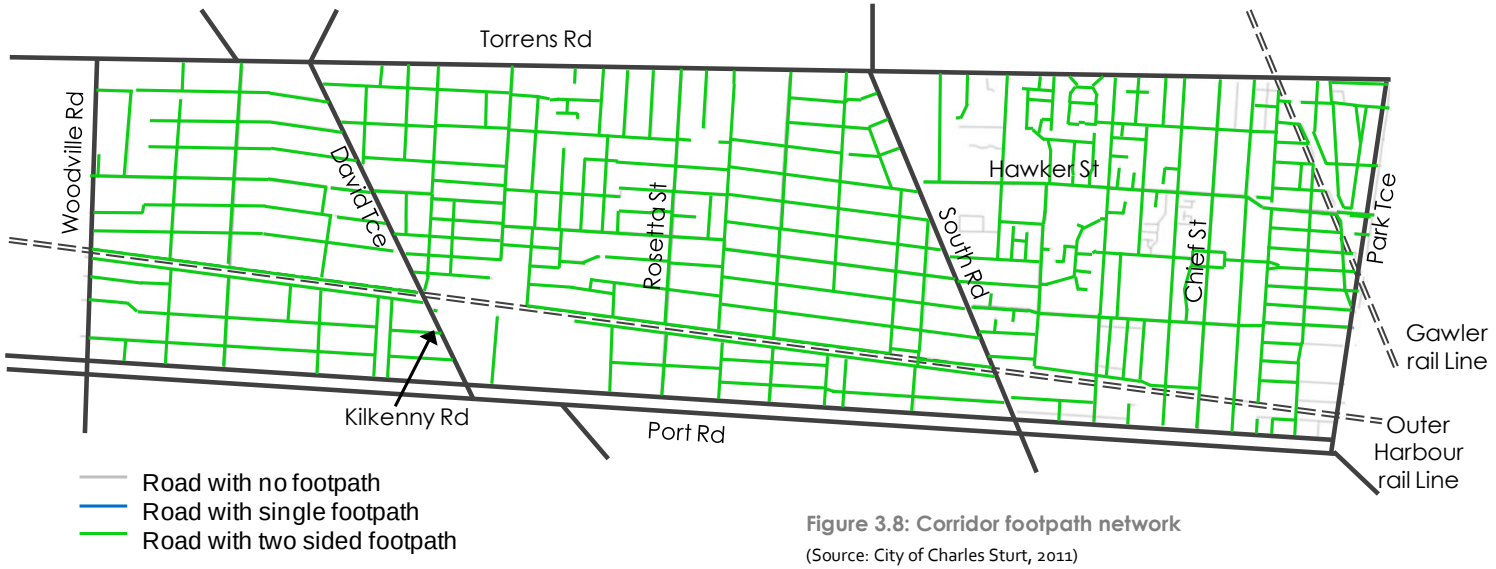


Figure 3.8: Corridor footpath network
(Source: City of Charles Sturt, 2011)

Railways typically present a challenge to walking in areas, severing access through infrequent crossing points often coordinated with road crossings.

In this study however, the corridor is unique with a high number of dedicated at-grade pedestrian crossings across the railway line, not combined with road crossings (between South Road and Woodville Road), and are shown in Figure 3.9.

The crossings across the railway contribute to maintaining a high level of access to and from the north and south within the corridor. The limited number of road crossings would otherwise severely limit the number of choices for pedestrians.

The pedestrian crossings across the railway line provide key access for people walking to schools and public transport, in particular bus services on Port Road.

The future upgrade of the railway to electrified services may require removal of these crossings; however the City of Charles Sturt should seek to maintain all of the crossings where possible. Upgraded pedestrian facilities have been provided at Croydon on Elizabeth Street as illustrated in Figure 3.19 in section 3.13.

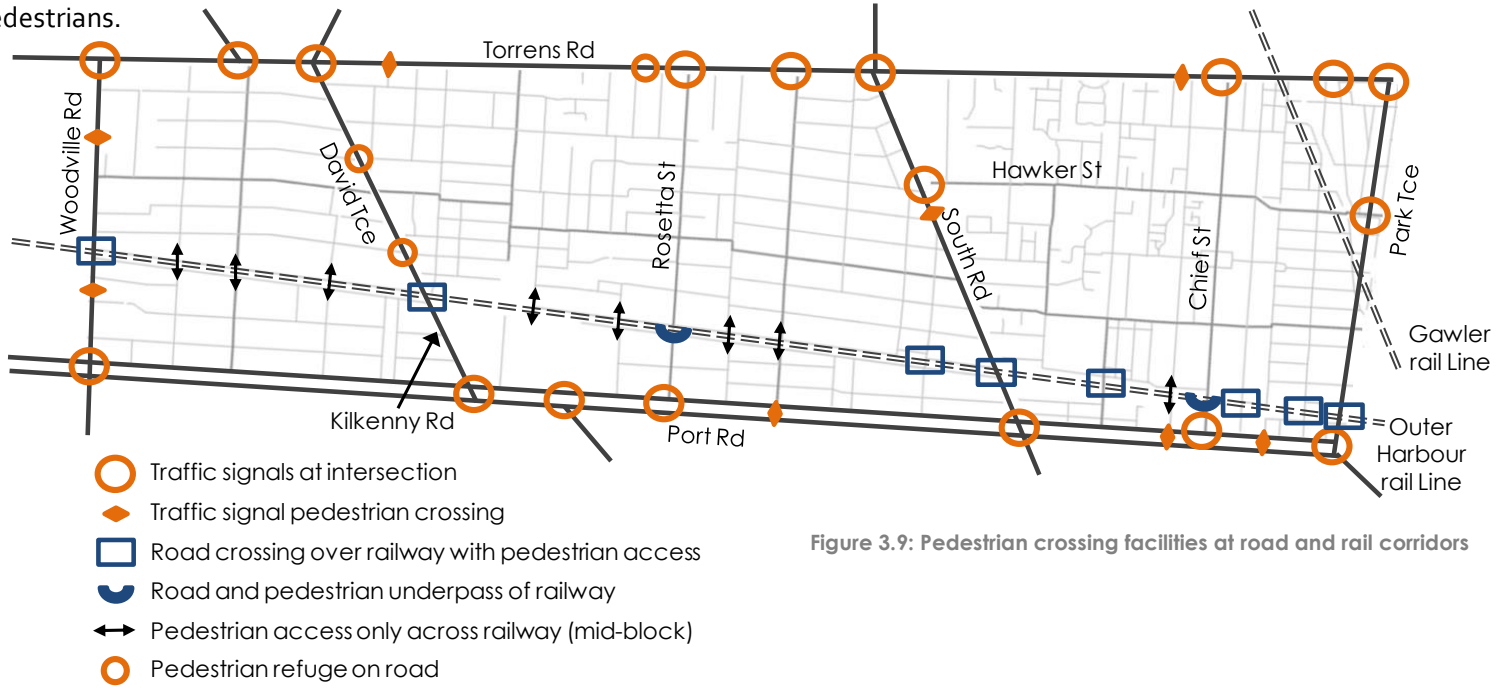


Figure 3.9: Pedestrian crossing facilities at road and rail corridors

The pedestrian crossing at Rosetta Street for the underpass requires people to walk across to the railway station and use the platform underpass system to cross the railway corridor. Access to the platform underpass is highly circuitous and unclear for people not familiar with the area. The south-eastern footpath approach to the underpass is shown in Figure 3.20 in section 3.13. This is a similar situation on all underpass approaches.

Whilst there are a range of facilities for people to use to cross the arterial roads, they are poorly spaced and not coordinated with public transport stops. The design of the roads does not assist people to cross at mid-block locations. The traffic volumes on these roads are very high, in particular during peak periods, and will be perceived to be a barrier by pedestrians to walking when having to cross these roads to their destinations.

Torrens Road has a raised central median to the northwest of South Road and there are few pedestrian openings through the median for people with prams or bicycles to use. There is a fence constructed in the median to control pedestrian movements. Torrens Road to the southeast of South Road has a wide carriageway carrying four traffic lanes. Pedestrians crossing this road must negotiate both directions of traffic at once with no median protection or refuge facilities.

Woodville Road and South Road present similar problems for pedestrians with wide roadways and high traffic volumes to contend with. David Terrace has two pedestrian refuges to the north of the railway line, however the high traffic volumes in two lanes present significant challenges to pedestrians crossing the road with continuous single lane flows in each direction.

Similarly with Port Road, the wide open reserve median can be difficult for pedestrians to cross with limited footpaths across the grassed (and very soggy in winter) reserve, as well as water ponding on the side of the unsealed shoulders at times. Figure 3.21 in section 3.13 indicates some of these problems that exist on Port Road and Torrens Road.

3.9 Cycling

Cycling is an ideal transport mode for many journeys in and around the City of Charles Sturt generally, with its relatively flat topography and proximity to the Adelaide central business district, and availability of other large centres and services in the region. The road grid network provides a high level of access visibility and permeability.

The local community demonstrates a high desire for walking or cycling with up to 14% of people travelling to work by walking or cycling[2].

The most popular area for cyclists is Bowden and Woodville. The corridor has similar or higher cycling than the Charles Sturt average, and the Adelaide metropolitan area. The data suggests an increase in walking and cycling since the previous census in 2001 for most of the areas in the corridor, although some recorded a decrease. The results for the corridor are shown in Figure 3.10.

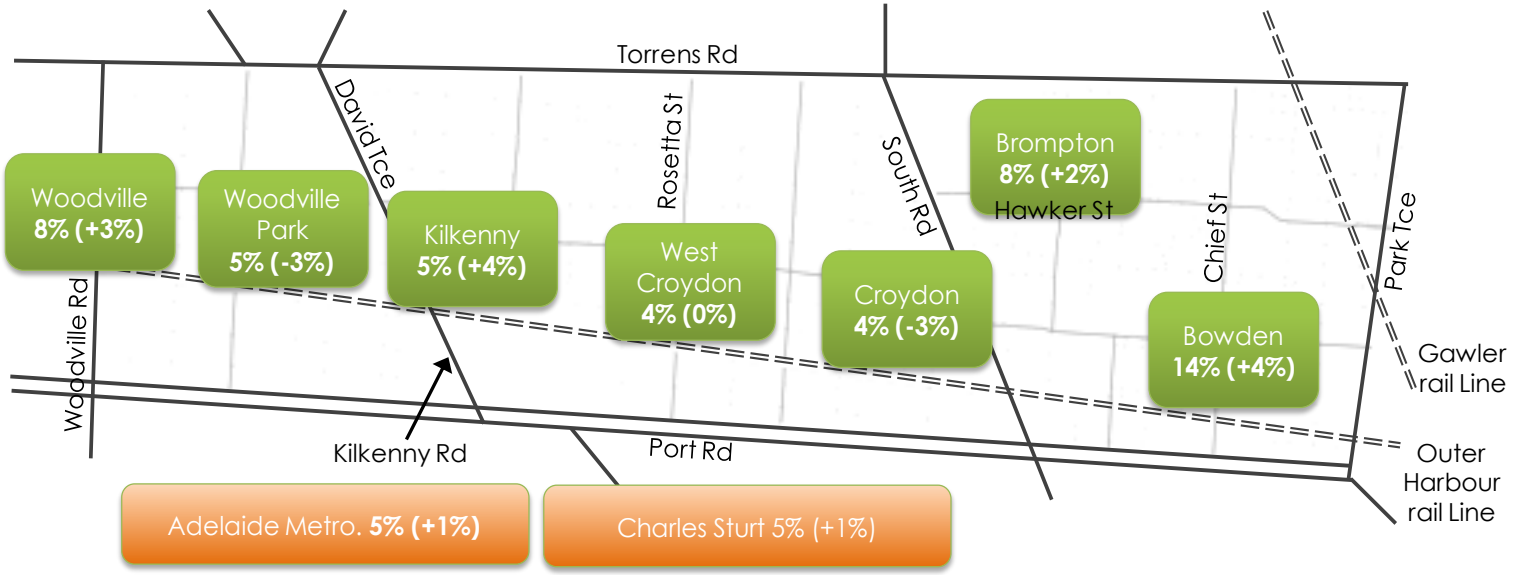


Figure 3.10: Walking or cycling to work statistics (2006 Census)

[2] City of Charles Sturt (2007), Community Analyst Eastern Charles Sturt

Traffic speeds on most streets in the corridor where there is a mix of bicycles and motorized vehicles are higher than desirable for cycling. Given the lack of formal dedicated cycling facilities on local streets, cyclists have no choice but to mix with motor vehicles during their journey. These are typically illustrated in Figure 3.22 in section 3.13.

Formal facilities are limited to the arterial roads bordering the corridor including Port Road, Park Terrace and Torrens Road, as well as David Terrace/Kilkenny Road.

The corridor's bicycle network comprises local streets as part of the Bikedirect[3] network which is designed to provide options for people with different cycling needs and abilities to use either arterial roads or local streets. The routes through the corridor do not comprise any formal facilities, such as bicycle lanes. Cyclists using these routes must also cross busy arterial roads carrying high traffic volumes. The cycling network is shown in Figure 3.11.

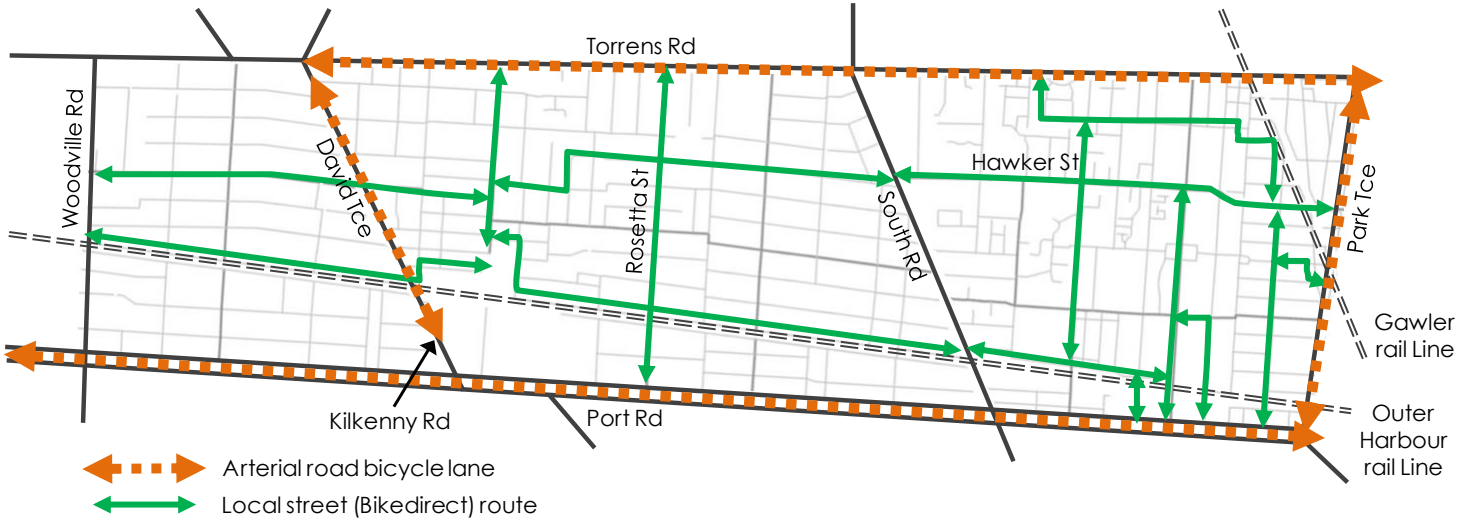


Figure 3.11: Bicycle Routes in and around the growth corridor

[3] Department for Planning, Transport and Infrastructure (2011), Bikedirect maps

Footpaths are generally constructed to less than 1.4 metres in width, and whilst most appear to be in good condition, they are too narrow for comfortable cycling by children under 12 who are legally permitted to do so. Many footpaths are located adjacent to fences where the risk of collision with reversing vehicles at driveways is present.

A shared use off-road path exists at the West Croydon railway station for cyclists to cross Rosetta Street at the underpass, on the northern side. The off-road path is shown in Figure 3.23 in section 3.13.

Cyclist access along Rosetta Street (to the north and south) is problematic with limited space through the underpass, and a circuitous route through the adjacent shared path system across the railway corridor.

Parking for cyclists along the railway line is limited with only Woodville railway station providing lockers and/or bicycle rails. Parking at other destinations in the corridor is often not readily found where it is available, although bicycle parking rails are also provided at Elizabeth Street in Croydon as shown in Figure 3.24 in section 3.13.

3.10 Public Transport

The state government is responsible for the delivery of public transport services in Adelaide. Council does, however, provide some supporting infrastructure such as seats and shelters at bus stops and operates local community transport services.

The growth corridor is well serviced by public transport routes, with bus routes on each surrounding road, except Park Terrace and part of South Road, as well as through the corridor via Hawker Street. The Outer Harbor and Grange railway line bisects the corridor from southeast to northwest, whilst providing strategic public transport access from the west to the city. The size of the corridor placed most people within convenient walking distance of either bus or rail services.

Most bus routes service journeys to and from the city, with the Arndale Shopping Centre on Torrens Road being a significant bus terminus and interchange in the region. The Woodville Road routes travel to and from Glenelg and Marion, and David Terrace and Port Road routes travel to and from West Lakes and Port Adelaide. The routes are shown generally in Figure 3.12.

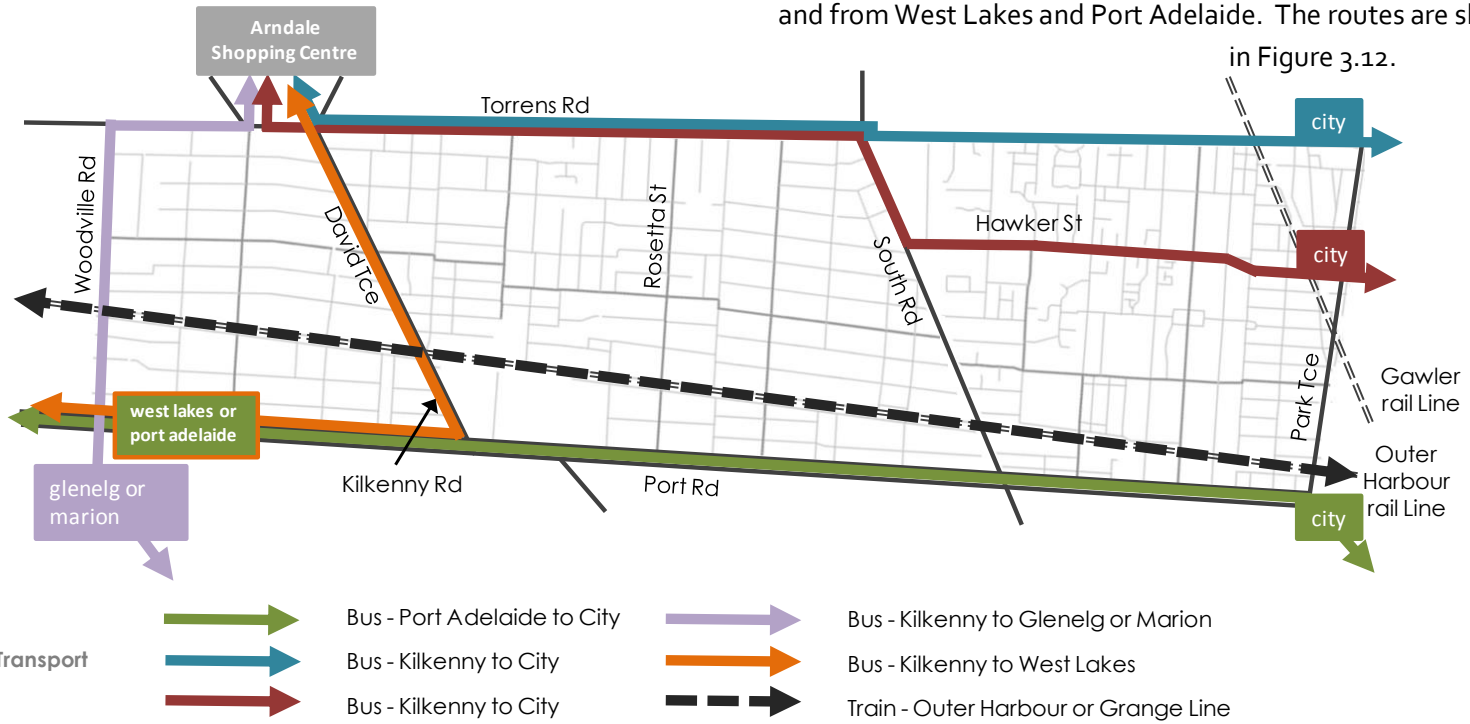


Figure 3.12: Public Transport Routes

There is very little access for people travelling north-south across the corridor compared to the southeast to northwest services to and from the city. Hence, much of the public transport in the corridor is part of the radial public transport network centred on the Adelaide central business district.

The frequency of bus services on David Terrace is very poor, with only four services per day at two hour intervals. Frequencies on other routes are good with less than 15 minutes during peak periods and 30 to 60 minutes during inter peak periods and weekends.

The train services are similarly of high level during peak periods and up to 30 minutes during inter-peak and weekends. The frequencies of services are shown in Figure 3.13.

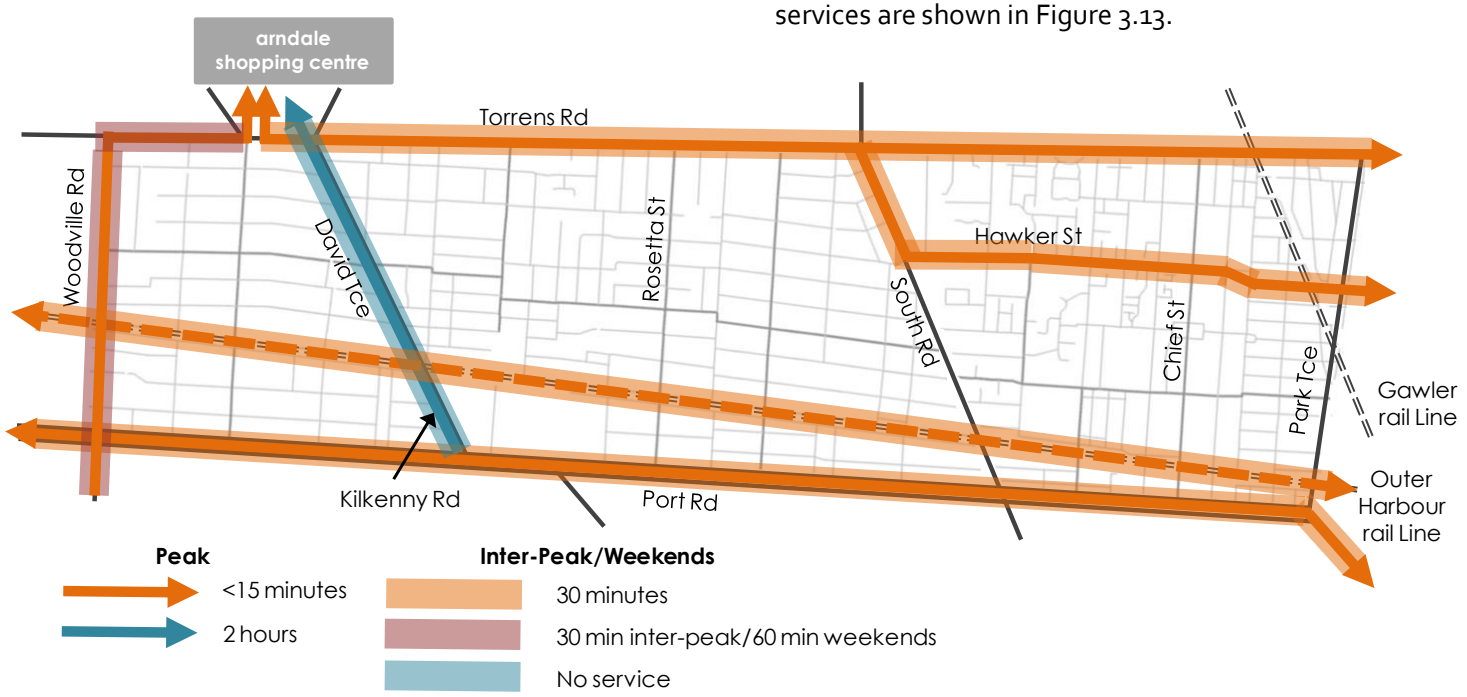


Figure 3.13: Public Transport frequency during all periods

The size of the growth corridor and the available services places many people within close proximity to public transport services. The potential walking routes and range to bus stops and railway stations are shown in Figure 3.14.

.As can be seen in that figure, many streets contribute to the walking component of accessibility to the public transport system. The walking routes are based on a 400 metre distance which equates to a five minute walk.

It is widely recognised that people will walk further to railway services with 800 metres generally considered the maximum. The diagram indicates a 400 metres walking radius for clarity, however if extending the walking range as discussed, much of the corridor would be encompassed.

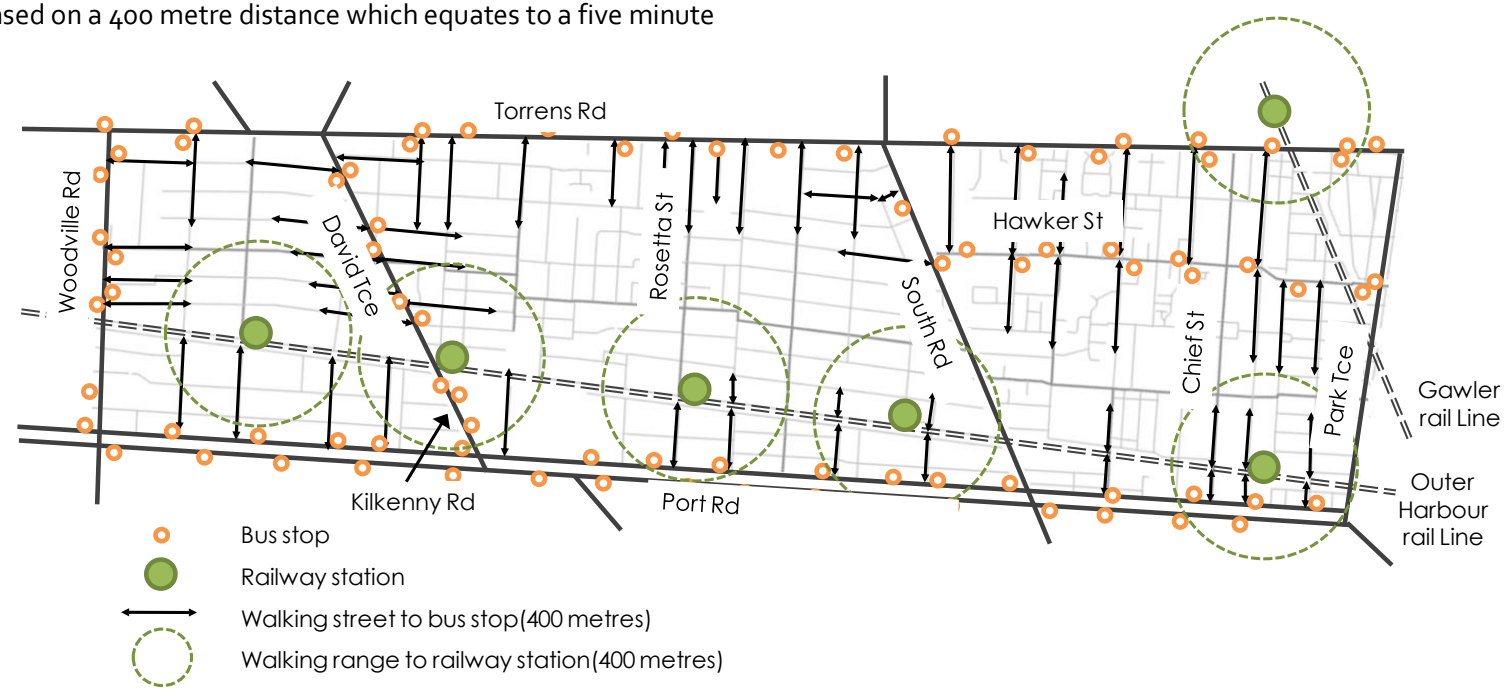


Figure 3.14: Public transport services walking accessibility

Bus Stops

Most bus stops on Port Road have bus shelters and DDA tactile systems provided by the City of Charles Sturt whilst only part of Torrens Road and Hawker Street has shelters. Many shelters are the older style with poor seating and limited cover from weather, and do not comply with current DDA requirements. Typical stops on Port Road and Torrens Road are shown in Figure 3.25 in section 3.13.

Railway Stations

The current railway stations are very old and in need of an upgrade, which is to be included as part of the electrification of the railway line in the next 10 years by the State Government. The nature of station upgrades is yet to be determined. There are generally poor facilities at each of the stations with:

- limited shelter for protection against the weather;
- no parking for bicycles, and
- platform levels requiring people to step up into the train.

This can be particularly difficult for children, elderly and people with prams or walking aids. Examples of the railway stations are shown in Figure 3.26 in section 3.13.

3.11 Parking

Parking in the corridor is currently mainly supplied through on-street parking.

There are very few sites with off-street car parking. Key attractors for parking in the area are:

- The railway stations with a variety of angled or parallel on-street parking available at each.
- Schools with off-street parking for staff, and on-street parking for pick-up and set-down each school day.
- Local centres where angled or parallel parking may be available.
- Reserves during weekends, in particular adjacent Croydon railway station.

There is very low demand for on-street parking in much of the residential area, with little parking intrusion from commercial operations on Torrens Road and Port Road evident in the area. The low density of the residential areas provides wide frontages for street parking, and space within allotments for off-street parking for over 2 vehicles in most cases.

The local centre at Elizabeth Street/Queen Street does generate a high level of parking demand on weekends associated with both retail activities and the adjacent reserve/playground.

3.12 Findings

Destinations

There are currently limited destinations within the corridor that would generate significant walking and cycling trips on any specific street. Destinations used on a daily basis include:

- Primary and secondary schools.
- Public transport stops including railway and bus.
- To a lesser degree, local centres in the corridor.

Streets

- Existing grid based networks bisected by the railway line with limited but vital crossing points.
- Good connectivity for motor vehicles to and from arterial roads.
- Generally wide streets for parking and two-way traffic flows, except Bowden / Brompton.
- Traffic management in some areas, with driveway links, roundabouts and 40km/h speed limit.
- Traffic volumes on local streets are mostly below 1,000 vehicles per day.
- Speeds on some streets are too high ranging from 45km/h to 65km/h.
- Few crashes occur on local streets with most occurring on arterial roads.

Walking

- Grid network in the corridor providing good connectivity and access to public transport stops.
- Railway line barrier is lessened by parallel routes and frequent crossings (at side streets).
- Arterial roads are barriers with poor crossing points, except at signalised intersections.
- Footpaths generally on both sides of each street but narrow (< 1.4 metres wide).
- Often footpaths are close to fences with many driveways causing cross-fall changes.
- Many kerb ramps do not meet current standards for DDA access.

Cycling

- Formal bicycle lanes limited to arterial roads.
- Good connectivity through grid network although squeeze points exist.
- Generally wide streets, except in Bowden and Brompton area where streets can be very narrow.
- Speeds are higher than desirable on most streets for mixing cycling with other vehicles on the road.
- Poor crossing points on arterial roads, except at signalised intersections.
- Narrow footpaths for children to ride on – many driveway conflicts.
- Lack of bicycle parking at railway stations and other local destinations.

Public Transport

- Regular bus and train services adjacent and through the study area, either railway corridor or on arterial roads only (except Hawker Street).
- Bus stops range 200m to 500m apart with shelters at most locations on Port Road and Torrens Road, but lacking on other roads including David Terrace and Woodville Road.
- Most stops and shelters will require upgrading to meet future accessibility requirements.
- Railway stations are old and need upgrading to provide adequate lighting, shelter and amenity.
- Low frequency services outside of peak hours on both bus and rail routes, with 30 minutes or greater between services.

Parking

- There is generally a low demand for parking in the corridor, similar to many residential areas.
- Few significant off-street parking areas in the corridor, with most parking provided on-street.
- No observed intrusion by parking from commercial areas on Port Road or Torrens Road into the residential areas
- Demands for parking typically at:
  - Railway stations
  - Local centres
  - Reserves
  - Schools
- Queen Street/Elizabeth Street local centre generated the highest parking demand in the corridor on weekends, with impacts on neighbouring residential streets.

3.13 Photo Directory


Figure 3.15: Chief St and Hawker St


Figure 3.16: Aroona Rd and Gardner Ave

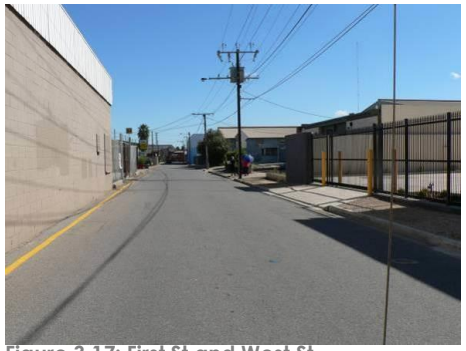



Figure 3.17: First St and West St


Figure 3.18: Footpaths on First St and Russell Tce


Figure 3.19: Pedestrian only crossings on Elizabeth St and Dale S

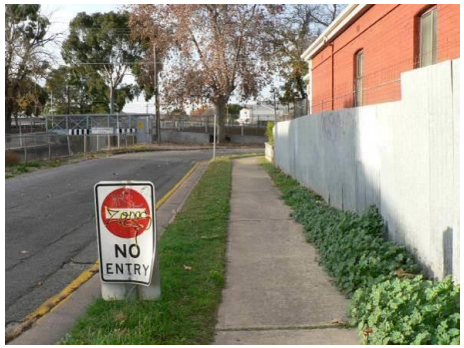


Figure 3.20: Pedestrian route at Rosetta St underpass

Figure 3.21: Walking barriers on Port Road and Torrens Road


Figure 3.22: Bicycle routes on Margaret Ave and Myponga Tce

Figure 3.23: Shared use path on Rosetta St

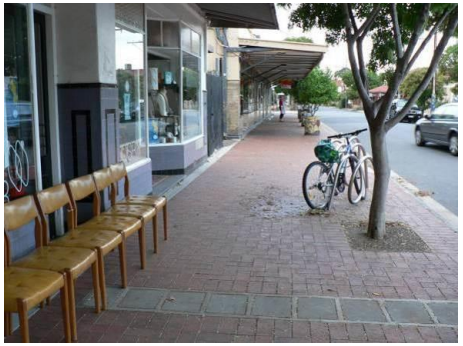


Figure 3.24: Bicycle parking at Elizabeth St shops

Figure 3.25: Typical bus stops on Port Road and Torrens Road

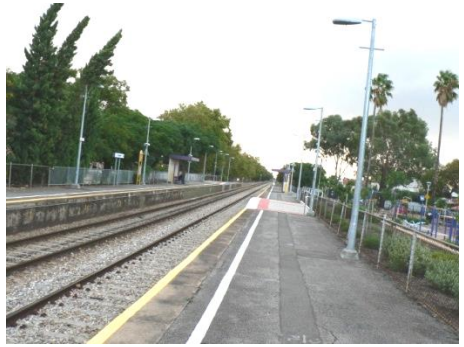


Figure 3.26: Railway stations at Croydon Park and Woodville Park

4. Best Practice Strategy

"Every street should promote the choice for walking or cycling"

The research of key topics related to the realm of walkable communities highlighted a number of best practice principles that are summarised in this section. These principles are then applied within a strategy specific to the corridor. Application of the strategy will support the choice by people for walking and cycling in conjunction with intensification of densities and uses in some areas. The research has also identified best practice across these areas which can be applied to the growth area to support walking and cycling, and achieving a desirable street environment.

Further discussion and detail of the best practice principles and recommendations can be found in the Research Supplement to the study.

The planning for walkable and bikeable neighbourhoods should aim for a transport system that supports sustainable communities.

The key components of this transport system are:

- Walking and cycling as preferred modes of transport.
- Good public transport services in all areas.
- Streets are community places.
- Local access to services, education and employment.

The key objectives which will assist with developing the desired nexus for a sustainable community include:

- *Balance demand for street space for all users.*
- *Create walking environments that connect local communities.*
- *Create cycling environments that encourage cycling for commuting, visiting and recreation.*
- *Reduce dependency upon the car.*
- *Strengthen access to and attrativeness of public transport.*

Based on the best practice review completed, this section provides information on how these objectives can be implemented to create viable and sustainable neighbourhoods.

4.1 Streets

Balance demand for street space for all users

Streets are used by all for access within a neighbourhood. The design of a street should balance the demand for street space for all users, and be designed to create an environment suited for walking and cycling in local areas.

The aim should be to create local streets that control speeds naturally to less than 30km/h, without the need for unsympathetic traffic-calming measures, through integrated design approaches to include:

- Narrow carriageway widths.
- Shift the horizontal alignment regularly (less than 100 metres) to avoid long straight streets and maximise speed of motor vehicles to 30km/h.
- Limit visibilities in accordance with appropriate design standards.
- Use features within the carriageway, such as trees, seats, crossing refuges or even bicycle parking, to control and constrain traffic.
- Provide on-street parking within the carriageway.
- Encourage greater use by pedestrians and cyclists by providing them priority.

The increased awareness of drivers to activity on streets and to streets as public spaces would be achieved through:

- Appropriate streetscape design and community displays, such as artwork, messages, etc.
- Create gateways phycially and visually at entry points into the network.
- Ensure motor vehicle drivers enter slowly into walkable neighbourhood areas.

The access provision for occassional service by large or emergency vehicles will need to be maintained, taking account of:

- Response times that may impact design but ensure clear paths of travel are available, albeit at lower speeds.
- Frequency of services based on land uses, and design accordingly.
- Alternative routes or methods for services may be preferable, including waste collection and maintenace requirements.

Strategy Actions: Streets

- Apply best practice principles to the street network.
- Develop a street classification strategy for the corridor based on Link and Place principles.
- Develop a long-term plan for the design of streets in the corridor to coordinate asset replacement programs.
- Prioritise improvements for high demand places in the corridor including:
  - railway precincts;
  - schools;
  - routes to public transport.
- Create an environment on streets to provide a high quality walking and cycling experience in line with best practice principles.

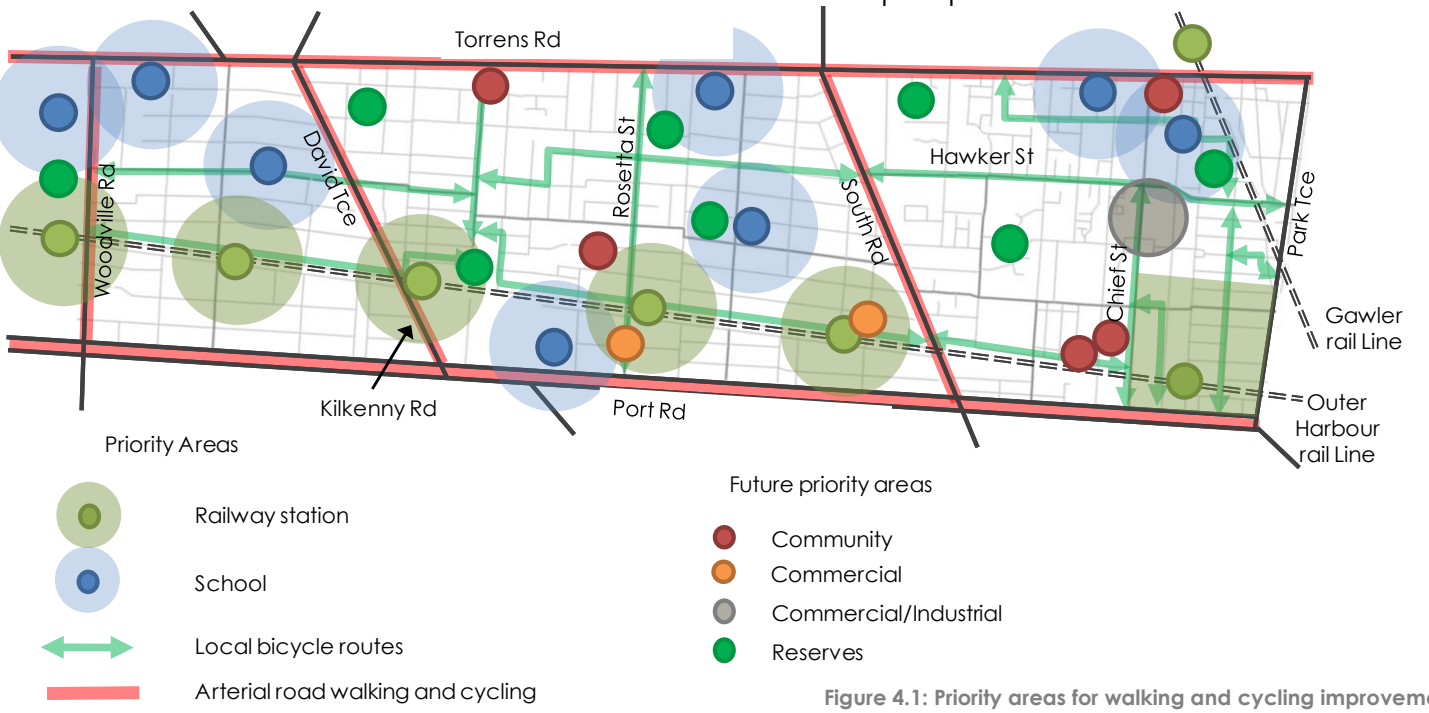


Figure 4.1: Priority areas for walking and cycling improvements

4.2 Walking

Create walking environments that connect local communities

The walking environment should cater for the needs of people who live and work in the area and make streets more enjoyable and safe for a quality journey. It should consider users beyond the typical public transport commuter including school children, elderly and parents with prams, who are most likely to be using the footpaths reguarly.

Key best practice principles for walking are:

Develop pedestrian networks as a high priority in street design:

- They should connect to one another and crossings should be on pedestrian desire lines to minimise deviation.
- Pedestrians should be confident in directions, with high quality wayfinding available to minimise wrong turns.

Make walking an enjoyable experience by ensuring pedestrian networks are high quality, safe, free from obstructions and of an acceptable gradient and width.

- Maximise space for people walking along a street, with the widest verges generally where possible.
- Provide a minimum width of 1.5 metres for a footpath in all streets.
- Wider footpaths where more people are walking, with 1.8 metres minimum around schools and public transport stops.
- Use single surface where adquate verge widths cannot be provided to avoid steep crossfalls and grades at driveways.
- Ensure ramps or island cut-outs are provided at all crossing points with height differences.
- Provide facilities to help cross the busy roads safely at frequent locations, including traffic signals, other priority crossings or refuge islands and medians.
- Provide shade, lighting and rest stops along streets.

Make streets safe by increasing natural surveillance, reducing speeds and mitigating the impact of anti-social behaviour for people walking.

- Provide a quality walking environment to enhance the way people feel about and interact with the local area and other people.
- Appropriate design measures are required to manage litter and graffiti and create engaging and interesting public space through the use of materials, lighting and art.

Strategy Actions: Walking

- Apply the best practice principles to create a highly walkable environment.
- Upgrade the width of footpaths and verges for people to use
  - minimum footpath of 1.5 metres generally.
  - minimum 1.8 metres around schools and public transport.
  - minimum 2.4 metres wide for through movements in activity centres.
- Upgrade kerb ramps within the corridor to current standards to ensure DDA compliance.
- Improve crossing opportunities at busy streets and roads, in particular Port Road central reserve and Torrens Road for access to public transport.
- Maintain the frequency of links across the railway line in particular between South Road and Woodville Road.
- Improve wayfinding throughout the street network to destinations and crossing points, in particular at the Rosetta Street underpass for pedestrian access, and railway pedestrian crossing locations.

Figure 4.2: Public transport stops and access routes

4.3 Cycling

Create cycling environments that encourage people to cycle for commuting, visiting and recreation

It is considered that all streets will provide for cyclists within an area and designed accordingly to ensure a safe and quality journey based on the following best practice principles:

- Reduce car intensity by reducing vehicle speeds to less than 30km/h on local streets to give cyclist confidence and freedom of movement along a carriageway.
- Ideally enable cyclists to share the carriageway safely on local streets with minimal difference in speeds to motor vehicles.
- Maximise awareness of drivers to the presence of cyclists with appropriate messages along the street.
- Maintain a grid network for good connectivity and permeability to enable the shortest route possible.
- Provide connectivity and priority across busy roads where possible.
- Provide separate facilities such as cycle lanes or off-road paths on higher order faster streets above 30km/h.
- Ensure end of trip facilities with high quality parking in convenient locations.
- Give cyclists access through activity areas to avoid unnecessary detours around these areas.
- Enable mixing of pedestrians and cycling to maintain convenient access through activity centres.
- Provide a high quality wayfinding system through the street system for cyclists to follow confidently.

Strategy Actions: Cycling

- Apply the best practice principles to create a highly bikeable environment .
- Prioritise improvements to main routes through and to schools/centres in the corridor.
- Provide or facilitate provision of quality parking for bicycles at destinations within and adjacent to the corridor including railway stations, reserves, retail and employment centres.
- Advocate for improved crossing points on arterial roads for priority bicycle routes within and adjacent to the corridor.
- Advocate for the completion of bicycle lanes on arterial roads – Torrens Road to Arndale Shopping Centre, David Terrace/Kilkenny Road. Seek new facilities on Woodville Road and South Road.
- Develop the railway terraces to bicycle greenways with consideration of shared use paths or dedicated paths where space permits.
- Plan for improved cyclist access through the underpasses on Rosetta Street and Chief Street.
- Advocate for secure bicycle parking provision at all rail stations within the corridor.

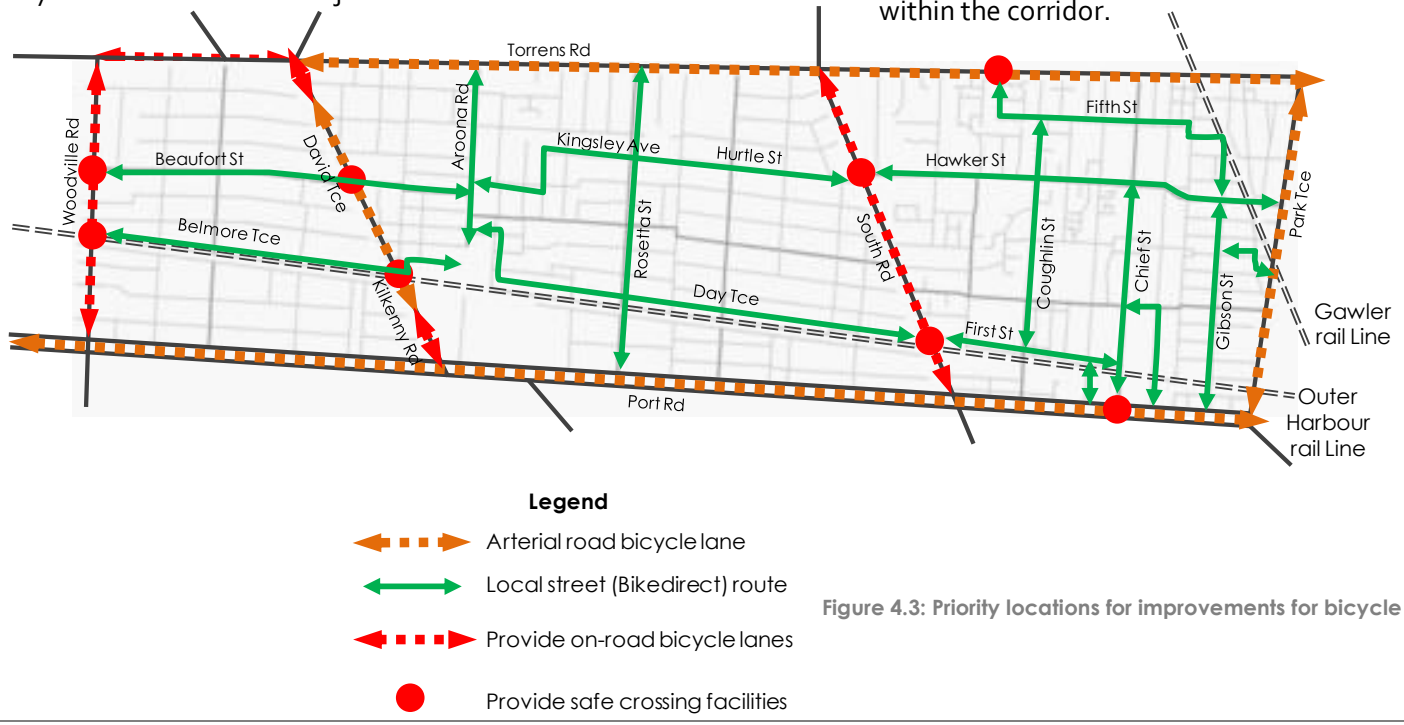


Figure 4.3: Priority locations for improvements for bicycle access

4.4 Public Transport

Strengthen access to public transport

Public transport is reliant on walking and cycling trips as access for many patrons using the services. The enhancement of a walkable and bikeable environment will support public transport use, however this is also contingent upon good services and facilities. Key best practice principles for public transport to support walking and cycling are:

- Ensure good permeability through the street network to minimise walking/cycling distances to public transport stops.
- Create a high quality of journey experience to and at public transport stops, facilitated through high standard stations including lighting, shelter, security etc.
- Provide high quality wayfinding and information for people using public transport.
- Limit park and ride capacity in urban situations with preference for walking and cycling.
- Provide kiss and ride facilities convenient to train stations to promote trip sharing.
- Maintain two way traffic flows so buses travelling in different directions can use the same route.
- Support high frequency services < 10 minutes during peak and < 15 minutes during interpeak periods.
- Provide high quality, safe and convenient parking for cyclists at kerb bus stops and all stations.

Strategy Actions: Public Transport

- Facilitate improved crossing points on arterial roads at bus stops in particular Port Road, Torrens Road, David Terrace/Kilkenny Road and Woodville Road.
- Advocate for improvements to frequency of bus services on David Terrace to and from Arndale Shopping Centre, and linkage to key regional destinations in particular the city and/or West Lakes.
- Advocate for the frequency of train services to be less than 10 minutes during peak periods, a maximum of 15 minutes during the inter peak period and improved at weekends to support walking and cycling trips within and outside the corridor.
- Advocate for the upgrade of rail stations within the corridor to provide high quality bicycle parking, shelter, lighting, security and access.
- Advocate for increased State Government funding to improve the quality of shelters at bus stops on all bus routes, including compliance with DDA requirements.

4.5 Parking

Reduce dependency upon the car

The management of parking is key to the dependance of motor vehicle usage in particular high density areas. Best practice principles for the management of parking:

- Give priority to bicycle parking at destinations, including activity centres and schools.
- Maintain control of off-street parking with maximum provisions for land uses, and separate the parking supply from residential apartment sales (often referred to as *"unbundled parking"*) for new development to recognise true parking costs.
- Initial parking requirements may need to be higher to provide common parking and subsequently a minimum provided reflecting appropriate demand levels.
- Levy to be applied where parking not provided to either provide a suitable level common parking or walking, cycling and public transport infrastructure improvements.
- Maximum parking provision as development progresses where parking is separated from residential apartment sales (referred to as *"unbundled parking"*) can be considered to provide choice and real cost to parking provision.
- Reciprocal parking to be utilised where appropriate land uses are developed.
- Manage on-street parking effectively in conjunction with off-street parking.
- Minimise on-street parking in activity areas with appropriate controls to prioritise use for visitors, customers and services.

The extent and layout of the provided parking should be suitable for the demand in each area and reflect the desired streetscape:

- Parallel parking is generally preferred along streets.
- Angle parking can be used where space is available and demand requires.
- Parking should not dominate the design of streetscapes either on-street or off-street.
- Create secondary access to off-street parking away from activity areas where possible, i.e. rear lane or side street access in centres.

Strategy Actions: Parking

- Apply best practice principles to the development and management of parking in high density areas.
- Seek to minimise parking levels for on and off street parking to reflect appropriate demand levels.
- Use of a parking levy where appropriate to fund appropriate extent of common parking and walking, cycling and public transport infrastructure.
- Develop plot and precinct layout principles that reduce the visual impact of car parking on street frontages and do not impinge on walking and cycling routes.
- Seek to improve parking layouts to facilitate walking and cycling routes at destinations including schools, public transport stops and local centres.

5. Link and Place

One of the methods for establishing a street's strategic role that balances the need for movement and destinations is the Link and Place approach (Jones, Boujenko and Marshall, 2007)[4], which will be described and used throughout this Report. This approach, developed by the European Commission in 2004, is now widely used in the UK, Australia and New Zealand and is advocated by the UK's 'Manual for Streets' [5&6] publications.

5.1 What is 'Link and Place'

Urban streets provide the setting for a wide range of urban street activities, which can be grouped under two broad types of street functions: 'Link' and 'Place'.

As a Link, a street provides a conduit for through movement, and forms an integral part of the wider urban street network and other, more specialised, urban transport networks (e.g. on-street light rail network). A Link user may travel by a variety of modes, from private car or truck to bus, bicycle or on foot. Their essential need is to follow a continuous, linear path through the street network, with minimum disruption and a seamless connection from the beginning to the end of their journey. In general they are seeking to minimise travel time along each section of street.

As a Place, a street is a destination in its own right: a location where activities occur on or adjacent to the street. A Place user is someone wishing to make use of some of the features that are on that particular street, and will usually do so on foot. While such people are classified as 'pedestrians', they are not all passing through the area – many of them are spending time in the area, and may be carrying out a wide variety of activities (e.g. shopping, talking, waiting, resting, working). They are particularly affected by the noise and air pollution produced by motorised vehicular traffic and the general severance effect of heavy traffic volumes in inhibiting their movement between places on opposite sides of the street.

LINK

street as a movement conduit

PLACE

street as a destination in its own right

Design objective: **SAVE TIME**

Design objective: **SPEND TIME**

[4] Jones, P., Boujenko, N. and Marshall, S. (2007) *'Link and Place: A Guide to Street Planning and Design'*, Local Transport Today, London

[5] Department for Transport (2007) *'Manual for Streets'*, Thomas Telford Publishing, London

[6] Department for Transport (2010) *'Manual for Streets 2: Wider Application of the Principles'*, Chartered Institution of Highways and Transportation, London

Not all of the traffic and transport-related activity observed on urban streets is part of that street's Link function. There are also some types of Place-related activities that are directly connected with traffic and transport, and occur within and adjacent to the carriageway. For example: loading/ unloading, parking by employees, customers, residents, etc. and buses and trams stopping to drop off/pick up passengers.

Further information regarding the Link and Place concept can be found in the *'Link and Place: A Guide to Street Planning and Design'* (Jones, Boujenko and Marshall, 2007) and *'Streets for People: Compendium for South Australian Practice'* (Boujenko, N., Morris, P., and Jones, P., 2011)

5.2 Benefits of the Link and Place approach

The Link and Place approach provides a series of tools and techniques (tied together by the concept of a Link and Place and the 'streets for people' philosophy) that offers to enrich projects in a variety of ways, including:

- Determining strategic street requirements from a balanced point of view, by applying a Link and Place street classification matrix.
- Assessing street performance in an integrated way, for all people using streets (not just by studying traffic congestion when addressing a project funded by a transport authority).
- Using people-centred criteria for assessing and prioritising street user needs.
- Carrying out street design with stakeholders and involving stakeholders throughout the process.
- Determining maintenance performance standards.
- Appraising street design with an aid of people-centred criteria.

Overall, it provides a holistic framework that serves to integrate land use policy and planning with transport and traffic needs.

Experience shows that applying the Link and Place approach to a project creates solutions that provide a better fit for purpose and that are more likely to meet stakeholder approval.

Though leading to greater results if adopted in full, selecting a few Link and Place street applications will still benefit any project.

5.3 Determining Link and Place status levels

For determining both Link and Place status level, the decision is based on how far from the street (and from which areas) the origins of the journeys for both Link and Place users (i.e. the catchment area for the street users). For example, if more than 50% of the street users staying within the street environment come from the surrounding district, then Place designation should reflect a district-wide origin of street users.

For Link status, as a starting point the current road classification level can be used as a guide. But many streets carry other transport networks too, including: tram, bus, cycle, heavy goods vehicle. The final Link status should be based on the highest value from the individual modal networks.

Example: Link status and modal volumes in Adelaide, South Australia

Table 5.1 provides an indicative (not definitive) relationship between Link status levels and volumes of cars and buses. It is important to note, however, that strategic Link/Place designation may aim to change (increase or decrease) traffic volumes currently experienced and therefore should be based on the desired volume of people moving through or around the link.

Place status should be based on the degree of significance of that part of the street network in the city or regional/national context. This may be characterised in terms of the extent of the catchment area of visitors to the street, or in relation to the historical or cultural significance of the buildings or the street space itself.

Table 5.1: Indicative relationship between Link status levels

Link status level	Conventional classification	Typical traffic volumes [1]	Typical bus volume [2]
I - Metropolitan	Highway/bypass route	> 35,000	> 1,000
II - Regional	Arterial road	22,000-35,000	500-1,000
III - District	Sub-arterial	15,000-22,000	300-500
IV - Neighbourhood	Collector	4,000-15,000	30-300
V - Local	Local access road	< 4,000	< 30

[1] Annual Average Daily Traffic
[2] Average scheduled buses per day

Where the street is primarily retail in nature, then a hierarchy will already have been set out in planning documents than can be adapted for this purpose. Otherwise, it will be helpful to develop 'rules of thumb', such as:

- A street with a primary school is of at least Neighbourhood Importance
- A street with a secondary school is of at least District importance

It is important to note, however, that even though some buildings or land uses may themselves be significant, the street environment immediately in front of them may not be reflective of that designation, as it may not attract visitors staying in the area.

5.4 Street Typologies

Source: 'Streets for People: Compendium for South Australian Practice' (Boujenko, N., Morris, P., and Jones, P., 2012)[7]

Each street in a street network has its specific role: all streets cannot be popular destinations, just as not all should prioritise vehicular movement. Before the design process begins, it is important to establish the street's vision; the role of the street within a wider street network hierarchy. This vision should reflect a street's strategic role within the wider street network.

Functional considerations, such as speed, street space allocation, volumes for the modes of traffic, frequency of crossings, width of footways, etc., are also related to a street's strategic role. Once determined, a street's strategic role, vision and guiding principles will guide and shape the design process.

Road traffic engineering emerged as a discipline since the automobile became a commodity, defining road functions on the basis of the movement needs alone. This was typically defined by a road hierarchy, which expressed relative importance of a road depending on its vehicular flow: from a highway and down to local access roads. Planning for access needs was deemed strategically opposite to movement needs. This approach for classifying roads was reflected in road designs with carriageway widths optimised for traffic management in most cases.

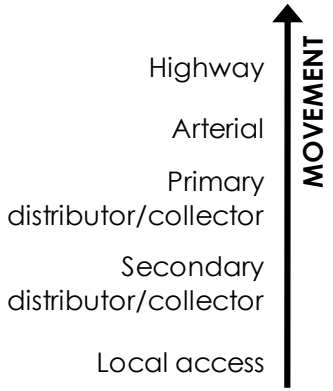


Figure 5.1: Typical road hierarchy

The term 'road' in most dictionaries is defined as a 'way by which people, vehicles and animals pass between places'. It therefore refers primarily to a carriageway space. A 'street' on the other hand, is a space between buildings, including a carriageway, footways and access to frontages.

We now recognise the role that streets play as destinations in their own right, as places we visit to enjoy for leisure, recreational or other "unnecessary" activities, not only to access necessary places of work or residence or to move through. This led to a re-think of the road hierarchy concept. For example, *'Local Roads Advisory Committee Road Classification in South Australia'*[8] states *'Roads have a number of functions that can be conveniently grouped into: Movement function (traffic) and access function (abutting land use)*'

[7] Boujenko, N., Morris, P. and Jones, P. (2012) 'Streets for People: Compendium for South Australian Practic'e

[8] Department for Planning, Transport and Infrastructure (2008), *'Road Classification Guidelines in South Australia'* (2008)

5.5 Corridor Typologies

The Street Typology methodology will assist the City of Charles Sturt in developing a strategic approach to planning and designing streets in the corridor. The methodology permits the definition of streets into defined typologies which will guide the development of appropriate street designs to suit the specific Link and Place status of each street.

The streets in the corridor, as discussed in Section 3, are traditionally described as distributor, collector or local streets under the functional road network classifications. The street typology methodology enables a different approach to classification which will better suit the traffic and activity functions of the street that is the status of Link and Place.

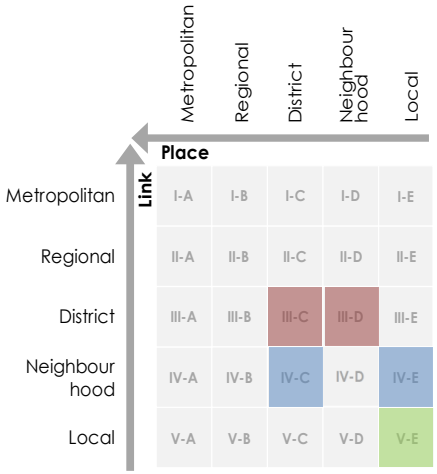


Figure 5.2: Street typologies identified in the corridor

Typologies have been developed for the typical streets found in the local street network within the corridor. The specific typologies are shown in the Link and Place street classification matrix in Figure 5.2 and range from Local to District in both Link and Place status.

Six street cross-sections will be developed to incorporate principles advocated here and typical strategic and physical characteristics as shown in Table 5.2.

Table 5.2: Description of Street Typologies identified in the corridor

Typology	Description
V-E	Local street, typically a No through Road, in a 10 metre reserve
V-E	Local street in a 10 metre reserve
IV-C	Neighbourhood street with district level destinations in 20 metre reserve
IV-E	Neighbourhood street with local destinations in 20 metre reserve
III-C	District street with district destinations in 20 metre reserve
III-D	District street with neighbourhood destinations in 15 metre reserve

The application of these typologies to a number of streets is discussed later in this report to enable consideration of how each typology can be used. It is important to note that whilst street reserve widths have been nominated, each typology can be adjusted to suit different width reserves but may impact on the available verge space.

It should be noted that the street typology templates shown in section 7 have been developed to describe the transport characteristics and requirements for the particular street. Hence, the templates will provide the desirable characteristics with respect to:

- Carriageway width and length.
- Footpath and verge widths.
- Crossing points where applicable.
- Use of single surface or vertical separation with kerbs.
- Examples of streetscape opportunities, including trees, seats, etc.

The templates do not attempt to resolve issues that arise from street design as these will vary according to the specific street. These issues include:

- Stormwater management.
- Specific materials or plants.
- Styles of furniture.
- Demand and provision of parking.

It is expected that the planning and design process will consider and address these issues based on the specific streets.

5.6 Applying the typology

The typologies can be applied to the street network based on the status of link and place of each street. An example of this application has been undertaken for the broader street network in the corridor to provide a basis for further planning and design of these streets.

It should be noted that the example application of typologies has been based on a desktop review of the street environments and characteristics in the area. When considering the application of the typologies, the following must be clearly understood and defined:

Existing operating characteristics of the street including:

- Traffic volume and traffic speeds.
- Traffic mix of heavy and light vehicles.
- Pedestrian and cyclist usage.
- Origins and destinations of people using the street.
- Destinations on or adjacent to the street.

Future characteristics to consider:

- Changes to land use and development along the street.
- Desired function of the street.

It is very important to consider the future characteristics and function of the street in order to use a street typology which will be suitable for the intended link and place status of the street. Notwithstanding the above, community engagement will be paramount in achieving progress in street planning and design in the corridor. This strategy provides a consistent approach in classifying the link and place status of each street in the context of an overall street network, and hence a consistent message when communicating the vision and objectives for streets in the corridor.

The differences between each of the typologies may appear to be subtle but can have significant ramifications in the completed street design, with care to be exercised to ensure the correct typology, and hence objectives, for the street are achieved.

For instance, the use of streets in a grid network can vary considerably in link status depending upon the destinations in the area. Grid networks will permit multiple options for people to choose how to travel to a location. Hence, many streets in a grid network can be considered to provide neighbourhood link status with a local place status (i.e. IV-E), especially streets connecting to an arterial road which would function as a collector route. Conversely, the objective for the street could be to maintain a local link status (i.e. V-E) regardless of the perceived or actual current function of the street.

The difference between the two typologies is significant, with a change from primarily a single lane two way road to two lane two way road. Hence, the operating characteristics for people in that street could change considerably. In the end, local community support for any change to a street is required in order for success to be achieved. Each street will need to be considered individually, however this study provides a standard framework to use in that process.

The application of street typologies is discussed through practical examples in Appendix A. These examples have been developed for the Kilkenny and Grange precincts where opportunity for redesign of the street network in conjunction with future land use development may arise.

6. Study Recommendations

6.1 Best Practice

A review of best practice principles has identified a series of key objectives which the City of Charles Sturt should set to assist with developing the desired nexus for a sustainable community. These include:

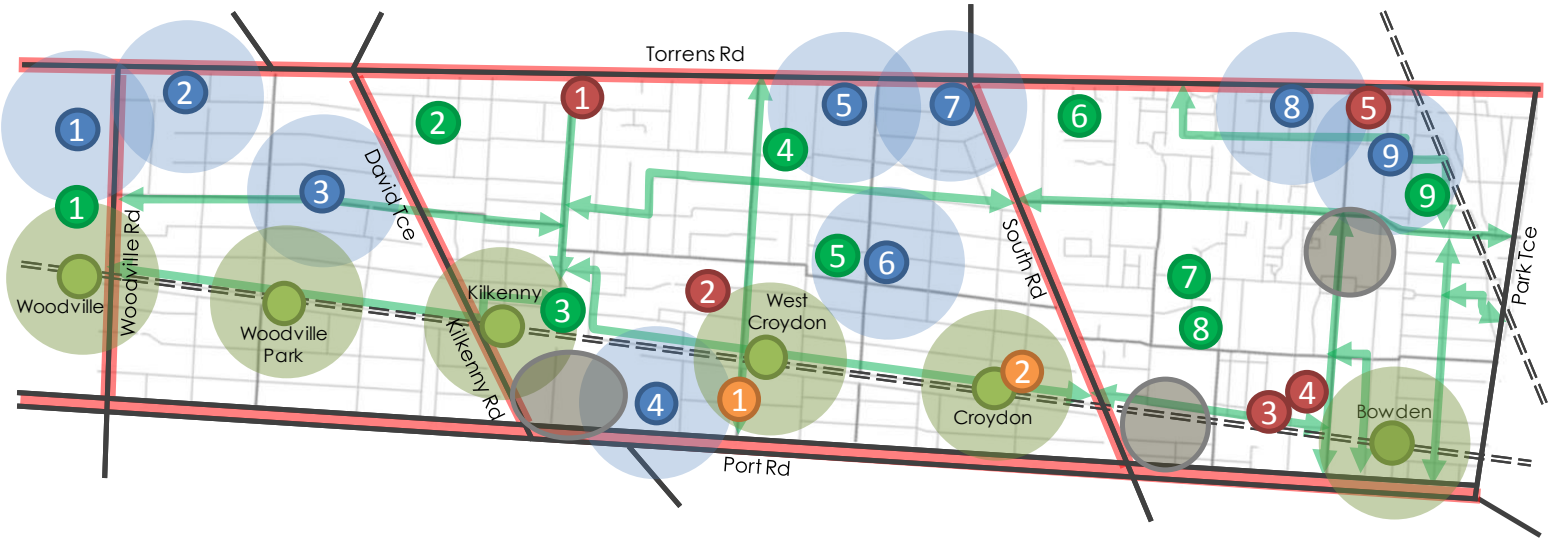
- Balance demand for street space for all users.
- Create walking environments that connect local communities.
- Create cycling environments that encourage cycling for commuting, visiting and recreation.
- Reduce dependency upon the car.
- Strengthen access to and attractiveness of public transport.

The best practice review has enabled the development of key strategy actions within the corridor, which can be applied to support an environment conducive to walking and cycling. The key recommendations of these actions are set out below.

6.2 Street and Corridors

- Apply best practice principles to the street network.
- Develop a street classification strategy for the corridor based on Link and Place principles identifying key places and movement needs.
- Develop a long-term plan for the design of streets in the corridor to coordinate asset replacement programs.
- Prioritise improvements for high demand places in the corridor including railway precincts, schools, local centres and routes to public transport.
- Create an environment on streets to provide a high quality walking and cycling experience in line with best practice principles.

Figure 6.1 shows some of the priority locations for walking and cycling improvements.



Legend

Railway station

Commercial/Industrial

Local bicycle routes (refer to Figure ...)

Arterial road - walking and cycling

School

1. Woodville High
2. Woodville Special
3. Whitefriars
4. Kilkenny Primary
5. Adelaide Secondary School of English
6. Islamic College of SA
7. Croydon High
8. Bowden Brompton Community
9. Immaculate Heart of Mary Primary

Reserve

1. Saint Clair Oval
2. Alton
3. McInerney
4. Carnarvon
5. Croydon Avenue
6. Albert Greenshields
7. Josiah Mitton
8. Ivan Franko
9. Parfit Square

Community

1. Challas Gardens Hotel
2. West Croydon and Kilkenny RSL
3. The Brompton
4. Gaslight Tavern
5. Onvingham Hotel/ Bombay Bicycle Club

Commercial

1. Rosetta Avenue, West Croydon
2. Queen Street, Croydon

Figure 6.1: Priority areas for walking and cycling improvements

This study has identified appropriate street typologies to be applied to streets within the corridor to enhance and encourage use of the streets for walking and cycling based activity, and lessens the impact of motor vehicles.

The streets in the corridor are traditionally described as distributor, collector or local streets under functional road network classifications. The street typology methodology enables a different approach to classification which better suits the traffic and activity functions of the street; the status of Link and Place.

The Street Typology methodology will assist the City of Charles Sturt in developing a strategic approach to planning and designing streets in the corridor. The methodology permits the classification of streets into defined typologies which guide the development of appropriate street designs to suit the specific Link and Place status of each street.

Typologies have been developed for the typical streets found in the local street network within the corridor. Specifically, these typologies range from Local to District in both Link and Place status. The specific typologies considered in this report and their status within the Link and Place matrix are shown in Figure 6.2

Six indicative street cross-sections will be developed for the Link and Place typologies highlighted in the Figure 6.2 matrix. The cross-sections incorporate the design principles advocated with the Link and Place methodology and the typical strategic and physical characteristics that would be accommodated within the identified typologies.

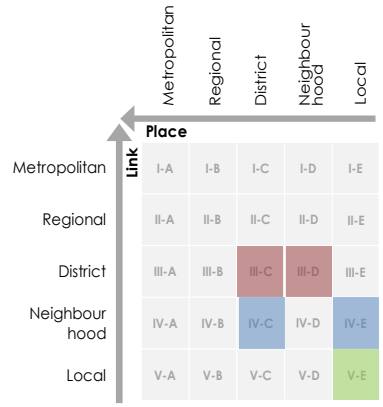


Figure 6.2: Street typologies identified in corridor

The street typology templates will describe the transport characteristics and requirements for the particular street. Hence, the templates provide the desirable characteristics with respect to:

- Carriageway width and length.
- Footpath and verge widths.
- Crossing points where applicable.
- Use of single surface or vertical separation with kerbs.
- Examples of streetscape opportunities, including trees, seats, etc.

The templates do not attempt to resolve issues that arise from street design as these will vary according to the specific street. Issues that would need to be resolved at the level of each specific street include stormwater management, specific materials or plants, styles of furniture and the level of demand and provision of parking. It is expected that the planning and design process will consider and address these issues based on the specific streets.

The typology templates will be used to develop a new approach to the local street network in the City of Charles Sturt, reflecting the existing operating characteristics and the desired function and land use profiles of each individual street.

6.3 Walking

- Apply the best practice principles to create a highly walkable environment.
- Upgrade the width of footpaths and nature strips for people to use to provide:
    - minimum footpath of 1.5 metres generally.
    - minimum 1.8 metres around schools and public transport.
    - minimum 2.4 metres wide for through movements in activity centres.
- Upgrade kerb ramps within the corridor to current standards to ensure DDA compliance.
- Improve crossing opportunities at busy streets and roads, in particular Port Road central reserve and Torrens Road for access to public transport.
- Maintain the frequency of links across the railway line in particular between South Road and Woodville Road.
- Improve way finding throughout the street network to destinations and crossing points, in particular at the Rosetta Street underpass for pedestrian access, and railway pedestrian crossing locations.

Figure 6.3 shows the extensive use of the local street network to access public transport, supporting the recommendations identified.

Figure 6.3: Public transport stops and access routes

6.4 Cycling

- Apply the best practice principles to create a highly bikeable environment.
- Prioritise improvements to main routes that provide access to schools/centres in the corridor.
- Provide or facilitate provision of quality parking for bicycles at destinations within and adjacent to the corridor including railway stations, reserves, retail and employment centres.
- Advocate for improved crossing points on arterial roads for priority bicycle routes within and adjacent to the corridor.
- Advocate for the completion of bicycle lanes on arterial roads – Torrens Road to Arndale Shopping Centre, David Terrace/Kilkenny Road. Seek new facilities on Woodville Road and South Road.
- Develop the railway terraces to bicycle greenways with consideration of shared use paths or dedicated paths where space permits.
- Plan for improved cyclist access through the underpasses on Rosetta Street and Chief Street.

Figure 6.4 indicates some of the priority locations for bicycle access improvements.

6.5 Public Transport

- Facilitate improved crossing points on arterial roads at bus stops in particular Port Road, Torrens Road, David Terrace/Kilkenny Road and Woodville Road.
- Advocate for improvements to frequency of bus services on David Terrace to and from Arndale Shopping Centre, and linkage to key regional destinations in particular the city and/or West Lakes.
- Advocate for the frequency of train services to be less than 10 minutes during peak periods, a maximum of 15 minutes during the inter peak period and improved at weekends to support walking and cycling trips within and outside the corridor.
- Advocate for the upgrade of rail stations within the corridor to provide high quality bicycle parking, shelter, lighting, security and access.
- Advocate for increased State Government funding to improve the quality of shelters at bus stops on all bus routes, including compliance with DDA requirements.

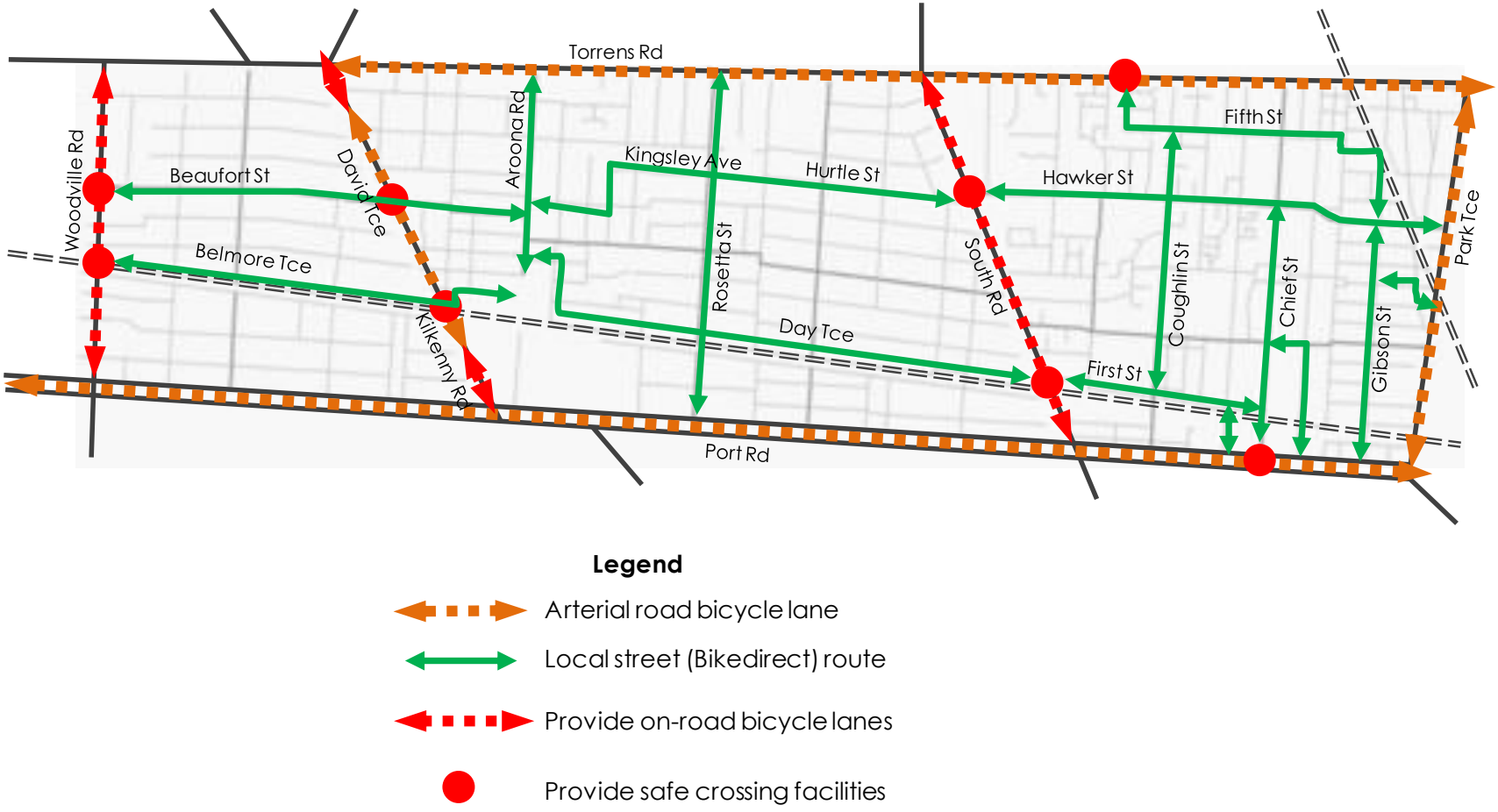


Figure 6.4: Priority locations for improvements for bicycle access

6.6 Parking

- Apply best practice principles to the development and management of parking in high density areas.
- Advocate to minimise parking levels for on and off street parking to reflect appropriate demand levels, including separating parking supply from residential apartment sales (often referred to as *"unbundled parking"*) for new development to reflect true cost of parking to property owners.
- Use of a parking levy where appropriate to fund appropriate extent of common parking and walking, cycling and public transport infrastructure
- Develop plot and precinct layout principles that reduce the visual impact of car parking on street frontages and do not impinge on walking and cycling routes.
- Advocate for improvements to parking layouts to facilitate walking and cycling routes at destinations including schools, public transport stops and local centres.

7. Street and Corridor Templates

7.1 V-E Local Link and Local Place (No Through Road/Laneway)

Streets (or segments of streets) that cater for local access and local movement only and have restricted accessibility or linkages to a wider street network (e.g. cul-de-sacs, closed-off road sections and laneways). These streets do not have any destinations, other than local (i.e. no parks, shops or open spaces).

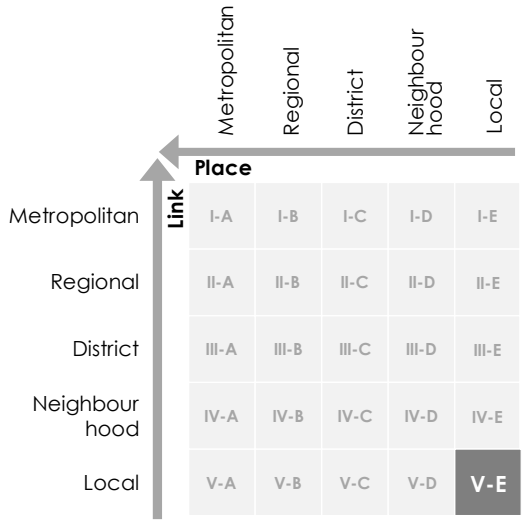
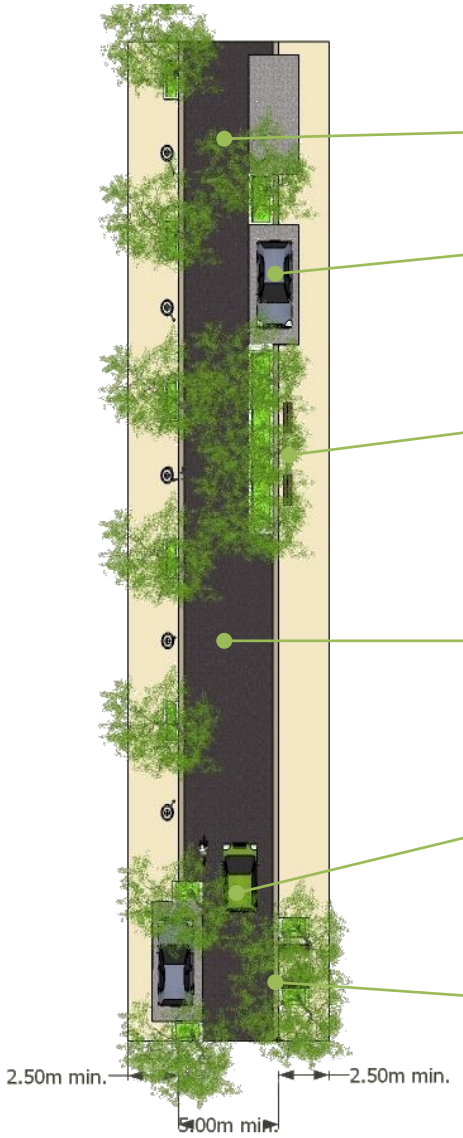


Figure 7.1: Matrix for local link and place (No Through Road/Laneway)

Typology description

- Refer to the description for standard V-E street type (in Section 7.2), which is applicable to this typology.
- Limited accessibility and no through traffic is likely to attract vehicular traffic volumes below 100 vehicles per day and will also keep vehicular speeds below 20km/h making these streets safe environments for walking and staying activities.
- Special nature of limited accessibility on these streets enables them to promote and encourage staying activities, for instance, playing activities for children.
- Pocket parks (small spaces with landscaping and seating) and verge gardens maintained and used by adjacent residents could be knitted into the fabric of the street, providing local opportunities for socialising and relaxation.
- Single surface environments would be appropriate here, which will allow for mixed use of streets.



Bicycles to mix with motor vehicles in low speed environment

Parallel parking to be staggered along street

Maximise footpath widths on each side.

Footpath width:
- **minimum** 1.5 metres minimum
- **absolute minimum** 1.2 metres

Two lane two-way carriageway with kerbs or single surface:
- **minimum** width 5.0 m
- **minimum** passing length 15 m

Single lane two-way carriageway:
- **minimum** single lane width 3.0 m
  maximum single lane length 30 m

Delineate street edges with:
- Furniture, signage, seating, lighting
- Plantings (canopy and ground levels)
- Kerb or edge strips (single surface)

Figure 7.2
V-E (no through road/laneway)
Plan View and Description

7.2 V-E Template (10 metre reserve)

Streets (or segments of streets) that cater for local access and local movement. These streets do not cater for any destinations, other than local land use access (i.e. no parks, shops or open spaces).

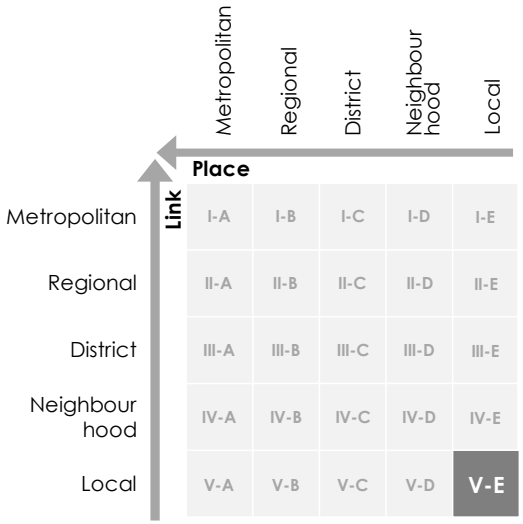


Figure 7.3: Matrix for local link and local place

Typology description

- The combination of low strategic status Place and low strategic Link implies that these street segments accommodate local adjacent destinations and provide access to them.
- Focus should be on safe slow speed environments, pedestrian and cycling priority and accessibility, good informal surveillance and personal security.
- As a local Link, street design should prevent throughput of any 'unnecessary' traffic, catering for local access only.
- Speed restraint measures are particularly appropriate here and target design speeds should be below 30km/h.
- Measures appropriate to create the right speed environment could target carriageway width and alignment, short lines of sight and changes in surface materials (for example, at crossing points).
- Tight turning circles at all intersections are appropriate, to reduce driver speeds and shorten pedestrian crossing distances.
- Carriageway width should be minimised: V-E streets would typically receive traffic flows of 100-500 vehicles per day (with upper traffic volumes of 1,000 vehicles per day) and for most of the day these streets will be free of traffic, warranting narrowing of carriageway width in places to one travelling lane.
- V-E street types should promote community interaction and cohesion and should cater for local playing activities for children.
- Single surface environments would be appropriate here, which will allow for mixed use of streets.

Figure 7.4: V-E Cross Section and Perspective View

V-E (No Through Road/Laneway) Template (10 metre reserve)

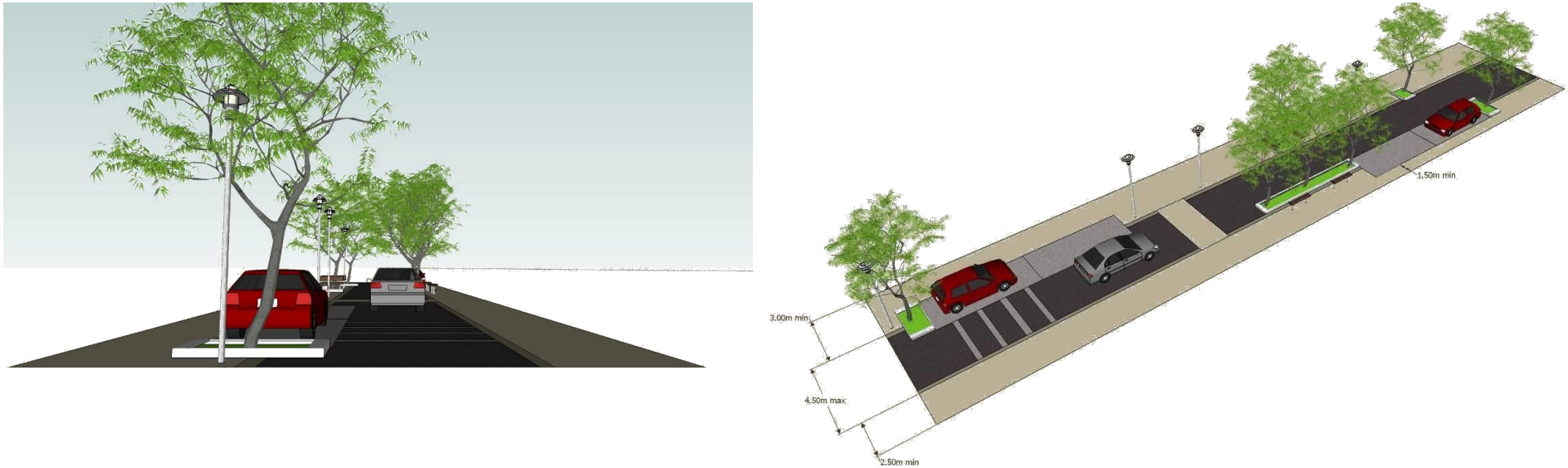
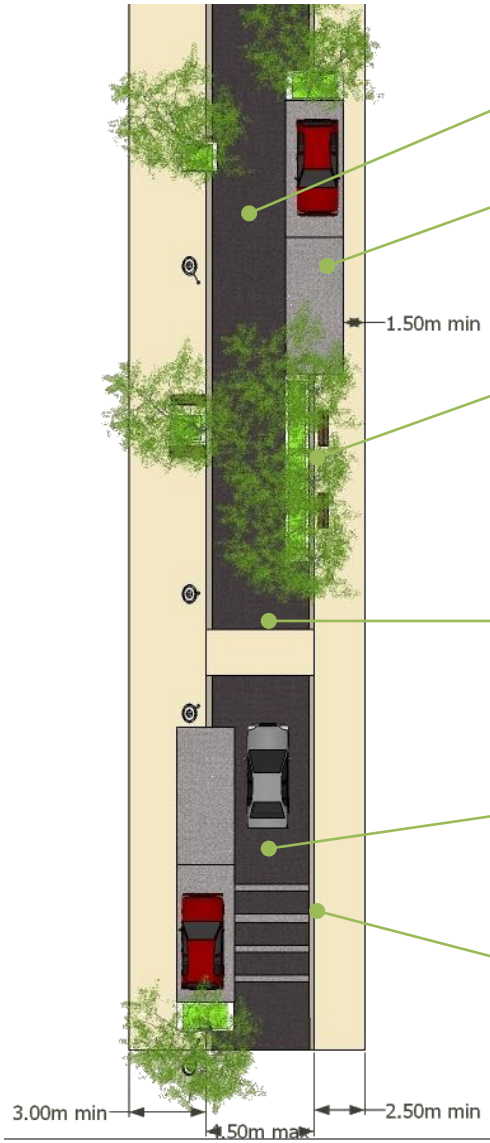


Figure 7.5: V-E (no through road/laneway) Cross Section and Plan View



Bicycles to mix with motor vehicles in low speed environment

Parallel parking to be staggered along street

Maximise footpath widths on each side.
- **minimum** 1.5 metres minimum
- **absolute minimum** 1.2 metres
- alternate wider footpath regularly on longer streets (>200 metres)

Two lane two-way carriageway with kerbs or single surface:
- **maximum** width 4.5 m
- **minimum** single lane width 3.0 m

Single lane two-way carriageway:
- **maximum** single lane length 30 m
- **minimum** passing length 15 m

Delineate street edges with:
- Furniture, signage, seating, lighting
- Plantings (canopy and ground levels)
- Kerb or edge strips (single surface)

Figure 7.6
V-E
Plan View and Description

7.3 IV-C Neighbourhood Link and District Place

Streets (or segments of streets) that act as neighbourhood collector roads for movement also provide destinations accessed by residents from a wider district catchment (approximately up to 5km). Destinations along this street type may include corner shops and supermarkets, cafes, local schools, child care facilities, playgrounds or tennis courts.

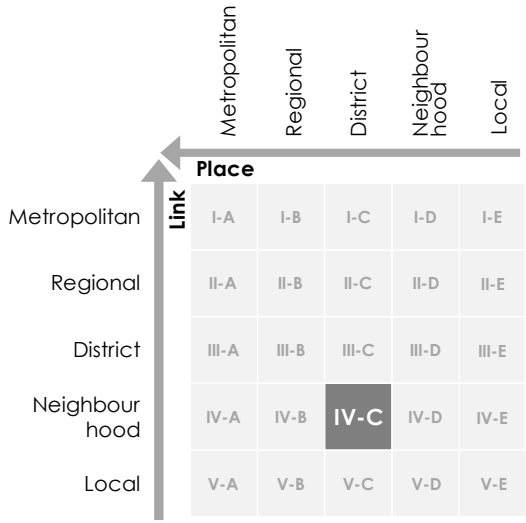


Figure 7.6: **Matrix for neighbourhood link and district place**

Typology description

- These street segments cater for neighbourhood level interest in through movement and provide district-wide attractors (places).
- Presence of destinations along IV-C street segments generates pedestrian activity, therefore focus should be on safe slow speed environment below 30km/h and pedestrian and cycling priority and accessibility.
- Minimal through traffic is expected, therefore focus should be on steady slow vehicular speed and narrowing of the carriageway to two lanes of moving traffic.
- Achieving speed environments of 30km/h and below will safely integrate movement of cars and cyclists, therefore there is no need for providing segregated cycling tracks.
- Street design should promote journeys on foot and by cycle to access destinations here, which should be reflected in design priorities.
- Tight turning circles at all intersections are appropriate, to reduce driver speeds and shorten pedestrian crossing distances.
- 'District' Place status should promote community interaction and accessibility and street design should encourage development of destinations along these streets by catering for on-street activities (e.g. climate protection, seating, parking).
- Single surface environments would be appropriate here, which will allow for mixed use of streets.
- The length of these treatments should be relatively short and only for the area of activity as required.

- Higher levels of commercial vehicles would be expected on these streets to service the activity areas.

IV-C Template (20 metre reserve)

Figure 7.7: IV-C Cross Section and Perspective View

Bicycles to mix with motor vehicles in low speed environment

Parking to be staggered on each side:
- Parallel spaces
- Angled spaces in high demand areas

Maximise footpath widths on each side.
- **minimum** 4.0 metres minimum
- **absolute minimum** 2.4 metres (at squeeze points)
- offset with wider side to activity areas

Two lane two-way carriageway with kerbs or single surface:
- **maximum** width 6.5 metres
- **maximum** segment length 150 metres (between slow points / transitions)

Delineate street edges with:
- Furniture, signage, seating, lighting
- Plantings (canopy and ground levels)
- Kerb or edge strips (single surface)

Figure 7.9
IV-C
Plan View and Description

7.4 IV-E Neighbourhood Link and Local Place

Streets (or segments of streets) that act as neighbourhood collector roads for movement and also for access to immediate land uses. These streets do not have any destinations, other than local residential (i.e. no parks, shops or open spaces).

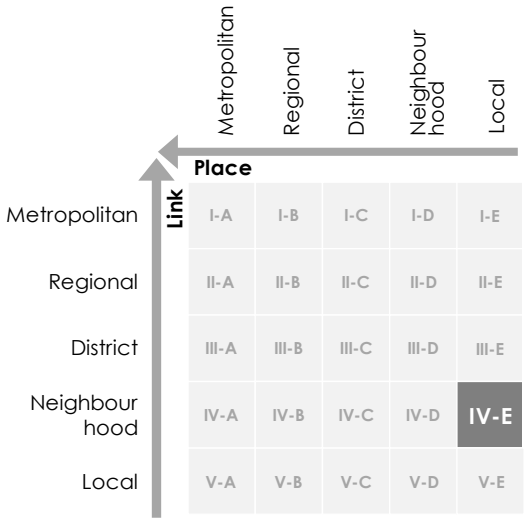


Figure 7.9: Matrix for neighbourhood link and local place

Typology description

- These street segments act as neighbourhood collectors, while providing for local accessibility.
- Lack of significant destinations coupled with typical traffic volumes of above 4,000 vehicles per day means that IV-E streets are unlikely to attract staying pedestrian activities, but will cater for pedestrian commuters.
- If land uses along this street are predominantly residential, the design should aim to achieve speed environments of 30km/h or less to promote local safety and accessibility and minimise noise impact from traffic.
- Achieving speed environments of 30km/h and below will safely integrate movement of cars and cyclists, therefore there is no need for providing segregated cycling tracks.
- Street design should promote journeys on foot and by cycle to access destinations here, which should be reflected in design priorities.
- Tight turning circles at all intersections are appropriate, to reduce driver speeds and shorten pedestrian crossing distances.
- Single surface environments would be appropriate here, which will allow for mixed use of streets.

IV-E Template (20 metre reserve)

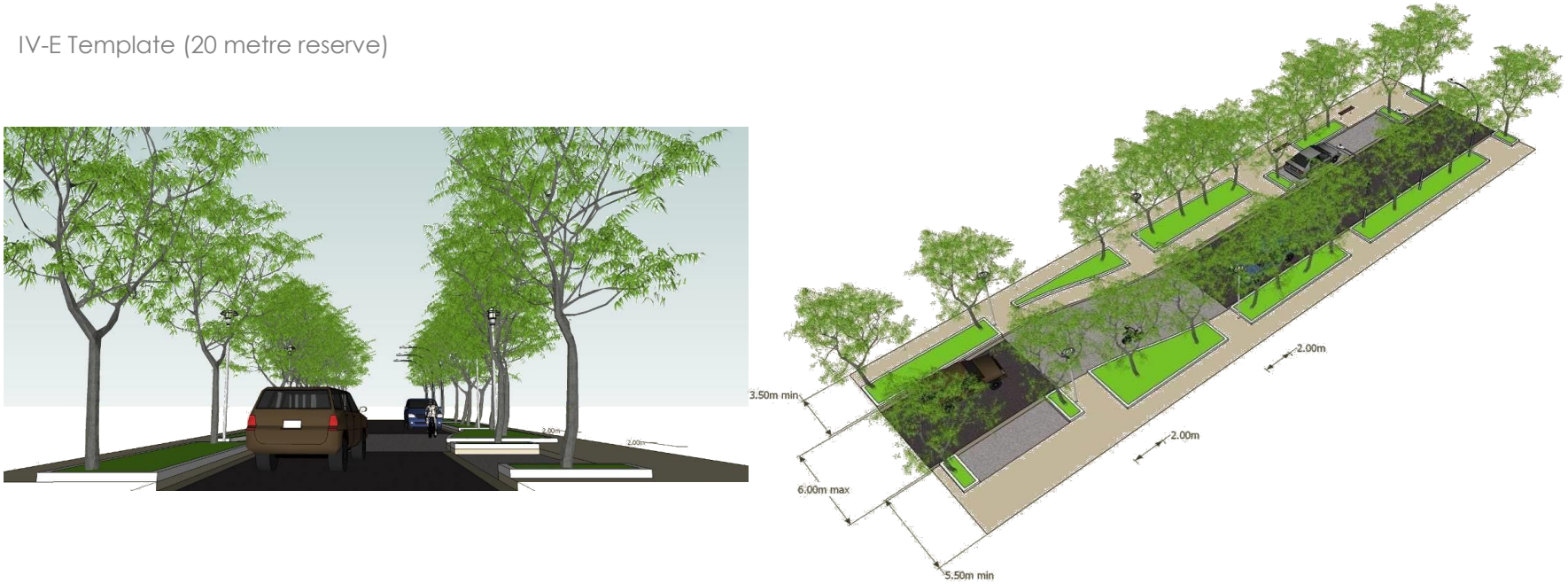


Figure 7.10: IV-E Cross Section and Plan View

Bicycles to mix with motor vehicles in low speed environment

Parking to be staggered on each side with parallel spaces

Maximise verge widths on each side:
- **minimum** 3.5 metres
- stagger wider verge along street

Footpath width:
- **minimum** 1.5 metres
- **absolute minimum** 1.2 metres

Two lane two-way carriageway with kerbs or single surface:
- **maximum** width 6.0 metres
- **maximum** segment length 100 metres between transitions
- transition regularly to remove straight line of sight along street
- high light transitions with distinctive pavement or streetscape features

Delineate street edges with:
- Furniture, signage, seating, lighting
- Plantings (canopy and ground levels)
- Kerb or edge strips (single surface)

Figure 7.12
IV-E
Plan View and Description

7.5 III-C District Link and District Place

Streets (or segments of streets) that act as district collector roads for movement also cater for district destinations. The destinations may include major community sporting grounds, community halls/gathering places, schools catering for pupils from a wider district catchment, district activity centres (shopping centres, etc).

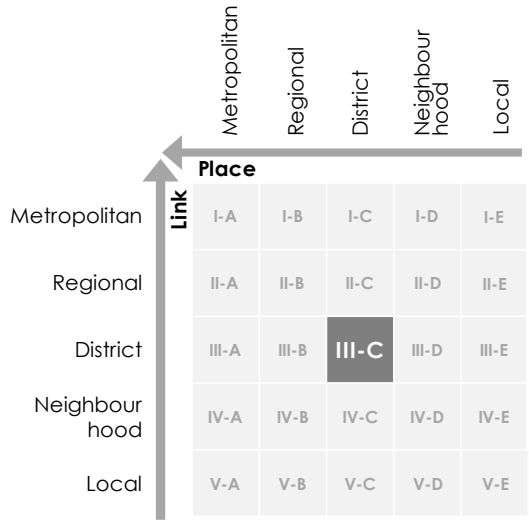


Figure 7.12: Matrix for district link and district place

Typology description

- These street segments act as district collectors (typical of minor arterials), while providing for district level of activities and destinations.
- These streets are significant from a destination point of view and street design, especially here, and should capture and celebrate the quality and character of the area.
- The flexibility of 'Place' design is preferable, enabling special events to take place and different weekend uses (for example, food stalls/farmer markets, community events, etc).
- Achieving speed environments below 40km/h is essential to enable district-significance Place to prosper, minimising impacts of traffic severance and noise.
- In terms of segregation of cyclists from general traffic flow, this is a borderline case and the approach will depend largely on the speed environment that can be achieved: for speeds around 30 km/h segregated cycle facilities are not necessary, however, in environments of 40km/h and above, segregated cycle paths are recommended.
- Street design should promote journeys on foot and by cycle to access destinations here, which should be reflected in design priorities (frequent safe opportunities to cross, minimised interruptions along the route from side streets, cycle stands).

- Tight turning circles at all intersections are appropriate, to reduce driver speeds and shorten pedestrian crossing distances.
- On-street parking should provide limited short-term parking to adjacent businesses, preventing long-term parking (in cases of limited street width, car parking could be incorporated on side streets to free up space for kerb side activities and through movement of traffic).
- Single surface environments would be appropriate here, which will allow for mixing of street uses.

III-C Template (20 metre reserve)

Figure 7.13: III-C Cross Section and Plan View

Bicycles:
On-street mixing with motor vehicles, and
Off-road shared use path
- **minimum** width 2.5 metres

Pedestrian crossing opportunities with priority in frequent locations (high demand areas):
- **maximum** 75 metres spacing
- Traffic signals with short wait times, and/or
- Raised table crossing (Koala type)

Maximise verge widths on each side:
- **minimum** 6.5 metres
- alternate wider verge along street

Footpath width:
- **minimum** 2.4 metres
- **absolute minimum** 1.5 metres

Two lane two-way carriageway with kerbs:
- **maximum** width 6.5 metres
- **maximum** segment length 150 metres between transitions
- transition regularly to remove straight line of sight along street
- crossing highlighted with distinctive pavement

Delineate street edges with:
- Furniture, signage, seating, lighting
- Plantings (canopy and ground levels)
- Kerb or edge strips (single surface)

Parking to be staggered on each side:
- Parallel spaces
- Angled spaces in high demand areas

Figure 7.15
III-C
Plan View and Description

7.6 III-D District Link and Neighbourhood Place

Streets (or segments of streets) that act as district collectors for movement and also cater for neighbourhood destinations. District level of movement often caters for traffic volumes above 12,000 vehicles per day and may incorporate bus services. The destinations may include major community sporting grounds, community halls/gathering places, schools catering for pupils from a district catchment, district activity centres (shopping centres, etc).

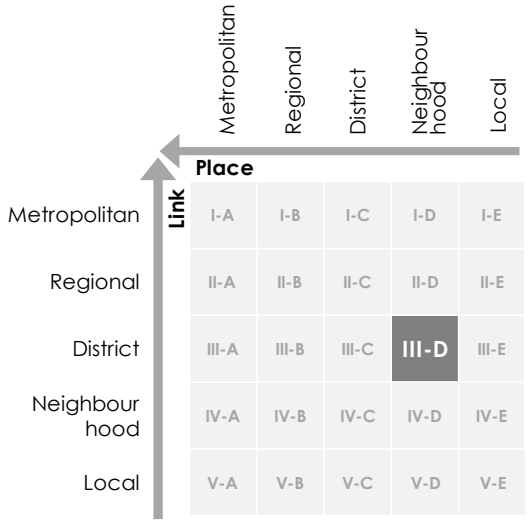


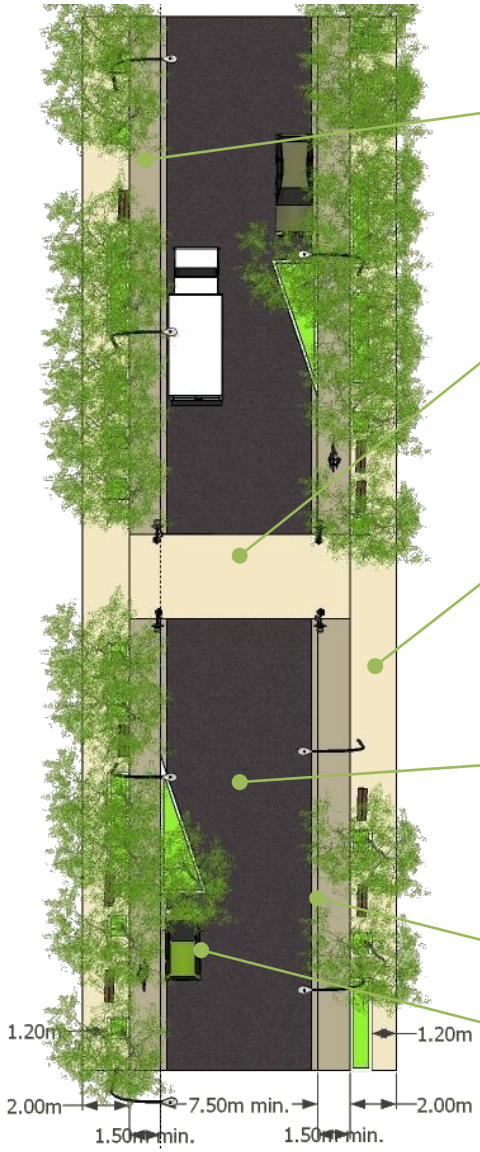
Figure 7.15: Matrix for district link and neighbourhood place

Typology description

- With the Link status higher than the Place status, III-D streets should minimise disruption to commuters, while still encouraging low speeds, ensuring compatibility with a Place of neighbourhood status.
- Street design should promote journeys on foot and by cycle to access destinations here, which should be reflected in design priorities.
- On-street parking should provide limited short-term disabled and visitor parking to adjacent businesses, preventing long-term parking (in cases of limited street width, car parking could be incorporated on side streets to free up space for kerb side activities and through movement of traffic).
- In most cases, one in each direction will be sufficient to accommodate vehicular flow, with provision for turning movements and bus stops, where necessary.
- Appropriate speed environment is below 40km/h and segregated cycle lanes are likely to be required.
- Tight turning circles for all intersections are appropriate, to reduce driver speeds and shorten pedestrian crossing distances.
- Single surface environment would be appropriate here, which will allow for equal/shared priority of street use.

III-D Template (15 metre reserve)

Figure 7.16: III-D Cross Section and Plan View



Off-road bicycle paths on each side of carriageway:
- **minimum** 1.5 metres wide
- vertical separation from carriageway
- single surface with footpath

Pedestrian crossing opportunities with priority in frequent locations:
- **maximum** 75 metres spacing in demand areas
- Traffic signals with short wait times, and/or
- Raised table crossing (Koala type)

Maximise verge widths on each side:
- **minimum** 3.5 metres

Footpath width:
- **minimum** 1.5 metres
- **absolute minimum** 1.2 metres

Two lane two-way carriageway with kerbs:
- **maximum** width 7.5 metres (8.0 metres for bus routes)
- **maximum** segment length 200 metres between transitions
- transition regularly to remove straight line of sight along street
- crossings highlighted with distinctive pavement

Delineate street edges with:
- Furniture, signage, seating, lighting
- Plantings (canopy and ground levels)
- Kerb or edge strips (single surface)

Parallel parking:
- Alternate side regularly
- Kerb extensions to define areas

Figure 7.18
III-D
Plan View and Description

Appendix A

Link and Place Examples

TRANSPORT STUDY - APPLICATION OF THE CONCEPTS

In developing recommendations for Charles Sturt, two workshops were held to apply evolving concepts and recommendations to streets and neighbourhood areas in Charles Sturt Council.

This section outlines assessment of issues and opportunities for two train station environments: Grange and Kilkenny.

Grange Neighbourhood Area

Streets and general neighbourhood environment were assessed to identify and explore liveability and sustainability issues for neighbourhood communities.

To support the study assessment, a series of maps were prepared displaying key information about neighbourhood environments studied. These maps are included here, as well as a description of key places and through routes. Photos covering all other streets are also included.

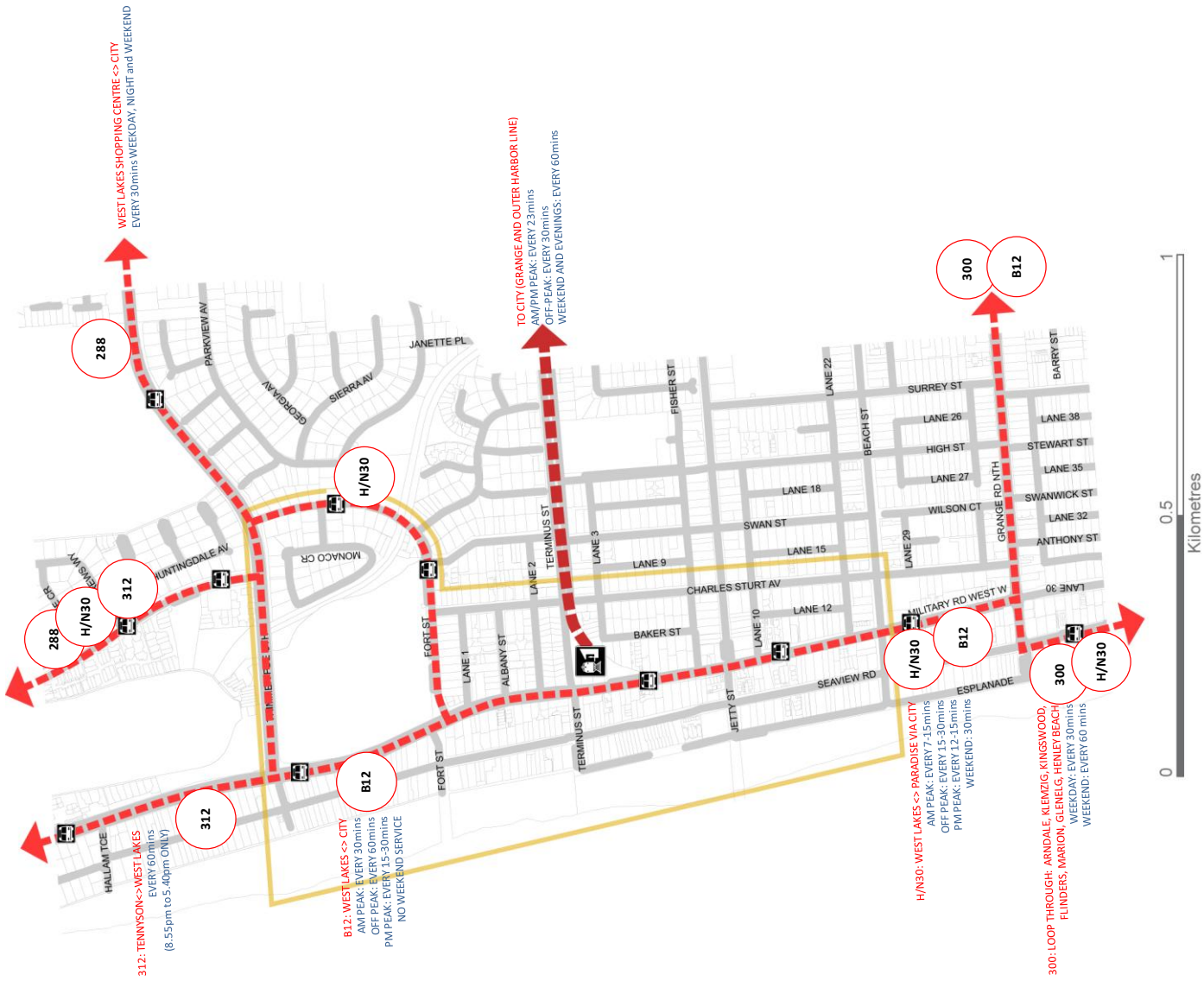
SPEED ENVIRONMENT

AVERAGE TRAFFIC SPEED

Source: City of Charles Sturt, 2010

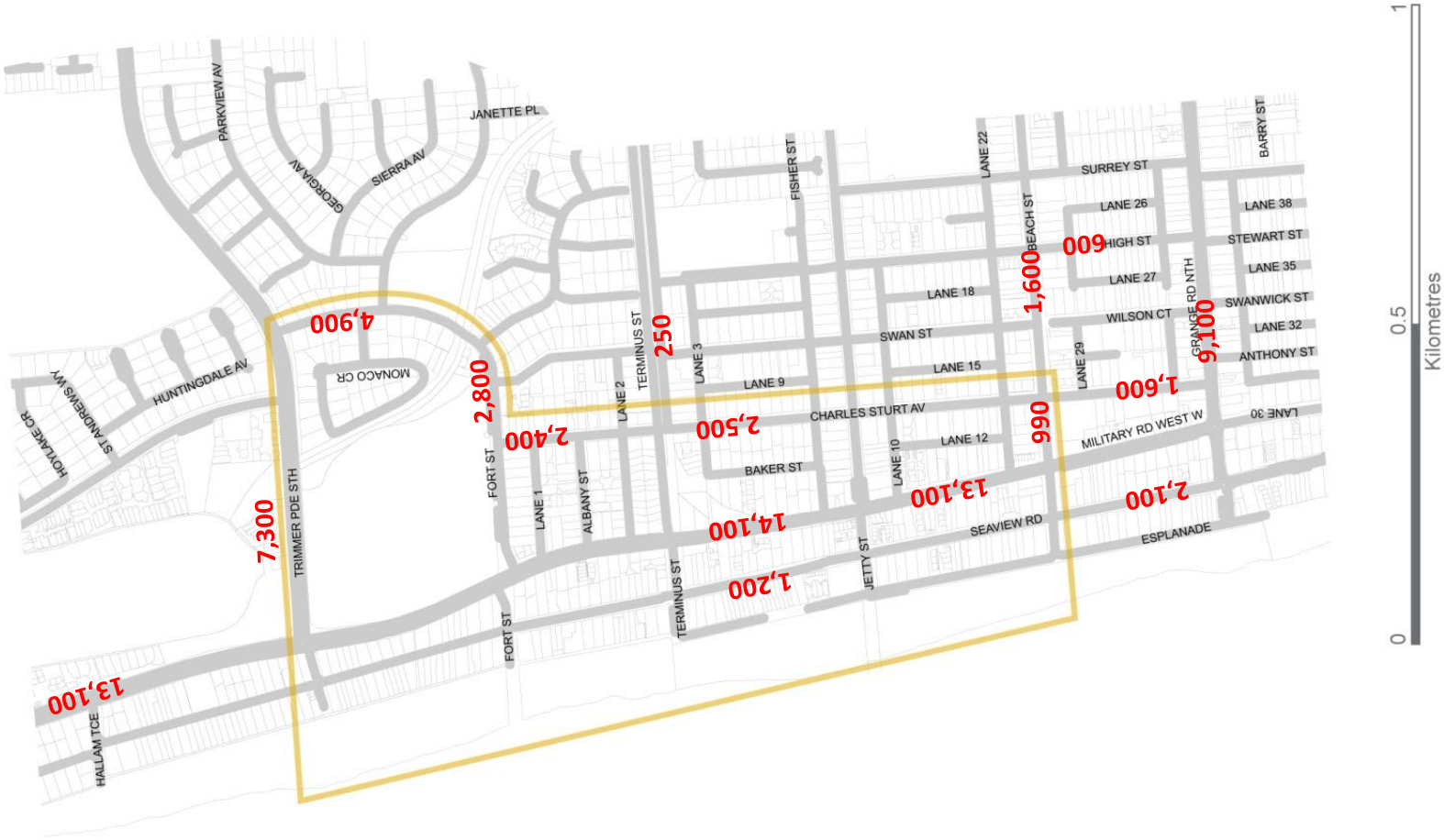
PUBLIC TRANSPORT PROVISION

Source: Adelaide Metro timetable information
(checked on 3 June 2011)



TRAFFIC ENVIRONMENT

Annual Average Daily Traffic Estimates (AADT)
Source: City of Charles Sturt, 2010



DESTINATIONS

Indicative location of destinations that are likely to attract custom from local residents, based on visual site assessment.

PEDESTRIAN AND CYCLIST ACCIDENTS

Locations of collisions involving a pedestrian or a cyclist over the last 5 years.
Source: Department for Planning, Transport and Infrastructure Crash Statistics Data for a period between 2004 and 2008

TRIMMER PDE

Link

Serving 7,300 vehicles per day on average by four carriageway lanes (with additional turning lanes), Trimmer Parade offers a convenient and fast link for vehicular traffic between Military Road and Fredrick Road.

Trimmer Parade is a bus route for a number of services, however there are no bus stops along Trimmer Parade within the study area.

Though speed data was not available, the speeds along this road are likely to be in excess of 55km/hr, due to good lines of sites and wide carriageways.

Place

Both Grange Reserve to the south of the road and a new and popular playground to the north are important open spaces used by visitors from a wider district area.

Grange Reserve is fenced off along Trimmer Parade, offering poor accessibility and legibility to people on foot. Entrances are of poor amenity and are not signed. There are no pedestrian crossings to serve these open spaces. There are no pedestrian footways along the southern side of Trimmer Parade.

The road offers a hostile environment to cyclists and pedestrians and acts as a barrier between two open spaces. Widened carriageway at an intersection with Military Road is a particularly hostile area to vulnerable road users, with two accidents involving cyclist recorded.

FORT ST

Link

Fort St serves on average between 2,800 and 4,900 vehicles per day accommodated by a two lane single carriageway. H and N30 bus route runs along Fort Street. One of the bus stops along Fort Street has no shelter.

Though this road carries low traffic volumes, cars travel at speeds above 50km/hr for its entire length.

Place

Fort Street abuts Grange Reserve, which is used by visitors from a wider district area. Westminster Aged Care Facility is situated along Fort Street.

Grange Reserve is fenced off along Fort Street, offering poor accessibility and legibility to people on foot. Entrances are of poor amenity and are not signed.

Fast moving traffic poses a risk for pedestrians in the area. Poor pedestrian connections and accessibility to Grange Reserve promote car dominance within the area.

A water channel reserve running across Fort Street offers poor amenity for pedestrian walkers and joggers.

MILITARY RD

Link

Military Road is an important north-south arterial road, linking beachfront communities. It caters well for traffic with dual two-lane carriageways separated by a median. Average traffic speeds along the road are 55km/hr and vehicular traffic in the study area is between 13,100 and 14,100 vehicles per day.

Buses B12 and N/H30 run along Military Road, connecting West Lakes to the City and Paradise.

There are no continuous cycle lanes along Military Road. Small sections of narrow cycle lanes operate in peak hours only. In the last 5 years, crashes between motorists and cyclists along Military Road occurred at junctions with Trimmer Parade, Fort Street and Beach Street.

Place

Major destinations along Military Road are: Grange Reserve, petrol station and convenience store adjacent Terminus Street and businesses close to Jetty Street. The area around Jetty Street acts as a 'main street' destination for residents of Grange, offering basic service of post office, pharmacy, supermarket, newsagent and a number of cafes. As such, it is an important neighbourhood destination for journeys on foot therefore with a potential to minimise trips from this area.

There are a number of significant issues associated with Military Road, affecting the liveability of the area:

- There is only one pedestrian crossing across Military Road within the study area, which is not situated directly on a pedestrian desire line.

- Lack of pedestrian crossing facilities contribute to Military Road acting as a severance of the area for pedestrian users walking to the beach or to destinations along Military Road.
- There are no continuous footways along the western side of the road and no climate protection along the street and at some bus stops.
- Footpath next to commercial premises along Military Road is cluttered with advertising signs.
- There is no sense of destination or arrival associated with the commercial hub around Jetty Street.
- Provision of cyclist facilities and safety are poor.
- There is no signage and a concealed entrance to the train station.

SEAVIEW RD

Link

Seaview Road comprises a two lane single carriageway and carries low volumes of traffic, between 1,200 and 2,100 vehicles per day. Even though the speed limit is 40km/hr, speed measurements in two locations showed average speeds of 44 and 48km/hr.

There are no bus routes along Seaview Road. There are also no cycle facilities.

With five crashes involving a cyclist and one involving a pedestrian in the last five years, there are safety concerns associated with the street environment. It is recommended that further investigation to look into these crashes takes place.

Place

There are a few businesses close to the intersection with Jetty Road, offering hair and beauty services and fast food outlets.

Close proximity to the beachfront, the esplanade and to businesses along Jetty Street, makes Seaview Road an important environment for journeys on foot and by bike.

Tall mature pine trees (albeit not continuous) create a unique feel of a shaded boulevard.

CHARLES STURT AVE

Link

Charles Sturt Avenue runs between Fort Street and Grange Road, offering short north-south route alternative to Military Road and Seaview Road within the area and to the West Torrens Shopping Centre. It carries similar vehicular flows to Seaview Road (between 1,600 and 2,500 vehicle per day). High average speeds have been measured along the road (53, 56 and 54 km/hr) above the speed limit of 50km/hr.

The carriageway width is approximately 7.6 metres (narrower than Seaview Road that measures up to 10m) with road markings limited to intersections with major roads only.

There are no bus services running along the street and no cycle lanes.

Place

Grange train station is located in close proximity to the intersection with Terminus Street, thus good pedestrian accessibility and connections in this area are very important.

The street is lined with predominantly single storey residential dwellings. Other than Grange Reserve at the northern end of the street, there are no other destinations here.

JETTY ST

Link
Jetty Street carries low levels of traffic flow from the immediate area. However, it provides a direct connection between Military Road and Fredrick Road. There is no traffic flow or speed data available.

The street measures approximately 20m between private land boundaries, and the 10m wide carriageway accommodates on-street parking and two lanes of traffic.

Place
A section of Jetty Street between Military Road and Charles Sturt Avenue acts as a main street for the wider area (in conjunction with a small section of Military Road immediately to the north), offering a supermarket, florist and a couple of cafes, which are popular destinations for the immediate community.

In this location, activities spill onto the footpath areas, encouraged by modest outdoor seating areas and awnings. Indented 45 and 90 degree parking on the north and south sides of this street section, respectively, suggest high priority for car accessibility.

ESPLANADE AND WATERFRONT

Link
Esplanade provides car accessibility between Terminus and Grange Roads. Traffic volumes here are generated by immediate local access needs and car parking for waterfront users.

A shared pedestrian and cycling path runs along Esplanade, offering a priority recreational route.

Place
Recently redesigned Esplanade square at Jetty Street provides a large and spacious car park for visitors. The public space is dominated by car parking provision and does not offer a sense of arrival or destination.

In addition to the beach, the visitor attractors are the Grange Hotel and a restaurant along the beach.

The Grange waterfront is more relaxed in comparison with Henley Beach and Glenelg, offering opportunities for more quiet enjoyment of the area.

BEACH ST

Link
Beach Street provides car access to the Esplanade and accessibility to 45 degree car parking strip at its western end. Average car speeds east of Military Road are 45km/hr.

Place
Beach Street accommodates four commercial uses, being the art gallery, book shop, a hair dressing salon plus another business as well as a church and tennis/netball court. It offers a good car parking provision to these frontages.

TERMINUS ST

BAKER ST SYSTEM AND LANEWAYS SOUTH OF JETTY ST

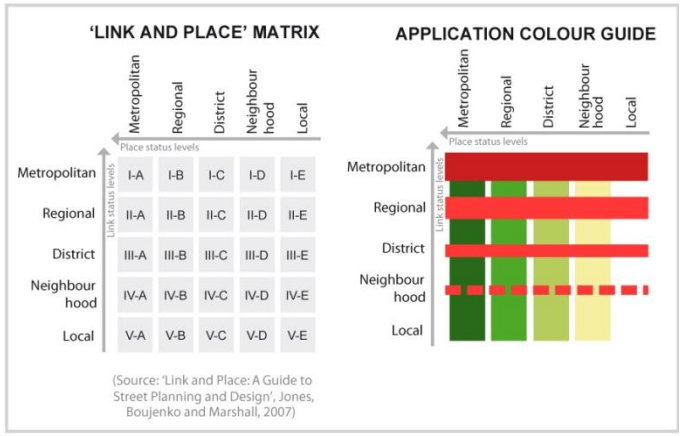
Consider:
- Personal security, microclimate
- Opportunities

MONACO CR

ALBANY ST, CANNAUGHT ST AND LANEWAY

CURRENT LINK AND PLACE DESIGNATIONS AND KEY ISSUES WITHIN THE STUDY AREA

Current Link and Place designations



Currently, Military Road and Trimmer Parade act as two main Links in the Grange area, with a designated 'district' level Link status. This means that these routes carry traffic to/from local, neighbourhood and a wider district area. Other important routes in the neighbourhood are Fort Street, Charles Sturt Avenue, Jetty Street and Seaview Road, all acting as neighbourhood significance collector roads.

The two main destinations (of district significance) are the beach and Grange reserve, attracting large numbers of visitors. A small section of Jetty Street and Military Road (marked in a yellow colour) act as a main street for the immediate area, offering services and cafes.

Taking into account current Link and Place designations, performance data available and assessment of the liveability considerations in the area, the following key issues were observed during site visits:

- Low pedestrian priority throughout the area: poor accessibility to Grange Reserve, lack of crossings across Military Road, lack of signage, dominance of cars (and car parking) throughout offering poor amenities, etc
- Poor cycling priority with no (or very limited) facilities along Military Road and Trimmer Parade and high speed environments on all other residential and neighbourhood roads
- Potential conflicts (that need to be investigated further) between vehicular traffic and vulnerable road users along Military Road and Seaview Road at intersections with other streets
- There are very few every day local destinations that could minimise car journeys and activate the streets
- Local streets carrying low volumes of traffic are not designed as play areas or community spaces
- Poor connectivity through large areas of private land, especially between Military Road and the beach
- Most residential streets are straight and wide, providing enabling environments to speeding of traffic (with surveys confirming average speeds to be above local speed limits at a number of locations)
- There is no climate protection along most of the streets (exceptions are some of the sections of Jetty Street, Seaview Road and Charles Sturt Avenue)
- Residential development adjoining Monaco Drive has no pedestrian connections to adjoining Grange Reserve
- Pedestrian footways are missing along some of the streets (Military Road, Cannaught Street and Fort Street west)
- Train station waiting environment is of poor amenity
- Access points to train station are unattractive, concealed from the lines of sight and offering poor sense of personal security to users
- Grange beach focal point is dominated by a car park and offering no sense of arrival
- Low density of the dwellings is contributing to low numbers of pedestrians and cyclists along the streets.

PROPOSED LINK AND PLACE DESIGNATIONS WITHIN THE STUDY AREA

Grange lies at the terminus of a major fixed line transit corridor (the Grange rail line). This offers opportunities for growth and development of the Grange neighbourhood area.

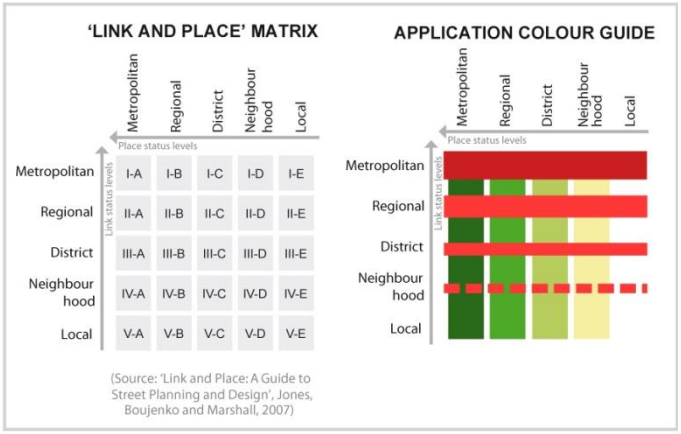
This corridor forms part of a collection of five existing corridors within the Greater Adelaide region targeted for residential and employment growth in the 30 Year Plan. The 30 Year Plan anticipates that more than 50% of projected dwelling growth and 35% of new jobs will be delivered along such corridors (inclusive of TODs). The 30 Year Plan considers that regeneration and residential growth should occur around transit stations and within 800m of the transit route.

The Residential Growth and Character Study prepared by Jensen Planning and Design undertook an initial review of potential built form and extent along the major transit corridors. The Study recommends that development should comprise:

- Within 100m of station – high density, medium rise buildings (4-5 storeys)
- Within 200m of station – medium density, lower rise buildings (2-3 storeys)
- Within 800m of station – lower density, lower rise buildings (2 storeys)

The 30 Year Plan identifies as a priority the preparation of a Structure Plan for the Outer Harbor /Grange major corridor (known as the North Western Growth Corridor). The structure planning process is almost complete and it is anticipated that it will encourage:

- residential infill within walking distance of the railway station
- a focus or centre along the Jetty Street beach front
- potential renewal or expansion of the existing neighbourhood centre on Military Road
- enhanced connections and streetscape improvements
- lowering of height and scale closer to recognised character precincts or areas



Possible future Link and Place designations

The map to the left shows the potential future Link and Place status of the neighbourhood area.

The main change is the expansion of mixed-use activities and higher density around Grange Station, along Military Road (eastern side) and Jetty Street.

The potential future changes for Links and Places within the area will provide a unique opportunity for Jetty Street to strengthen its role as a main street within Grange neighbourhood. The area around Jetty Street and Terminus Street could become more active and vibrant. This places a higher importance of addressing current issues in this area to make it more liveable.

Kilkenny Neighbourhood Area

The yellow boundary on the map above indicates the study area boundary for the Kilkenny neighbourhood area.

Streets and general neighbourhood environment were assessed to identify and explore liveability and sustainability issues for neighbourhood communities.

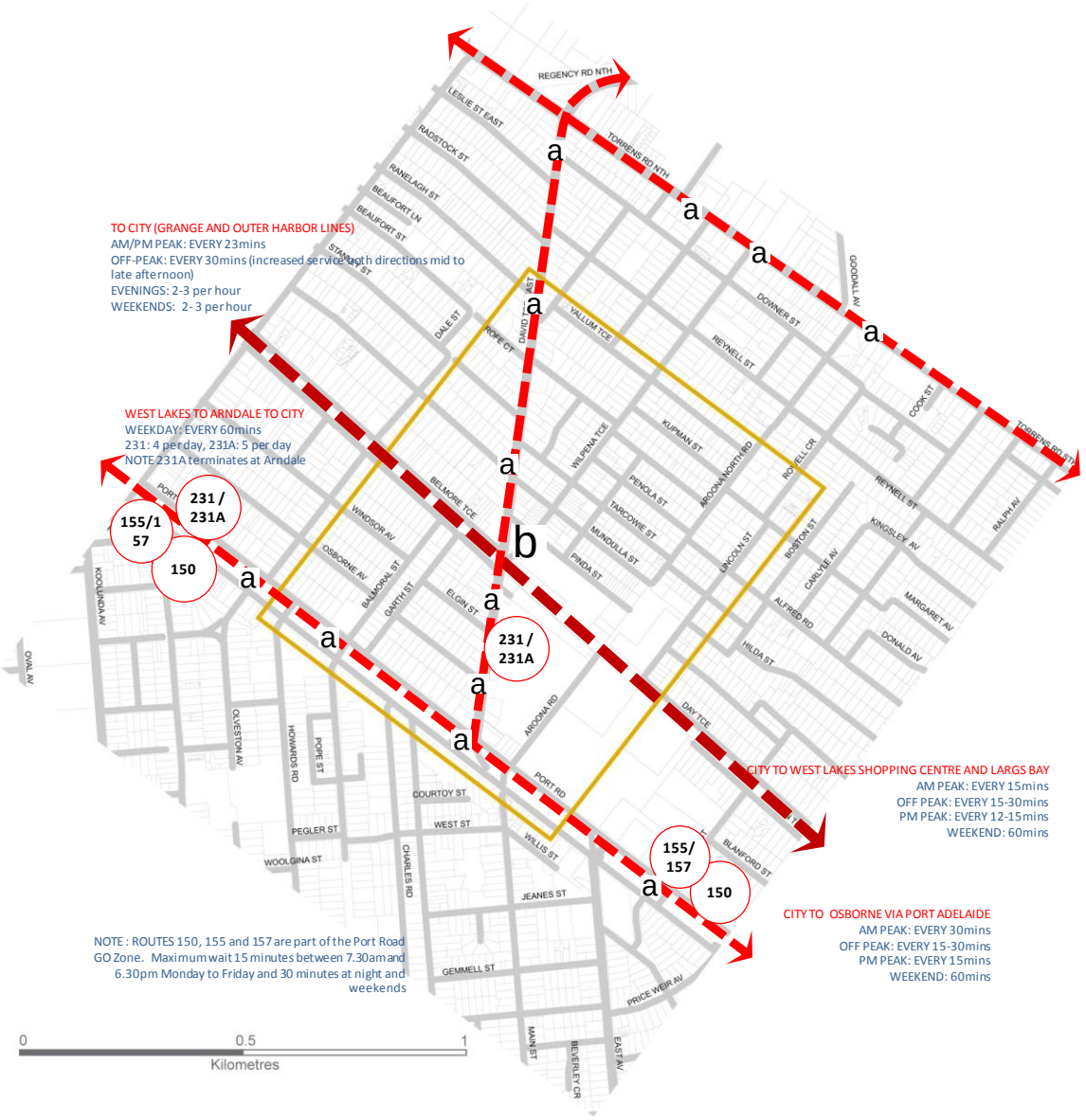
To support study assessment, a series of maps were prepared displaying key information about neighbourhood environments studied. These maps are included here, as well as a description of key places and through routes. Photos covering all other streets are also included.

SPEED ENVIRONMENT

AVERAGE TRAFFIC SPEED (km/h)
Source: City of Charles Sturt, 2010

PUBLIC TRANSPORT PROVISION

Source: Adelaide Metro timetable information
(checked on 3 June 2011)



TRAFFIC ENVIRONMENT

Annual Average Daily Traffic Estimates (AADT)
Source: City of Charles Sturt, 2010

DESTINATIONS

Indicative location of destinations that are likely to attract custom from local residents, based on visual site assessment.

PEDESTRIAN AND CYCLIST ACCIDENTS

Locations of collisions involving a pedestrian or a cyclist over the last 5 years.
Source: Department for Planning, Transport and Infrastructure Crash Statistics Data for a period between 2004 and 2008

DAVID TCE
AND
TRAIN STATION

Link

David Terrace is an arterial road carrying on average 18,400 vehicles per day and forms part of the Adelaide Metropolitan Freight Network. In general, the road comprises a single lane in either direction with a line marked bicycle lane, on-street parking and painted median within the section of the study area.

The road is bisected by an at-grade level railway crossing.

There are sections of cycling paths along David Terrace, which are frequently encroached upon moving traffic. Three cycling accidents have been recorded along David Terrace in a five year period ending in 2008.

Place

David Terrace forms part of the network of roads within the northwest corridor that were laid out in the 1800's. Therefore, there is a long history of development within the area notably punctuated by the construction of housing in the late 1800's/early 1900's and the emergence of industry since the 1920's. The net result along David Terrace is a mix of residential, industrial, retail, institutional and religious activities.

There is a cluster of retail/commercial properties immediately to the north of the railway line (adjacent Belmore Terrace) and between Port Road and Elgin Street (including Watermans and a small local centre). Along the balance of the western side of the road, there are interspersed restaurant, church, office and petrol filling station activities.

The eastern side is primarily defined by large scale industrial uses, much of which is disused, providing little activity or place creation.

Overall, David Terrace offers potential with the original 'main street' set of shops adjacent Belmore Terrace, however, it is generally considered to be a relatively

pedestrian unfriendly environment with high traffic speeds, changes in footpath forms and width and minimal tree planting or landscaping.

There are no signalised pedestrian crossings across David Terrace. Pedestrian footpaths offer little or no climate protection, are very narrow in a number or locations and are further constrained by electricity poles and traffic signage blocking pedestrian paths. At intersections, side streets are widened to provide convenient turning circles for vehicles, while lengthening pedestrian crossing distances. With fast moving large volumes of cars and freight, this is a very hostile area for pedestrians.

The Kilkenny Rail Station is located on the eastern side of David Terrace. The station is relatively basic with minimal shelter and no nearby activity to provide passive surveillance. The station was formerly utilised by workers at the Bianco and John Shearer sites and has therefore declined in user throughput since these businesses declined or relocated. There is no formal or controlled pedestrian access to the station from the western side of David Terrace

WILPENA TCE

Link

Wlipena Terrace carries on average 1,100 vehicles per day accommodated by a single lane in either direction, coupled with on street parking and indented landscaping. Traffic calming is attempted by a series of roundabouts at intersections along the road, however average recorded vehicular speed at Wilpena North was 60km.hr. .

The road provides a direct connection between David Terrace and Torrens Road extending the full width of the corridor between these arterial roads.

Place

The southern end of Wlipena Terrace terminates adjacent to Kilkenny Rail Station. The station is a pedestrian attractor, however, other than some mature landscaping it sits within a low amenity environment with minimal infrastructure.

Wilpena Terrace is primarily residential in nature other than industrial activities near Pinda Street and a church in Mundulla Street. There is clear evidence of a past commercial/retail focus with a large number of converted properties with commercial frontages between Pinda Street and Penola Street. The majority of these converted properties have retained their former shop fronts and built form as part of their adaptive re-use. The balance of the street comprises lower density detached dwellings.

PINDA ST

Link

Pinda Street carries approximately 500 vehicles per day. Pinda Street is a no-through road, however, it provides vehicle access to a mix of industrial and residential uses along its length and to McInerny Reserve at its eastern terminus.

A footpath runs along its northern edge and there are few street trees or other landscaping.

Place

Pinda Street comprises clearly defined zones along its relatively short length.

West of Wilpena Street: large scale industrial premises are located on the southern side and two residential dwellings on the northern side (primarily the secondary elevation of single storey residential dwellings that front Wilpena Terrace).

East of Wlipena Street (southern side): vacant former industrial premises including a substantial large scale industrial building (former John Shearer factory) directly front onto the street.

East of Wlipena Street: (northern side) – there are a mix of industrial uses and associated buildings, along with recreational uses (tennis courts/children's play space).

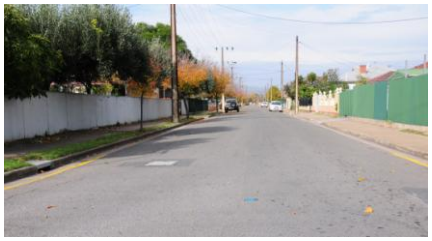
Pinda Street terminates with a small car park and direct pedestrian and cyclist access into McInerny Reserve.

SACKVILLE ST

MARGARET AVE

LINCOLN ST

ALFRED RD



ROWELL CRES

CAVENDISH ST

AROONA RD NTH AND AROONA RD STH

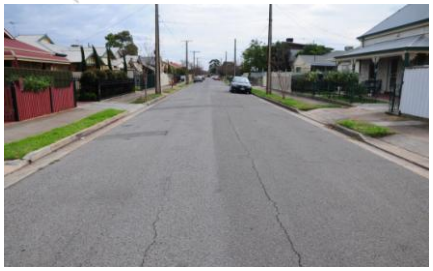
MUNDALLA ST

TARCOWIE ST

BRYAN AVE

YALLUM TCE

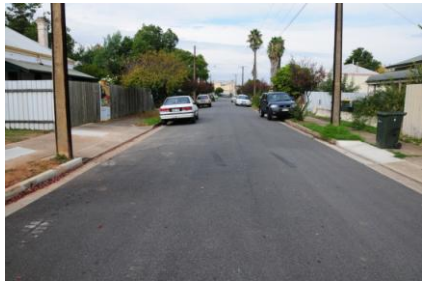
KUPMAN ST



BELMORE TCE AND RUSSELL TCE

ELGIN ST

JEANETTE ST



WINDSOR AVE

GARTH ST

OSBORNE AVE

BALMORAL ST

RANELAGH ST

ROFE CT

CURRENT LINK AND PLACE DESIGNATIONS AND KEY ISSUES WITHIN THE STUDY AREA

Currently, Port Road and David Terrace act as the two main Links in the Kilkenny area. Port Road is designated as a metropolitan Link and David Terrace a regional Link status. The balance of the streets within the study area all act as local Links.

Within the area, Port Road contains a linear strip of commercial activities that comprises a mix of uses that serve both a local and wider customer base. David Terrace is designated as an arterial road and additionally carries commercial vehicles as part of the Metropolitan Freight Network.

Current Link and Place designations

Taking into account current Link and Place designations in the area, performance data available and assessment of the liveability considerations in the area, the following key issues were observed during site visits:

- Poor pedestrian priority along David Terrace with no safe crossing points.
- Poor pedestrian footways along David Terrace, blocked by electricity poles, signage and other infrastructure and a mix of pavement widths.
- Frequent pedestrian interruptions along David Terrace by side streets.
- Poor/partial cycling provision along David Terrace with 3 crashes in years.
- A network of local streets based on an existing grid pattern that provides good pedestrian connectivity and wayfinding, however, results in straight long local streets that enable speeding much above the speed limit (for example, average speeds of 60km/h have been recorded along Wilpena Terrace, Belmore Terrace and Harvey Street)
- Variable quality in the local street environment ranging from lower quality streetscapes (eg Pinda Street) to higher quality streets (eg Wilpena Terrace).
- Train station passenger waiting environment is of poor amenity.
- Access to train station is basic, generally concealed from view and offers only a poor sense of safety and security for users.
- Very few destinations in the area, limited to David Terrace and McInerny Reserve, which provide a neighbourhood focus for play and recreation.
- Low density residential environment that is contributing to low numbers of pedestrians and cyclists along the streets.

PROPOSED LINK AND PLACE DESIGNATIONS WITHIN THE STUDY AREA

Kilkenny incorporates a rail station along a major fixed line transit corridor (the Outer Harbor line). The main Port Road corridor also resides within this corridor providing additional public and private travel options.

The 30-Year Plan for Greater Adelaide proposes that more than 50% of projected dwelling growth and 35% of new jobs will be delivered along such corridors (inclusive of TODs). The 30 Year Plan considers that regeneration and residential growth should occur around transit stations and within 800m transit routes.

Kilkenny contains two extensive land holdings, the John Shearer and Bianco sites, which provide the foundation for significant regeneration of the station environs. The area also contains a significant proportion of original character housing stock that should be retained and enhanced as part of future urban development outcomes.

The Kilkenny and Seaton Park Scoping Study (2009) undertook an initial review of options and identified opportunities for:

A Station plaza precinct

- 'Green' streets along Wilpena Terrace and Pinda Street.
- Gateway mixed use development on David Terrace.
- Mixed-use residential development up to 5 storeys.

The 30-Year Plan identifies as a priority the preparation of a Structure Plan for the Outer Harbor /Grange major corridor (known as the North Western Growth Corridor). The structure planning process is almost complete and it is anticipated that it will encourage:

- Renewal of the existing industrial sites for higher density, mixed use development.
- Residential infill within walking distance of the station.
- Increased activity along David Terrace and consideration of options for enhanced retail and other uses along Wilpena Terrace.
- Retention and enhancement of character precincts or areas.

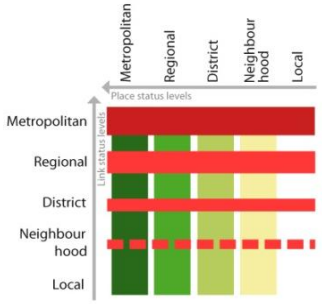
Possible future Link and Place designations

'LINK AND PLACE' MATRIX

Link status levels \ Place status levels	Metropolitan	Regional	District	Neighbour hood	Local
Metropolitan	I-A	I-B	I-C	I-D	I-E
Regional	II-A	II-B	II-C	II-D	II-E
District	III-A	III-B	III-C	III-D	III-E
Neighbour hood	IV-A	IV-B	IV-C	IV-D	IV-E
Local	V-A	V-B	V-C	V-D	V-E

(Source: 'Link and Place: A Guide to Street Planning and Design', Jones, Boujenko and Marshall, 2007)

APPLICATION COLOUR GUIDE



The map opposite shows the potential future Link and Place status of the neighbourhood area.

The main opportunity, likely to transform the entire neighbourhood area, is the redevelopment of the John Shearer and Bianco sites into mixed-use medium density developments. This will present new opportunities for the Kilkenny area to activate some of the streets and there will be a new and emerging need for services and recreational opportunities within walking distances.

Given the current constraints of David Terrace, unless some of the freight traffic is relocated to an alternative route, it may not provide the best environment for attracting on-street pedestrian activation. Wlipena Terrace, however, is a much better candidate for a neighbourhood main street that may provide a quiet and enjoyable environment for social interaction. Recent revival of interest and expansion of cafes and eclectic shops along Queen Street nearby provides a precedence of the success that could be achieved here.

There are also significant opportunities in activating Kilkenny station area, as a result of possible redevelopments.

The recommended re-design priorities in the Kilkenny area therefore are:

- Transformation of Wilpena Terrace into a neighbourhood main street.
- Improving pedestrian and cyclist safety and provision along David Terrace.
- Slowing down traffic in residential streets and creating safer environments for on-street social interaction and local activities.
- Improving pedestrian and cycling connections to Wilpena Terrace, Port Road, Torrens Road and David Terrace.
- Improving train station environment.

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